

California Air Resources Board

**Public Hearing to Consider Amendments to the
Low Carbon Fuel Standard**

**Final Statement of Reasons for Rulemaking,
Including Summary of Comments and Agency
Response**

**Attachment 3 - Table 3
First 15-Day Comments**

*Public Hearing Date: November 8, 2024
Agenda Item No.: 24-6-2*

Comment Log Display

Here is the comment you selected to display.

Comment 1 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name Rich
Last Name Elam
Email Address relam@ucsd.edu

Affiliation

Subject Proposed Low Carbon Fuel Standard Amendments

Comment

001.1

As a retired Bio-science Researcher who has been a pro environment person reading and researching what needs to be done to stop Climate Change I am 100% in favor of any Reduced Carbon rules that can be enacted.
Also if California puts the new Rules in place We set the standard and create new clean energy jobs.
This is only good for the California Public.

Attachment

Original File Name

Date and Time Comment Was Submitted	2024-08-12 17:41:00
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Comment 2 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Bonita
Last Name	Lang
Email Address	Beelee1015@yahoo.com
Affiliation	
Subject	Air quality

002.1

Comment

Keep our air clean! Stop poluters @

Attachment**Original File Name****Date and Time Comment Was Submitted**

2024-08-12 17:58:14

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Comment 3 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Liam
Last Name	Harwyn
Email Address	liamharwyn@gmail.com
Affiliation	citizen
Subject	Lower Carbon in our atmosphere

Comment

003.1

Capturing carbon and reducing the release of carbon into our atmosphere is incredibly urgent and important for the survival of life on earth and for the air quality for all of us, but especially for those most at risk of developing lung cancers, such as infants, children and those with compromised immunity. The toxins released by climate-caused wildfires and loose carbon regulations pose a constant threat to the health of the public, our food and water sources. The new carbon regulations should place public health before private profits.

Attachment**Original File Name**

**Date and Time Comment Was
Submitted**

2024-08-13 06:26:18

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Comment 4 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Vincent
Last Name	Vandenbosch
Email Address	skitripvv@gmail.com
Affiliation	Air lines pilot
Subject	Clean Air Clean energy

Comment 004.1

Look up we have a huge clean energy source 24-7 work on capture and storage SUN & Done! I've been flying and have a Birds Eye view on what we humans are doing to our planet and environment and am personally disturbed.

Attachment

Original File Name

**Date and Time Comment Was
Submitted**

2024-08-13 08:33:39

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Comment 5 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Phil
Last Name	Moore
Email Address	topazes.08.hurdles@icloud.com
Affiliation	NGO
Subject	Exemption of Jet Fuel

Comment

005.1

I strongly protest to the continued exemption of jet fuel from LCFS obligation. Airlines have shown themselves time and time again to not act in any meaningful way to lower their carbon emissions. They speak out of both sides of their mouth, praising SAF and continually asking for more and more incentives, while quietly lobbying behind closed doors against any kind of obligation, whether at federal or state level. California has the opportunity to once again be a pioneer and leader in this area, and finally hold airlines to account through a minimum of equal treatment to all other fossil fuels. Airlines will only ever commit when all feel equal levels of responsibility of emissions reductions. We are not asking for a mandate, though that would be the more effective path as proven in Europe. We are simply asking for aviation to shoulder its fair share of obligation under LCFS, as gasoline and diesel have since the beginning. Anything short risks compromising the integrity of both California's climate leadership as well as the airlines' stated GHG reduction targets. The time for talking and cheap press releases is long past. The time for action is now and CARB can spark this into motion with a simple change to this exemption, ending the free carbon handout to the airline industry and catalyzing the sustainable aviation fuels industry anew

Attachment**Original File Name**

**Date and Time Comment Was
Submitted**

2024-08-13 16:21:31

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Comment 6 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Danny
Last Name	Tonasio
Email Address	datona5@gmail.com
Affiliation	
Subject	Volume standards for soy or canola oil

Comment

006.1

Hello, while I understand the goal of reducing emissions, the draconian edict of "arbitrarily" saying you must be producing in 2023 to have the ability to "wait" until 2028 to adjust your supply chain is illogical and very damaging to companies who have invested near billions to provide California with renewable fuels. Your decision to allow those who were producing in 2023 the ability to "wait" until January 2028 is a nod to common sense, but the deadline of "you have to have been producing in 2023 to get this accommodation is quite harmful to many not only producers of renewable fuels but of their suppliers who have contracts to furnish them with feedstocks. The goal of CARB (end result at least) is to incentivize foreign feedstocks, and punish North American companies.

006.2

The 2023 stipulation is harmful and should be removed to allow companies who did not produce in 2023 but are producing now, to be able to adjust in a timely, not harmful manner. Many plants were constructed to supply California with better fuels, yet encountered delays in being built during a very difficult supply chain situation over the last 4-5 years. I ask that you not punish them for an arbitrary deadline and treat them the same as those who have been producing in 2023 and prior it would be extremely harmful if you kept the proposal, but hardly damaging to the goals of CARB.

Thank you,
Danny Tonasio

Attachment

Original File Name

Date and Time Comment Was Submitted	2024-08-13 20:01:48
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Comment 7 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Andrea
Last Name	Carcovich
Email Address	shakelikemilk@hotmail.com
Affiliation	
Subject	CARB

Comment

Dear California Air Resources Board,

Your proposed amendments to California's Low Carbon Fuel Standard are a climate policy failure that backslides on the state's role as a climate leader. The program subsidizes combustion fuels to the tune of billions of dollars per year and has no place in our toolkit of climate policies for the 2020s. There is too much on the line for our climate to get this critical program so wrong.

Governor Newsom's budget proposes significant delays and cuts of hundreds of millions of dollars to vital zero-emission transportation programs, which makes it all the more urgent to use the Low Carbon Fuel Standard to more fully support zero-emissions transportation. Historically, California has thrown good money after bad, and devoted 80% of the LCFS's \$3 to 4 billion each and every year to combustion technology. It would be wild to allow these funds to continue to languish on the climate sidelines, instead of anchoring our transition to a zero-emissions future.

The world has changed a lot since the implementation of the LCFS in 2009. Unlike the 2000s, we have a north star goal for our climate and the air we breathe: zero emissions transportation. Continuing to invest the billions in revenue from the LCFS into harmful and polluting biofuels that end up combusted, instead of electric vehicles powered by clean energy, hampers our efforts to fight the climate crisis while enriching oil companies and industrial agriculture.

007.3

I urge you to correct your course and modernize the program by reflecting your consensus that the only way to meet air quality standards is through eliminating combustion altogether, not piling on billions of dollars in lavish incentives for combustion each and every year. By focusing on real air pollution solutions, you could add a clean air multiplier to the credits system, especially for public fleets that transport many people at once, would deliver major benefits for California's air quality and throw a lifeline to cash-strapped transit agencies that low-income Californians depend on for mobility.

California cannot meet our clean air and climate goals without harnessing the power of the Low Carbon Fuel Standard and overhauling this multibillion-dollar program for our zero emissions future. Please act expeditiously to reform the program to achieve our state's ambitious goals.

Sincerely,
Andrea Carcovich

Attachment

Original File Name

Date and Time Comment Was Submitted	2024-08-14 15:32:54
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Comment 8 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Scott
Last Name	Nelson
Email Address	play@kiteisland.com
Affiliation	
Subject	Proposed Low Carbon Fuel Standard Amendments (lcfs2024)
008.1 Comment	<div>reduce all pollution levels in California .</div>
Attachment	
Original File Name	
Date and Time Comment Was Submitted	2024-08-15 09:32:04

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Comment 9 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Stewart
Last Name	Hughes
Email Address	sohughes@heartofiowa.net
Affiliation	
Subject	Used Cooking Oil vs soybean oil in renewable diesel
Comment	<div>just some comments on proposed changes in renewable diesel feedstocks</div>
Attachment	www.arb.ca.gov/lists/com-attach/7102-lcfs2024-AGNWMVEiBzZWDwhk.docx
Original File Name	CARB letter.docx
Date and Time Comment Was Submitted	2024-08-19 10:50:29

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To start I will disclose I am in the business of consulting farmers on cash grain sales, commodity brokerage and crop insurance sales. Obviously I have a bias to support agriculture and any policies that encourage demand of agricultural products.

I read recently the California Air Resources Board wants to limit virgin soybean oil as a feedstock for renewable diesel production to 20%, I assume by volume. I don't know how that level was decided on or if the volume of renewable diesel to be refined and the amount feedstocks available make that possible. That's a problem I have with any mandate as many times the mandate doesn't always work in reality. I assume the 20% threshold can be adjusted to fit actual conditions.

009.1 Used Cooking Oil started as virgin oil, so I am curious about the rationale to limit virgin soybean oil volume to 20%. The requirement of proof any soybeans or canola used in oil production were grown before 2008 is puzzling. I would be interested to know why that restriction is being sought. It appears to be a subtle way to say CARB wants no domestically produced oil used in renewable diesel in California. We just don't store oilseeds for 15 years.

009.2 I am not opposed to refining used cooking oil for renewable diesel, it is better than dumping it down a drain or ending up in a landfill. It is an issue with Congress (namely the Inflation Reduction Act) allowing Used Cooking Oil to be IMPORTED from other countries, refined and issuing a \$1.00 to \$1.75 per gallon tax credit (depending on use) to the refiner and or the blender. However I do think CARB can be proactive and discourage importation of UCO that ultimately generates a tax credit. That is a job for Congress and I will let my representatives know my thoughts on the situation.

009.3 Importing UCO but not allowing the tax credit to the blender and or refiner is an acceptable compromise in my opinion. But I understand that is the job of Congress, not CARB. I just don't see why we are allowing any FOREIGN waste product to take precedence over home grown feedstocks for a great fuel source like renewable diesel. I believe UCO imports in 2022 in to the US were around 200 million pounds and last year were around 3 billion pounds. UCO could contain palm oil which is a major issue.

Thank you for your time and I hope I was able to convey my thoughts on this subject in a good manner. I just would like to see CARB take actions that put domestic energy production at the top of the list.

Sincerely,

Stewart Hughes

Conrad, IA

Comment Log Display

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Comment 10 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Ellen
Last Name	Koivisto
Email Address	offstage@earthlink.net
Affiliation	
Subject	"Low" carbon?? Seriously? Gotta be lower than that, now!

Comment

010.1

* The proposal to remove credits for hydrogen produced from fossil fuels is a positive step. But delaying implementation of this measure until 2030 means production of hydrogen from fossil fuels will continue to receive financial rewards for another five-plus years, thus incentivizing the harm we should be preventing.

010.2

* Biofuels produced from virgin soy or canola oil have major negative consequences, including deforestation, and incentivizing industrial agriculture that generates large amounts of greenhouse gas and other pollution, and drives up food prices. The proposed revision acknowledges such problems, but continues to provide credits for the production of biofuels that include up to 20 percent from these destructive sources. And even this weak restraint will not take effect until 2028. Environmental justice advocates have repeatedly called instead for caps on vegetable-oil based biofuels.

010.3

* The proposed draft continues to provide credits for industrial dairy "biogas." This financial support continues to incentivize the expansion of large-scale factory dairy farms, causing serious harm to the health of surrounding communities, increasing the greenhouse gases and pollution generated by the production of feed for cows confined to barns; concentrated methane emitted by pools of waste; the inevitable leakage of methane during storage and transportation; and greenhouse gas emissions produced by combustion of the product. We urge CARB to phase out support for biomethane as rapidly as possible.

010.4

* Unlike previous versions of the LCFS, the new proposal does not require airlines to take any responsibility for the combustion of

fossil jet fuel, even for intrastate travel. This is a step backward, excluding a major source of greenhouse gases and pollution from fossil fuel combustion.

Fix it. Now.

Attachment

Original File Name

**Date and Time Comment Was
Submitted**

2024-08-19 17:30:24

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Comment for Proposed Low Carbon Fuel Standard Amendments (lcfs2024)
- 15-1.

First Name	John
Last Name	Oda
Email Address	Jandjoda@aol.com
Affiliation	
Subject	Fix low carbon fuel program

010a.1 Comment

The proposal to remove credits for hydrogen produced from fossil fuels is a positive step. But delaying implementation of this measure until 2030 means production of hydrogen from fossil fuels will continue to receive financial rewards for another five-plus years, thus incentivizing the harm we should be preventing.

010a.2

* Biofuels produced from virgin soy or canola oil have major negative consequences, including deforestation, and incentivizing industrial agriculture that generates large amounts of greenhouse gas and other pollution, and drives up food prices. The proposed revision acknowledges such problems, but continues to provide credits for the production of biofuels that include up to 20 percent from these destructive sources. And even this weak restraint will not take effect until 2028. Environmental justice advocates have repeatedly called instead for caps on vegetable-oil based biofuels.

010a.3

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010a.4

* Unlike previous versions of the LCFS, the new proposal does not require airlines to take any responsibility for the combustion of

fossil jet fuel, even for intrastate travel. This is a step backward, excluding a major source of greenhouse gases and pollution from fossil fuel combustion.

Attachment

Original File Name

Date and Time Comment Was Submitted 2024-08-20 01:01:55

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Comment for Proposed Low Carbon Fuel Standard Amendments (lcfs2024)
- 15-1.

First Name	Mary
Last Name	Flanagan
Email Address	tomaryflanagan@gmail.com
Affiliation	
Subject	Reform the Low Carbon Fuel Standard

Comment

The California Air Resources Board's proposed update to the Low Carbon Fuel Standard doesn't go far enough. Despite persistent opposition from the environmental justice community, it continues those parts of the program that provide financial support for harmful practices, such as biofuel produced from virgin soy and canola oil, and factory farm production of "biomethane."

010b.1

* The proposal to remove credits for hydrogen produced from fossil fuels is a positive step. But delaying implementation of this measure until 2030 means production of hydrogen from fossil fuels will continue to receive financial rewards for another five-plus years, thus incentivizing the harm we should be preventing.

010b.2

* Biofuels produced from virgin soy or canola oil have major negative consequences, including deforestation, and incentivizing industrial agriculture that generates large amounts of greenhouse gas and other pollution, and drives up food prices. The proposed revision acknowledges such problems, but continues to provide credits for the production of biofuels that include up to 20 percent from these destructive sources. And even this weak restraint will not take effect until 2028. Environmental justice advocates have repeatedly called instead for caps on vegetable-oil based biofuels.

010b.3

* The proposed draft continues to provide credits for industrial dairy "biogas." This financial support continues to incentivize the expansion of large-scale factory dairy farms, causing serious harm to the health of surrounding communities, increasing the greenhouse gases and pollution generated by the production of feed for cows confined to barns; concentrated methane emitted by pools

010b.4

of waste; the inevitable leakage of methane during storage and transportation; and greenhouse gas emissions produced by combustion of the product. We urge CARB to phase out support for biomethane as rapidly as possible.

* Unlike previous versions of the LCFS, the new proposal does not require airlines to take any responsibility for the combustion of fossil jet fuel, even for intrastate travel. This is a step backward, excluding a major source of greenhouse gases and pollution from fossil fuel combustion.

In short, the Low Carbon Fuel Standards need to be further revised.

Sincerely,
Mary Flanagan

Attachment

Original File Name

Date and Time Comment Was
Submitted

2024-08-21 17:02:13

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Comment 11 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Ben
Last Name	Keller
Email Address	benk@sonic.net
Affiliation	
Subject	Strengthen climate protections to fix LCFS

Comment

011.1

011.2

011.3

011.4

The latest proposed LCFS revision does not go far enough to reform the program. CARB should phase out support for vegetable-oil-based biofuels produced from virgin oil, since the expansion of agricultural lands for biofuel production has large negative climate impacts. CARB must phase out support for biomethane, which is propping up the expansion of polluting factory farms. And the latest proposal leaves airlines off the hook for combustion of jet fuel.

Accounting tricks aside, the lowest-carbon fuel is clean zero-emission electricity. Ultimately, CARB should phase out subsidies for fuels that do not meet this high standard.

Attachment**Original File Name**

**Date and Time Comment Was
Submitted**

2024-08-19 20:59:03

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Comment 12 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Laura
Last Name	Haider
Email Address	lauragreen.rosenberger@gmail.com
Affiliation	Fresnans Against Fracking
Subject	Low Carbon Fuel Standard and AB 617

Comment

Airplanes should be responsible for their emissions and air pollution even if they use low carbon fuels because there are several disadvantaged communities near airports including in Sacramento. Low carbon fuels produced from some crops are energy intensive to grow and/or transport. Then, less land to grow food would cause Californians to import more food on diesel ships and planes.

Attachment

Original File Name

Date and Time Comment Was Submitted 2024-08-20 23:01:02

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Comment 13 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Dennis
Last Name	Albani
Email Address	DAlbani@caladvocates.com
Affiliation	
Subject	Board Member Eisenhut - Posted by Clerk on Commenter's Behalf
Comment	Please see attached.
Attachment	www.arb.ca.gov/lists/com-attach/7107-lcfs2024-UzVVJFcJAAwKbgBv.pdf
Original File Name	FW_ Board Member Eisenhut_Docket.pdf
Date and Time Comment Was Submitted	2024-08-21 09:23:59

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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From: Dennis Albiani <DALbiani@caladvocates.com>

Sent: Friday, August 16, 2024 3:18 PM

To: [REDACTED]

Subject: Board Member Eisenhut

[REDACTED] I was able to connect with Member Eisenhut this morning on the LCFS regulation. Since the regulation is out and in a 15 day comment period, he wanted to make sure the ex parte rules were followed. Below is what I shared with him:

I shared this section of the regulation:

4. With the proposed addition of subsection 95482(i), staff is proposing to provide credits for biomass-based diesel produced from virgin soybean oil and canola oil for up to 20 percent of annual biomass-based diesel reported on a company-wide basis. Biomassbased diesel from virgin soybean and canola oil in excess of 20 percent will be assessed the carbon intensity of the applicable diesel pool benchmark for that year, or the certified carbon intensity of the applicable fuel pathway; whichever is higher. California currently leads the nation in ZEV sales and stocks. As auto manufacturers comply with increasing ZEV sales requirements and as California prioritizes waste feedstocks and advanced decarbonization technologies, the State must ensure that other regions are able to also access increasing volumes of low-carbon alternative fuels. California expects that overall diesel demand will decline in the State over the coming decades due to the State's portfolio of ZEV and clean fuel policies. This proposed addition allows for California to displace up to 100% of the

State's current fossil diesel demand with cleaner alternative diesel. The proposed addition also avoids sending a long-term signal for virgin soy or canola oil to serve California demand. **For companies that already have a certified fuel pathway prior to the effective date of the amendments and for which the percentage of biomass-based diesel produced from virgin soybean oil or canola oil was greater than 20 percent of combined reported biodiesel and renewable diesel quantities for that company's 2023 LCFS reporting, this provision would take effect starting January 1, 2028, to provide time to adjust feedstock supply contracts as needed. All other companies would be subject to this requirement upon the effective date of the amended regulation.**

013.1

With the concerns on the last sentence that the date and requiring a "certified fuel pathway" essentially meant that businesses had to be in production no later than mid 2022, cuts out many entities that have initiated production since 2022.

I welcome the opportunity to complete a form or whatever other formalities need to be completed. Please let me know. Thanks.

Dennis Albiani, President

[California Advocates](https://caladvocates.org)

DAlbiani@caladvocates.com

(916) 441-5050 (o)

(916) 799-7564 (m)

(916) 441-4849 (f)



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Comment 14 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	David
Last Name	Gassman
Email Address	dfgassman@aol.com
Affiliation	
Subject	Biofuels

Comment

014.1

Biofuels produced from virgin soy or canola oil have major negative consequences, including deforestation, and incentivizing industrial agriculture that generates large amounts of greenhouse gas and other pollution, and drives up food prices. The proposed revision acknowledges such problems, but continues to provide credits for the production of biofuels that include up to 20 percent from these destructive sources. And even this weak restraint will not take effect until 2028. Environmental justice advocates have repeatedly called instead for caps on vegetable-oil based biofuels.

Attachment**Original File Name**

**Date and Time Comment Was
Submitted**

2024-08-21 10:45:08

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Comment 15 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Michael
Last Name	Daley
Email Address	mdaley@carbonsolutionsgroup.com
Affiliation	CSG
Subject	CSG Comments on LCFS 15-Day Changes
Comment	See attached for CSG's comments on the 15-Day Changes. Thank you.
Attachment	www.arb.ca.gov/lists/com-attach/7288-lcfs2024-UjFVIARiVFhRNARr.pdf
Original File Name	CSG Comments on LCFS 15-Day Changes.pdf
Date and Time Comment Was Submitted	2024-08-21 13:06:05

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August 21st, 2024

To the California Air Resources Board (CARB):

We write in strong support of CARB's Low Carbon Fuel Standard (LCFS) and appreciate the opportunity to participate in the rulemaking process for this groundbreaking program.

By way of background, Carbon Solutions Group (CSG) is a developer of EV charging infrastructure and an aggregator of environmental attributes. In California, CSG has developed ~230 DCFC and L2 charging ports, which represent roughly 3,000 kW. CSG is developing another 220 charging ports over the next two years in California, which will, in total, represent 10,000 kW.

CSG previously commented upon CARB's proposed LCFS amendments in February and May 2024. In this letter, CSG offers comment on an aspect of the "15-Day Changes"—the topic of widening the scope of base credit participation. Specifically, CSG stresses the critical need for EV charging infrastructure owner-operators (EVSPs) to participate in LCFS base credit generation for multi-unit developments (MUDs).

MUDs are an important sub-section of the residential market due to the relative driver-density per square-foot and the socio-economic plurality of its residents. For example, 38.9% of all residential units in California qualify as "attached units," which amounts to over 4,750,000 attached units in total.¹ More so, over 50% of new builds in California are MUDs, with the overwhelming majority of that figure being composed of structures of five units or more. As such, MUDs represent both a substantial portion of largely unaddressed EV demand, as well as a scalable means of reaching California's climate goals, such as the Advanced Clean Cars II (ACC II) rule. Indeed, ACC II is unachievable without incentivizing the MUD-residing portion of the population.

Furthermore, as noted in CSG's previous public comment letters, single-family homeownership has become cost-prohibitive for many Californians. A communal charging option at MUDs can offer an opportunity for low-to-middle income drivers to adopt EVs with greater ease, thereby addressing important social equity objectives.

However, MUDs—especially retrofit scenarios—present a series of unique challenges that are largely unsupported by any state-level incentive program or subsidy. Furthermore, it should be noted that retrofits make up a substantial part of overall demand. Of the total number of residential structures in California, older structures (44 years or older) comprise 70%.

¹ "California Housing Statistics." June 5, 2020. Accessed via:
<<https://www.infoplease.com/us/census/california/housing-statistics>>

Demand for an on-site MUD charging option is abundant among prospective EV drivers. As various studies have shown, EV drivers prefer to charge at home. For example, December 2023 AutoPacific data reports:

70% of surveyed respondents who currently reside in a condo complex, and 67% of those who live in an apartment building, either intend to purchase, or will consider purchasing an EV in the near future, compared to 63% of those who own a single-family home. At the current time, however, relatively few apartments and condos offer onsite charging for residents, meaning most of these EV considerers will have to be reliant on public charging, which is less convenient and generally much more expensive than charging at home.

42% of all EV rejectors cite lack of a place to charge at home or work is a reason why they don't want an EV, ranking 3rd in their list of rejection reasons. [...] AutoPacific's data also show that the vast majority, 79%, of EV owners who live in an apartment or condo actually do have EV charging available to them where they live. This strongly suggests that most EV considerers who live in an apartment or condo won't make the switch to electric unless their property managers install EV charging on site.²

015.1 Cont

When it comes to a potential EV charging retrofit, oftentimes, the process starts with residents themselves: would-be EV drivers residing at an MUD express desire for on-site charging. In response, an MUD owner will reach out to CSG, or another EVSP, in order to execute an installation.

Yet, while there is demand from residents and will from the property owner, a series of logistical and financial challenges quickly emerge that often sink any hopes of the installation of EV charging infrastructure at the MUD.

Firstly, most older MUDs have implicit electrical capacity constraints. Increasing capacity alone sometimes requires significant financial investment. Cascading costs usually follow as well. The location of parking spaces is not necessarily close to an electrical room, for example. In turn, structural alterations are often required, driving up costs further. These construction and electric costs obviously precede the actual cost of installation itself. Thus, the financial outlay for an MUD usually ends up being too burdensome to pursue. CSG's experience and analysis indicate that the total cost to install charging infrastructure in an MUD can range from \$5,000 to \$25,000 *per L2 charger*.

While HOAs do have budgets for upgrades, older buildings rarely, if ever, have "EV charging" as a line item in that budget. Therefore, there is no "in-house" capital to allocate for an EV charging retrofit. Likewise, there is often times no utility incentive program or rebate program to facilitate the installation of EV charging in MUDs. And while an MUD could feasibly participate in incremental LCFS credits, these fractional credits are insufficient to reduce costs to a level that will result in the execution of an installation, particularly in a retrofit scenario.

² AutoPacific, "EVs Have Greater Appeal to Apartment and Condo Residents than Homeowners." December 12, 2023. Accessed via: <<https://www.autopacific.com/autopacific-insights/2023/12/12/evs-have-greater-appeal-to-apartment-and-condo-residents-than-homeowners>>

These challenges are manifest before even considering the costs of the EVSP, such as the need to cover the capital costs of installation and the operational costs of running the charging stations. Part of this cost recovery process involves a markup on electricity, which of course has its ceiling, beyond which no resident-driver is willing to pay.

015.1 Cont In short, MUD residents are not buying EVs because there is no on-site EV charging option at home. Conversely, MUD owners presently lack the financial incentive to take the risk to install EV charging optionality on-site. As such, a substantial portion of California's transportation pool remains unconverted to EVs, resulting in a massive obstacle towards reaching California's climate goals. This supply-demand disparity is another example of the chicken-or-the-egg dilemma that has beleaguered EV adoption overall. However, with groundbreaking programs like LCFS, that dilemma has been minimized in certain sectors of the overall transportation pool. It is CSG's hope that the MUD sector can likewise be incentivized successfully.

Therefore, CSG respectfully asks CARB to consider allowing EVSPs / property owners to participate in base credits *and* incremental credits for residences qualifying as MUDs. Materially, these credits would be generated from communal L2 chargers that are accessible to any resident or guest of the MUD. This base credit participation would help balance the financial risk that EVSPs and property owners undertake each time an MUD decides to install EV charging infrastructure.

The above comments are offered in light of CARB's ongoing expertise, diligence, and efforts to optimize California's LCFS. We thank you for your vision and ethic, and remain, as ever, proud participants of this historic program.

Best Regards,

Michael Daley
Director of Policy & Government Affairs
Carbon Solutions Group
mdaley@carbonsolutionsgroup.com

Comment Log Display

Here is the comment you selected to display.

Comment 16 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Eduardo ("Eddie")
Last Name	Angeles
Email Address	eduardo.angeles@aa.com
Affiliation	American Airlines
Subject	Support for the Proposed LCFS Amendments
Comment	Please see attached letter.
Attachment	www.arb.ca.gov/lists/com-attach/7290-lcfs2024-BnVVJgZ3VHcKYwh6.pdf
Original File Name	Support Ltr CARB LCFS Proposal.pdf
Date and Time Comment Was Submitted	2024-08-21 16:54:08

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

August 21, 2024

Clerks' Office
California Air Resources Board
1001 I Street
Sacramento, California 95814

Re: Support for California Air Resources Board Proposal to Retain Jet Fuel Exemption in Low Carbon Fuel Standard Program

In response to the revised Proposed Low Carbon Fuel Standard Amendments posted August 12th, 2024, we are writing to share our support for the recent California Air Resources Board (CARB) proposal to retain the jet fuel exemption under its Low Carb Fuel Standard (LCFS) Program. American Airlines supports the withdrawal of the proposal to eliminate the jet fuel exemption and retain the existing opt-in approach for SAF under the CARB LCFS Program.

016.1

American Airlines is committed to reducing its climate impact and achieving net zero carbon emissions by 2050, and transitioning to SAF is core to this commitment. We have long recognized that scaling up the supply of SAF and achieving net-zero carbon emissions by 2050 can only happen by working collaboratively with governments and other stakeholders across sectors. Achieving this ambition for SAF will require new and additional policy incentives, streamlined permitting processes, and close collaboration among governments, the aviation industry, the fuels industry, environmental organizations and others.

Aviation accounts for 2.6% of the U.S. greenhouse gas emissions but 5% of U.S. Gross Domestic Product (GDP) and 4.1% of California's GDP, thus exerting outsize economic impact relative to its share of emissions. U.S. civil aviation firms employ more than 380,000 California-based employees, with an overall economic impact of \$194 billion.¹ Aviation is critical to driving California's economy and its rank as the 5th largest economy in the world, enabling \$114 billion in annual trade flows and underpinning many of California's other significant economic drivers such as agriculture, tourism, manufacturing, banking, technology, and small business.

California has established itself as an early leader in attracting investment, production, and use of SAF through the existing LCFS Program, which provides an opt-in credit for SAF that helps reduce the price difference between SAF and conventional jet fuel. Ensuring a healthy and vibrant aviation industry is essential to California's future, and leveraging CARB's early leadership on SAF can enable California leadership in the emerging SAF production industry, creating new jobs and economic development opportunities.

The primary impediment to increased SAF production and availability in California remains the higher cost of SAF for producers and buyers relative to conventional jet fuel and renewable diesel. Whether or not jet fuel becomes a deficit generating fuel has no direct impact on whether SAF is produced or used.

¹ [The Economic Impact of Civil Aviation on the U.S. Economy, State Supplement, US Department of Transportation, November 2020](#)

Our mutual interest is to increase SAF production, availability, and use, and the most effective way to accomplish this is to continue the positive, collaborative approach represented by the existing “opt-in” mechanism developed by CARB and the aviation community. We support CARB’s decision to withdraw the proposal to remove the exemption for jet fuel for intrastate flights, preserve the existing opt-in approach for SAF. We look forward to the opportunity to work with CARB and other stakeholders across the SAF ecosystem to explore solutions which build on the existing opt-in model of the LCFS Program. We recommend that CARB establish a joint CARB-industry working group with stakeholders across the emerging SAF ecosystem to explore alternative policy and voluntary proposals to rapidly increase SAF production, availability and use in California. We look forward to working with CARB on such measures to accelerate SAF deployment.

Yours truly,

Eduardo A. Angeles

Eduardo A. Angeles
Director, State & Local Government Affairs

Comment Log Display

Here is the comment you selected to display.

Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Joey
Last Name	Airoso
Email Address	communications@maasenergy.com
Affiliation	
Subject	Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment	Please see attached.
Attachment	www.arb.ca.gov/lists/com-attach/7292-lcfs2024-B2QFagFyWWIQOIM2.docx
Original File Name	Circle A Dairy.docx

**Date and Time Comment Was
Submitted**

2024-08-23 07:34:41

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

VIA ELECTRONIC SUBMISSION

August 23, 2024

The Honorable Liane Randolph

Chair, California Air Resources Board

P.O. Box 2815 Sacramento, CA 95812

Via electronic submission

Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation

Dear Chair Randolph:

I am a California dairy farmer.

Based in large part on the new market for dairy biogas that was created by the CARB LCFS program, I agreed to build a digester on my dairy. We have been online since 2018, and our pathway application was approved in 2020, with the understanding that our digester could participate in the market for up to 30 years.

Now, after I made this commitment and the digester investment is irrevocable, CARB is changing the LCFS rules so that my dairy can claim avoided methane benefits for no more than 20 years, meaning that I have only 16 years left to operate this digester. So CARB is taking 10 years of profitability away after I have already made the investment.

Unless CARB restores the 30-year eligibility, I expect we and our industry partners will immediately freeze or cancel all future investments in the digester, including additional manure collection, biogas capacity upgrades, solar power supply, CO2 sequestration, additional manure treatment to reduce methane slip - or any other improvements - whose return is now at risk.

Please act immediately to restore our faith that it is safe to invest in renewable energy in California.

Sincerely,

Joey Airoso

Circle A Dairy

017.1

Form Letter 1 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name: Rick

Last Name: Gorzeman

Email Address: communications@maasenergy.com

Affiliation: Cornerstone Dairy

Subject: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see attached.

Attachment: www.arb.ca.gov/lists/com-attach/7293-lcfs2024-VTZcNVUmU25SMVIg.pdf

Original File Name: Cornerstone Dairy - PDF.pdf

Date and Time Comment Was Submitted: 2024-08-23 07:39:48

Form Letter 2 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name: Willem

Last Name: De Boer

Email Address: communications@maasenergy.com

Affiliation: De Boer Dairy

Subject: Re: 15-day Comment Period

Comment:

Please see the attached letter.

Attachment: www.arb.ca.gov/lists/com-attach/7294-lcfs2024-Wz9dPgRaAzJWPwht.pdf

Original File Name: De Boer Dairy - PDF.pdf

Date and Time Comment Was Submitted: 2024-08-23 07:45:50

Form Letter 3 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Doug

Last Name: Brunner

Email Address: communications@maasenergy.com

Affiliation: De Jager South Dairy

Subject: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see attached letter.

Attachment: www.arb.ca.gov/lists/com-attach/7295-lcfs2024-Wz9VNlcJU2pWMVI1.pdf

Original File Name: De Jager South Dairy - PDF.pdf

Date and Time Comment Was Submitted: 2024-08-23 07:48:47

Form Letter 4 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Richard and Eric

Last Name: Westra

Email Address: communications@maasenergy.com

Affiliation: Decade Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see the attached letter.

Attachment: www.arb.ca.gov/lists/com-attach/7296-lcfs2024-AGRUN1AyV2UDYQZj.pdf

Original File Name: Decade Dairy - PDF.pdf

Date and Time Comment Was Submitted: 2024-08-23 07:53:33

Form Letter 5 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Bernard and Adam

Last Name: TeVelde

Email Address: communications@maasenergy.com

Affiliation: Dixie Creek Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see the comments in the attached letter.

Attachment: www.arb.ca.gov/lists/com-attach/7297-lcfs2024-UzdTPFMqUGoDYFIN.pdf

Original File Name: Dixie Creek - PDF.pdf

Date and Time Comment Was Submitted: 2024-08-23 08:12:45

Form Letter 6 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Mike and Sybrand

Last Name: Vander Dussen

Email Address: communications@maasenergy.com

Affiliation: Double Diamond Dairy

Subject: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see comments in letter.

Attachment: www.arb.ca.gov/lists/com-attach/7298-lcfs2024-B2NTOgN3U2JSOFUw.pdf

Original File Name: Double Diamond Dairy - PDF.pdf

Date and Time Comment Was Submitted: 2024-08-23 08:19:40

Form Letter 7 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Greg

Last Name: Fernandes

Email Address: communications@maasenergy.com

Affiliation: Fern Oaks Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see comments in letter.

Attachment: www.arb.ca.gov/lists/com-attach/7299-lcfs2024-UTdSMQd0BThWD1I9.pdf

Original File Name: Fern Oaks Dairy - PDF.pdf

Date and Time Comment Was Submitted: 2024-08-23 08:24:57

Form Letter 8 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Case Sr. and Case Jr

Last Name: Vyfhuizen

Email Address: communications@maasenergy.com

Affiliation: Five H Farms

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see comments in the letter.

Attachment: www.arb.ca.gov/lists/com-attach/7301-lcfs2024-B2FVOlcgBDIKU1I6.pdf

Original File Name: Five H Farms - PDF.pdf

Date and Time Comment Was Submitted: 2024-08-23 09:09:56

Form Letter 9 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Frank

Last Name: Mendonsa

Email Address: eileen@maasenergy.com

Affiliation: FM Jerseys Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see attached letter.

Attachment: www.arb.ca.gov/lists/com-attach/7302-lcfs2024-VTMGbVULUmtWNVAi.pdf

Original File Name: FM Jerseys Dairy - PDF.pdf

Date and Time Comment Was Submitted: 2024-08-23 09:15:32

Form Letter 10 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Steve

Last Name: Hettinga

Email Address: communications@maasenergy.com

Affiliation: Hettinga Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see the letter attached for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7303-lcfs2024-AGhXNFYjV3AAbwVr.pdf

Original File Name: Hettinga Dairy - PDF.pdf

Date and Time Comment Was Submitted: 2024-08-23 09:19:59

Form Letter 11 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Frank and Tony

Last Name: Homen

Email Address: eileen@maasenergy.com

Affiliation: Homen Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see the letter attached for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7304-lcfs2024-AWlQOVY6UWdROVQL.pdf

Original File Name: Homen Dairy- PDF.pdf

Date and Time Comment Was Submitted: 2024-08-23 09:27:50

Form Letter 12 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Jim

Last Name: Wilson

Email Address: communications@maasenergy.com

Affiliation: J&D Wilson & Sons

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see the letter attached for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7307-lcfs2024-WjBTCgBlWFQLeglg.pdf

Original File Name: J&D Wilson & Sons - pdf.pdf

Date and Time Comment Was Submitted: 2024-08-23 10:58:08

Form Letter 13 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Mike and Manny

Last Name: Monteiro

Email Address: communications@maasenergy.com

Affiliation: Lakeside Energy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see the attachment for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7308-lcfs2024-WjYAZwZsUmQEcQNq.pdf

Original File Name: Lakeside Energy - PDF.pdf

Date and Time Comment Was Submitted: 2024-08-23 11:01:18

Form Letter 14 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Anthony

Last Name: Gorzeman

Email Address: communications@maasenergy.com

Affiliation: Little Rock Centralized Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see comments in attachment.

Attachment: www.arb.ca.gov/lists/com-attach/7309-lcfs2024-AW1TPAB1BCMFb1cy.pdf

Original File Name: Little Rock Centralized Dairy.pdf

Date and Time Comment Was Submitted: 2024-08-23 11:03:47

Form Letter 15 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Bernard and Alex

Last Name: TeVelde

Email Address: communications@maasenergy.com

Affiliation: Lone Oak 1 Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see comments attached.

Attachment: www.arb.ca.gov/lists/com-attach/7310-lcfs2024-WzdSO10yBTMAWVQ7.pdf

Original File Name: Lone Oak 1 Dairy - PDF.pdf

Date and Time Comment Was Submitted: 2024-08-23 11:08:20

Form Letter 16 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Bernard

Last Name: TeVelde

Email Address: communications@maasenergy.com

Affiliation: Lone Oak 2 Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see comments attached.

Attachment: www.arb.ca.gov/lists/com-attach/7311-lcfs2024-UT0GbwZpBDIAWQNs.pdf

Original File Name: Lone Oak 2.pdf

Date and Time Comment Was Submitted: 2024-08-23 11:10:57

Form Letter 17 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Larry

Last Name: Meirinho

Email Address: communications@maasenergy.com

Affiliation: Meirinho Holsteins Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

See attachment for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7312-lcfs2024-BmtdPgBoByYHaFI8.pdf

Original File Name: Meirinho Holsteins Dairy.pdf

Date and Time Comment Was Submitted: 2024-08-23 11:12:46

Form Letter 18 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Fred and Aiden

Last Name: Melo

Email Address: communications@maasenergy.com

Affiliation: Melo Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see comments in letter.

Attachment: www.arb.ca.gov/lists/com-attach/7313-lcfs2024-VzpXNARpUW0AWQVh.pdf

Original File Name: Melo Dairy.pdf

Date and Time Comment Was Submitted: 2024-08-23 11:16:39

Form Letter 19 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Arlin

Last Name: VanGroningen

Email Address: communications@maasenergy.com

Affiliation: New Hope Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see attached letter.

Attachment: www.arb.ca.gov/lists/com-attach/7314-lcfs2024-Uz0GZVIkBAgBbwdo.pdf

Original File Name: New Hope Dairy.pdf

Date and Time Comment Was Submitted: 2024-08-23 11:18:14

Form Letter 20 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Joe and Cory

Last Name: DeHoog

Email Address: communications@maasenergy.com

Affiliation: Oak View Creek Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see attached letter for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7315-lcfs2024-UD9QN1Q+WVUEdAlg.pdf

Original File Name: Oak View Dairy.pdf

Date and Time Comment Was Submitted: 2024-08-23 11:20:34

Form Letter 21 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Eric

Last Name: te Velde

Email Address: communications@maasenergy.com

Affiliation: Open Sky Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see attachment for comment.

Attachment: www.arb.ca.gov/lists/com-attach/7316-lcfs2024-VTpRJ1YyAj9QCQR3.pdf

Original File Name: Open Sky Dairy.pdf

Date and Time Comment Was Submitted: 2024-08-23 11:23:42

Form Letter 22 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Josh and Charlene

Last Name: Williams

Email Address: communications@maasenergy.com

Affiliation: Pixley Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

See attachment for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7317-lcfs2024-AnJSPQF4Aj1XNAV8.pdf

Original File Name: Pixley Dairy.pdf

Date and Time Comment Was Submitted: 2024-08-23 11:28:10

Form Letter 23 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Case

Last Name: Anker

Email Address: communications@maasenergy.com

Affiliation: Poplar Lane Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

See attachment for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7318-lcfs2024-VCRQOVwtAj0KbQBy.pdf

Original File Name: Poplar Lane Dairy.pdf

Date and Time Comment Was Submitted: 2024-08-23 11:34:21

Form Letter 24 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: JackeJong and Jacob

Last Name: DeJong

Email Address: communications@maasenergy.com

Affiliation: River Ranch Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see comments in the attached document.

Attachment: www.arb.ca.gov/lists/com-attach/7319-lcfs2024-AnBSPV0qU2UGcghX.pdf

Original File Name: River Ranch.pdf

Date and Time Comment Was Submitted: 2024-08-23 11:36:23

Form Letter 25 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Randy

Last Name: Gorzeman

Email Address: communications@maasenergy.com

Affiliation: Riverview Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

See letter for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7320-lcfs2024-B3UHhAZxAzUCdIIk.pdf

Original File Name: Riverview dairy.pdf

Date and Time Comment Was Submitted: 2024-08-23 11:38:56

Form Letter 26 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Bob

Last Name: Vander Eyk

Email Address: communications@maasenergy.com

Affiliation: Robert Vander Eyk Dairy

Subject: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see comments in letter.

Attachment: www.arb.ca.gov/lists/com-attach/7321-lcfs2024-USNXPIEyAzUKfgVx.pdf

Original File Name: Robert Vander Eyk Dairy.pdf

Date and Time Comment Was Submitted: 2024-08-23 11:43:03

Form Letter 27 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Nick Anker and Rocky
Last Name: Nick Anker and Rocky
Email Address: communications@maasenergy.com
Affiliation: Rockshar Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see comments in the letter attached.

Attachment:

Original File Name: Rockshar Dairy.pdf

Date and Time Comment Was Submitted: 2024-08-23 11:46:21

Form Letter 28 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Garret

Last Name: TeVelde

Email Address: communications@maasenergy.com

Affiliation: Stillwater Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

See attached document for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7323-lcfs2024-B3RUJII6BDsEbgF2.pdf

Original File Name: Stillwater dairy.pdf

Date and Time Comment Was Submitted: 2024-08-23 11:52:24

Form Letter 29 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Jeff

Last Name: Troost

Email Address: communications@maasenergy.com

Affiliation: Troost Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see attached document for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7324-lcfs2024-BXECdII8Um5VIAh8.pdf

Original File Name: Troost Dairy.pdf

Date and Time Comment Was Submitted: 2024-08-23 11:54:57

Form Letter 30 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Henry & Hans

Last Name: Van der Hoek

Email Address: communications@maasenergy.com

Affiliation: Van der Hoek Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see the letter attached for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7325-lcfs2024-UiRQNwFuWFRVNwJn.pdf

Original File Name: Van der Hoek.pdf

Date and Time Comment Was Submitted: 2024-08-23 12:01:00

Form Letter 31 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Daniel

Last Name: Van der Kooi

Email Address: communications@maasenergy.com

Affiliation: Van der Kooi Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see the letter attached for comments.

Attachment:

Original File Name: Van der Kooi.pdf

Date and Time Comment Was Submitted: 2024-08-23 12:04:00

Form Letter 32 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Case

Last Name: VanSteyn

Email Address: communications@maasenergy.com

Affiliation: Van Steyn Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see the letter attached for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7327-lcfs2024-BnBQN1Q7BAgCdwdz.pdf

Original File Name: Van Steyn Dairy.pdf

Date and Time Comment Was Submitted: 2024-08-23 12:06:28

Form Letter 33 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Simon

Last Name: Vander Woude

Email Address: communications@maasenergy.com

Affiliation: Vander Woude Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see the letter attached for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7328-lcfs2024-AnQBZgdoBzAHZANx.pdf

Original File Name: Vander Woude Dairy.pdf

Date and Time Comment Was Submitted: 2024-08-23 12:10:58

Form Letter 34 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Luke

Last Name: Vanderham

Email Address: communications@maasenergy.com

Affiliation: Vanderham Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see the letter attached for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7329-lcfs2024-BXMAZ1Q7AzRWNQR2.pdf

Original File Name: Vanderham Dairy.pdf

Date and Time Comment Was Submitted: 2024-08-23 12:13:22

Form Letter 35 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Alex

Last Name: DeJager

Email Address: communications@maasenergy.com

Affiliation: Vista Verde Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see the letter attached for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7330-lcfs2024-VSMGaQR2UnVSNVcI.pdf

Original File Name: Vista Verde Dairy.pdf

Date and Time Comment Was Submitted: 2024-08-23 12:16:00

Form Letter 36 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Rob

Last Name: Vanderweerd

Email Address: communications@maasenergy.com

Affiliation:

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see the letter attached for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7331-lcfs2024-UitXPgdtUXdQOwRb.pdf

Original File Name: Yokum Dairy.pdf

Date and Time Comment Was Submitted: 2024-08-23 12:18:07

Form Letter 37 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Jared

Last Name: Fernandes

Email Address: communications@maasenergy.com

Affiliation: Legacy Ranch Dairy

Subject: Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard Regulation
Comment:

Please see the letter attached for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7332-lcfs2024-WjYHZFQyVGYFYAd+.pdf

Original File Name: Legacy Ranch Dairy PDF.pdf

Date and Time Comment Was Submitted: 2024-08-23 12:27:33

Form Letter 38 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name: Peter and Leo

Last Name: Van Warmerdam

Email Address: communications@maasenergy.com

Affiliation: VanWarmerdam Dairy

Subject: comments on LCFS 15 day package

Comment:

Please see attached letter for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7374-lcfs2024-AnRQNwFuAw8GdwJj.pdf

Original File Name: Van Warmerdam - PDF.pdf

Date and Time Comment Was Submitted: 2024-08-27 08:48:33

Form Letter 39 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Joe

Last Name: Mendes

Email Address: communications@maasenergy.com

Affiliation: High Roller Dairy

Subject: Re: 15-day Comment Period for LCFS

Comment:

Please see attached document for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7375-lcfs2024-UTkGaQFnAjkAWQZ0.pdf

Original File Name: High Roller Dairy -.pdf

Date and Time Comment Was Submitted: 2024-08-27 08:56:25

Form Letter 40 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Matthew

Last Name: de Jong

Email Address: communications@maasenergy.com

Affiliation: Vintage Dairy

Subject: comments on LCFS 15 day package

Comment:

Please see attached letter for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7381-lcfs2024-UScHaARrACdXMAJl.pdf

Original File Name: Vintage Dairy- PDF.pdf

Date and Time Comment Was Submitted: 2024-08-27 08:58:38

Form Letter 41 for Comment 17 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - .

First Name: Ron and Joey

Last Name: Vander Poel

Email Address: communications@maasenergy.com

Affiliation: Bar VP Dairy

Subject: comments on LCFS 15 day package

Comment:

Please see attached letter for comments.

Attachment: www.arb.ca.gov/lists/com-attach/7382-lcfs2024-AGJRNgNwBwsBcQR0.pdf

Original File Name: Bar VP Dairy.pdf

Date and Time Comment Was Submitted: 2024-08-27 09:33:31

Comment Log Display

Here is the comment you selected to display.

Comment 18 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Graham
Last Name	Noyes
Email Address	graham@noyeslawcorp.com
Affiliation	Noyes Law Corporation
Subject	15-Day LCFS Comment by FS, Fueling Sustainability

Comment

Dear Clerk of the Board,

The following is a summary of the comment. The full comment is attached. Please contact me if there are any questions or issues with the filing.

FS Indústria de Biocombustíveis Ltda (FS, Fueling Sustainability) appreciates the opportunity to provide comments regarding the recent modifications proposed by the California Air Resources Board (CARB) to the Low Carbon Fuel Standard (LCFS) regulations (the "15-Day Changes"). We appreciate the California Air Resources Board's (CARB) role in developing and implementing the vitally important LCFS program. Aligned with CARB's LCFS and climate policy objectives, FS produces extremely low carbon intensity (Low-CI) ethanol and works to develop and implement technical innovations that can contribute to and be recognized in the LCFS and other carbon reduction programs. We are submitting these comments to share our perspective with CARB regarding proposals of particular importance to FS, and to share our direct experience in participating and complying with certification schemes.

Best Regards,

Graham Noyes for FS, Fueling Sustainability
Noyes Law Corporation
419 Broad Street, Suite E
Nevada City, CA 95959
www.fuelandcarbonlaw.com
(530)264-7157 Direct

graham@noyeslawcorp.com
[@Graham Noyes](https://www.linkedin.com/in/grahamnoyes)

Attachment

www.arb.ca.gov/lists/com-attach/7300-lcfs2024-VDJWI1YIAj1SN1Qy.pdf

Original File Name

FS LCFS Comment 15 day Changes Final.pdf

**Date and Time Comment Was
Submitted**

2024-08-23 09:05:21

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 21, 2024
Liane Randolph
Chair

Steve Cliff
Executive Officer

California Air Resources Board
1001 I ST Sacramento, CA 95814
RE: FS Comments Relating to Proposed 15-Day Changes to Low Carbon Fuel Standard

(Comment submitted electronically)

Dear Chair Randolph and Executive Officer Cliff:

FS Indústria de Biocombustíveis Ltda (FS, Fueling Sustainability) appreciates the opportunity to provide comments regarding the recent modifications proposed by the California Air Resources Board (CARB) to the Low Carbon Fuel Standard (LCFS) regulations (the “15-Day Changes”). We appreciate the California Air Resources Board’s (CARB) role in developing and implementing the vitally important LCFS program. Aligned with CARB’s LCFS and climate policy objectives, FS produces extremely low carbon intensity (Low-CI) ethanol and works to develop and implement technical innovations that can contribute to and be recognized in the LCFS and other carbon reduction programs. We are submitting these comments to share our perspective with CARB regarding proposals of particular importance to FS, and to share our direct experience in participating and complying with certification schemes.

FS would like to emphasize at the outset that while this comment letter does provide strong suggestions and some criticism regarding two areas covered by the 15-day changes, there is a great deal in the LCFS rule package that we heartily support. We commend CARB for the establishment of the LCFS and view it as a model program for the decarbonization of the transportation sector. It is because the LCFS program is so critical to the development of low carbon fuels and technologies that we are heavily invested in providing constructive input such that CARB and the LCFS can continue to be world leaders in transportation decarbonization and climate policy design and execution.

FS, Fueling Sustainability

FS is the first Brazilian company to produce ethanol, animal nutrition products, and corn oil exclusively from second-crop corn. FS uses energy cogeneration from biomass to meet its own energy needs and to generate surplus electricity that is sold to the Brazilian electrical grid. We have developed a new low-carbon value chain that encompasses Low-CI second-crop corn, incentivizes sustainable forest cultivation, enables the production and sale of high-quality animal nutrition and ethanol products, and generates bioenergy and steam. FS has an integrated food and energy production system, a business model that uses second-crop corn as raw material. This strategy results in better use of available agricultural resources, increased yield per acre, reduced need for expansion of cultivated land, better sustainability and greater reduction of greenhouse gas (GHG) emissions.



CARB Should Implement a Notice and Comment Period Focused on Technical Input Prior to Making Indirect Land Use Change Determinations and Recognize Fuel Combinations that Achieve Lower iLUC Scores

018.1

In the 15-Day Change proposed by the establishment of §95488.3(d)(2), CARB has proposed to undertake an unspecified process to potentially assign a more conservative land use change (iLUC) value when CARB determines that “no value in Table 6 is conservatively representative of a particular region/feedstock/fuel combination.” The complete proposed subsection contains the following language:

(2) The Executive Officer may determine that no value in Table 6 is conservatively representative of a particular region/feedstock/fuel combination and assign a more conservative LUC value. Such determination must be based on the best available empirical data, including but not limited to satellite-based remote sensing data for land cover monitoring, crop yields, and emission factors from the AEZ-EF model or carbon stock datasets. For feedstocks not listed in Table 6, the Executive Officer may determine and assign an appropriate LUC value based on empirical land cover data, crop yields, and emission factors.

018.1 Cont

To ensure transparency in determining carbon intensities under the LCFS, the Executive Officer should establish a clear process for determining and adjusting iLUC values. As CARB is well-aware, life cycle analysis (LCA) issues are complex and controversial and iLUC determinations can make or break a particular fuel’s opportunity to participate in the California LCFS marketplace. In addition, CARB’s initial determination for a particular region/feedstock/fuel combination will likely establish an iLUC value that will be applied to subsequent pathways that utilize this particular region/feedstock/fuel combination. Thus it is important that CARB establish a robust and public process prior to reaching these determinations.

This process should begin with preliminary communication and notification, with CARB committing to inform stakeholders in advance of any proposed iLUC value adjustments. Additionally, CARB should provide transparency in the methodologies and assumptions used. Before finalizing any changes to iLUC values, CARB should engage in a public consultation process, allowing for technical discussions where industry experts, stakeholders, and the public can contribute input on the proposed values and methodologies.

In addition to establishing a public process, CARB should also be open to the possibility of lowering an iLUC value rather than only adjusting iLUC values in a manner that is unfavorable to feedstock and fuels that are reviewed. We recognize that CARB will be consistently taking a conservative approach to iLUC values but cannot discern a sufficient rationale for CARB to only move iLUC values in one direction. To the extent that other regions of the world can provide feedstocks and fuels that are found to cause less land use change than regions already represented in Table 6, the resulting fuels should receive CI scores that reflect that better performance.

018.2

Brazilian second-crop corn provides an excellent example of why sufficient process and technical input is essential to LCFS policy design. This particular region/feedstock/fuel combination faces a significant challenge under the LCFS program due to the absence of a Table 6 value grounded on regional performance. The available global default value for corn



does not reflect the specific low-risk and Low-CI characteristics of Brazil's second-crop corn. We take this opportunity to request CARB's attention to the study and recognition of Brazilian farming practices, yields of double-cropped soy and corn per acre, the role of renewable biomass, the nature of second-crop corn and other factors that establish second crop Brazilian corn as a low-CI and low-ILUC feedstock and support Low-CI values for Brazilian Second Crop Ethanol. The main factors are highlighted below and warrant a robust review.

- 1) Improved agricultural practices and soybean-corn multi-cropping systems reduce the risk of iLUC.
- 2) Brazil has soybean land available that can be used to expand the production of second-crop corn, without requiring additional land.
- 3) A negative ILUC for Brazilian corn ethanol is documented in scientific literature.

Due to these factors, other jurisdictions with rigorous oversight programs have determined zero ILUC value for other multi-crops under specific conditions including the following.

- 1) The Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) has determined zero or negative ILUC values for secondary (oilseed) crops.
- 2) CORSIA has determined a zero ILUC value for sequential cropping in general which includes 2nd crop corn.
- 3) Brazilian corn ethanol is classified as a Low LUC risk by the ISCC/CORSIA.

018.3

**CARB Should Bifurcate Issues
Pertaining to Forest Biomass from this LCFS Rulemaking to
Receive Stakeholder Input Prior to Establishing a
New and Highly Complex Woody Biomass Scheme**

Regrettably, during the course of this rulemaking, CARB did not hold a workshop to discuss and examine the many complexities presented by forest biomass. CARB also did not share with stakeholders the extensive new language pertaining to forest biomass contained in the 15-Day Changes in §95488.8(g)(1)(A)(3) and the approximately six pages of new language proposed to be added to §95488.9(g).

FS respectfully submits that this LCFS proposal would have benefitted from a stricter reading of the California Administrative Procedure Act particularly given the tremendous wildfire risk in California that is fueled by such massive and dangerous quantities of forest biomass that the State has established a million-acre fire treatment strategy as further discussed by the comment letter of the California Forestry Association.

018.3 Cont

From the perspective of FS, the forest biomass scheme proposed in the 15-Day Changes is as completely unworkable in Brazil as it is in California. We do not think it feasible to propose simple fixes to make the scheme workable and would recommend that it be completely redesigned. However, we think this redesign is a process that will require many months if not a year. We also think it imperative that the many positive changes that CARB has made to the LCFS program should not be further delayed in terms of implementation. Therefore, we would recommend that CARB delete all of the new language pertaining to woody biomass from the LCFS rulemaking package and initiate a separate focused rulemaking that involves stakeholders and California agencies with forestry expertise in the process.



In terms of preliminary comments from FS to inform this forest biomass process, we would submit the following. To ensure a comprehensive and accurate assessment of the life cycle analysis (LCA) for renewable biomass used in combustion — whether it is a forest/agricultural/industrial residue or a purpose-grown forest biomass — CARB should establish the following clear and detailed minimum requirements:

- a. **Inclusion of Clear Definitions for Each Supply Chain Element:** This includes defining the Point of Origin, First Gathering Point, Processing Unit, and other critical links in the biomass supply chain. Clear definitions will ensure consistency and transparency in the assessment process.
- b. **Specify Emission Factors for Biomass Combustion:** We request specific definitions regarding where the LCA for biomass combustion begins and ends. This clarity is essential for accurately calculating the carbon footprint and understanding the environmental impact of biomass used for energy generation.
- c. **Definition of Waste/Residue:** To avoid ambiguity, it is essential for CARB to provide a precise definition of what qualifies as waste or residue, particularly in the context of energy generation. This clarity will be key in determining whether or not to account for upstream emissions of biomass in Tier 2 submissions.

Conclusion

We appreciate the opportunity to participate in this proceeding. Please count on FS for providing data and evidence, or any other support that CARB may need to pursue the listed topics.

Respectfully,

DocuSigned by:

CD36C38E34B34B9...

Executive VP Sustainability & Businesses Development

Comment Log Display

Here is the comment you selected to display.

Comment 19 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Graham
Last Name	Noyes
Email Address	graham@noyeslawcorp.com
Affiliation	Noyes Law Corporation for Raizen
Subject	Raizen's Comments on Proposed 15-Day Changes

Comment

Dear Clerk of the Board,

Attached please find Raizen's comments regarding the proposed 15-Day Changes to the Low Carbon Fuel Standard. Below is a brief summary of these comments. Please contact me regarding any questions or issues regarding the filing. Thank you for your assistance.

The recent modifications proposed by the California Air Resources Board (CARB) to the Low Carbon Fuel Standard (LCFS) regulations (the "15-Day Changes") present significant implications for biofuel producers globally. As one of the leading ethanol producers in Brazil, Raízen is deeply invested in the LCFS and broadly supports these changes, which will accelerate carbon intensity (CI) and petroleum reduction, phase in sustainability requirements, and promote advanced biofuels. From Raízen's standpoint, these changes resonate with our commitment to sustainability and innovation. These changes also have the potential to expand the global sustainable fuels market but to execute the revised LCFS effectively, it will be critical for CARB to work with stakeholders as CARB interprets and implements the sustainability and certification requirements.

Best Regards,

Graham Noyes for Raizen
Noyes Law Corporation
419 Broad Street, Suite E
Nevada City, CA 95959
www.fuelandcarbonlaw.com

(530)264-7157 Direct
graham@noyeslawcorp.com

Attachment	www.arb.ca.gov/lists/com-attach/7305-lcfs2024-AXMAZwRsWHELaAhm.pdf
Original File Name	Raizen's Comments on 15 Day Changes FINAL.pdf
Date and Time Comment Was Submitted	2024-08-23 10:29:09

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)



Raízen Energia S.A.

Av. Brig. Faria Lima, 4100 - Itaim Bibi,
São Paulo - SP, 04538-132

August 23, 2024

The Honorable Liane Randolph
Chair, California Air Resources Board

Steven Cliff
Executive Officer, California Air Resources Board

1001 I Street
Sacramento, CA 95814
(Comments submitted electronically)

RE: Raízen's Comments on Proposed 15-Day Changes

Dear Chair Randolph and Executive Officer Cliff:

The recent modifications proposed by the California Air Resources Board (CARB) to the Low Carbon Fuel Standard (LCFS) regulations (the "15-Day Changes") present significant implications for biofuel producers globally. As one of the leading ethanol producers in Brazil, Raízen is deeply invested in the LCFS and broadly supports these changes, which will accelerate carbon intensity (CI) and petroleum reduction, phase in sustainability requirements, and promote advanced biofuels. From Raízen's standpoint, these changes resonate with our commitment to sustainability and innovation. These changes also have the potential to expand the global sustainable fuels market but to execute the revised LCFS effectively, it will be critical for CARB to work with stakeholders as CARB interprets and implements the sustainability and certification requirements.

Based upon our review, the proposed LCFS regulations provide an overall framework to advance to a more sustainable and rigorous program but do not explicitly establish precisely how the program will be administered. Raízen appreciates that CARB has deliberately built flexibility into the revised LCFS so that CARB can supplement program details through experience gained via implementation and interaction with stakeholders. Raízen encourages CARB to work closely with stakeholders to align the revised LCFS program with international standards, and to welcome global feedstocks and fuels that meet LCFS sustainability requirements. Already a global policy leader, CARB will need to further expand its international engagement to evolve the LCFS program to align with the dynamic and complex international policy environment.

Emphasizing Certification and Sustainable Practices

Raízen's sourcing of feedstocks and energy is already aligned with CARB's increasing emphasis on sustainability certification. Raízen's sugarcane production is certified by several internationally recognized sustainability schemes (e.g., ISCC, Bonsucro, Renovabio) ensuring compliance with global standards for

environmental and social responsibility.

- 019.1 Notably, Raízen's sugarcane plantations are located in regions where there has been a documented increase in native forests, contrary to the common narrative that biofuel production necessarily leads to deforestation. Raízen's experience and practices demonstrate that it is possible to expand biofuel production while contributing positively to the environment. This proactive approach positions Raízen favorably under CARB's proposed regulations, which will require full third-party certification by 2031. We would encourage CARB to scrutinize existing certifications schemes for full alignment with existing programs and thereby avoid doubling of efforts and conflicting standards. This will allow Raízen and other international market participants to seamlessly comply with these requirements and send a global market signal that will support sustainable biofuel production and not incentivize negative activities or outcomes.

E2G Technology

- 019.2 One of the most significant aspects of CARB's proposed changes is the tightening of CI benchmarks for fuels. Raízen is particularly well-prepared to meet these challenges, thanks to our proprietary technology known as E2G, which converts sugarcane waste bagasse into ethanol. This second-generation ethanol technology utilizes agricultural waste as a feedstock and significantly lowers the carbon intensity of the resulting biofuel. The use of bagasse for biofuel production is not only scalable but the feedstock is also recognized as a residue according to the European Renewable Energy Directive (EU RED). This recognition means that bagasse is considered to have zero life-cycle GHG emissions up to the point of collection, giving it a significant advantage over feedstocks like soy, canola, and palm oil. Raízen is confident these advantages can drive further decarbonization under these regulatory changes. Furthermore, E2G (just like normal sugar cane ethanol) can be utilized in hard to abate sectors such as aviation, maritime shipping, and other sectors where electrification has significant limitations.

- 019.3 We anticipate that once Raízen's E2G technology is certified by CARB, it will achieve a CI score that is significantly lower than most other fuels currently in the market. The reduction in carbon intensity aligns with CARB's goals and provides California with the opportunity to achieve greater overall greenhouse gas emissions (GHG) reductions with the same volume of ethanol fuel which is critical given the regulatory blend level of E10 that currently exists. Brazil has deep and positive experience with higher ethanol blends. To facilitate more rapid achievement of California's petroleum and GHG reduction goals, Raízen encourages CARB to complete its review of E15 as quickly as possible and to continue its work to maximize E85 use in flex fuel vehicles (FFVs) and expand its fleet of FFVs via the Advanced Clean Cars rule.

Support for Sustainable Aviation Fuels

- 019.4 Raízen also appreciates CARB's specific recognition of sustainable aviation fuel

(SAF) within the LCFS framework. As one of the few companies currently furnishing feedstock to the US SAF supply chain, we see this as a critical area of growth. CARB's support of bio-based SAF not only provides a clear market signal but also encourages continued investment and innovation in this sector.

The aviation industry is one of the most challenging sectors to decarbonize, and bio-based SAF represents a viable pathway to achieving significant carbon reductions. Raízen's involvement in this market demonstrates our long-term commitment to providing sustainable solutions across the full range of transportation fuels. The proposed LCFS changes by CARB will likely accelerate the adoption of SAF, accelerating GHG and petroleum reduction in this critical area.

Indirect Land Use Change Calculations

We think it important to consider that via Section 95488.3(d) and associated Table 6, CARB has given itself the authority to assign a "more conservative" indirect land use change (iLUC) value when CARB determines that Table 6 "does not accurately reflect" the iLUC of a region/feedstock/fuel. CARB may also add new feedstocks/fuels to Table 6. Consistent with other LCFS provisions, we would recommend that CARB's process for changing iLUC values provides notice to stakeholders and the opportunity for public comment and particularly technical input. As CARB is well-aware, life cycle analysis (LCA) issues are complex and controversial and iLUC determinations can make or break a particular fuel's opportunity to participate in the California LCFS marketplace.

In addition to establishing a notice and comment process, CARB should also be open to the possibility of lowering an iLUC value rather than only adjusting iLUC values in a manner that is unfavorable to non-US sources of feedstock and fuels. We recognize that CARB will be consistently taking a conservative approach to iLUC values but cannot discern a sufficient rationale for CARB to only move iLUC values for non-US fuels in one direction. To the extent that other regions of the world can provide feedstocks and fuels that are found to cause less land use change than US fuels, the resulting fuels should receive CI scores that reflect that performance.

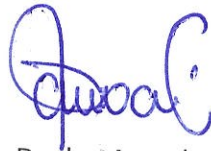
Conclusion

The proposed modifications to the LCFS regulations by CARB reflect a forward-thinking approach to reducing GHG emissions and promoting sustainable biofuels. From Raízen's perspective, these changes align with our long-standing commitment to sustainability and innovation. Our certified supply chain, development of low-CI fuels through E2G technology, and leadership in the SAF market position us to meet new standards set by CARB.

Raízen supports CARB's proactive efforts to drive the adoption of low-carbon fuels. We are eager to collaborate with CARB both now and in the future, leveraging our expertise, certified supply chain, and innovative technologies to

meet and exceed the new standards. Raízen is committed to working closely with CARB to ensure that the transition to a low-carbon economy is both efficient and sustainable.

Sincerely,



Paulo Macedo

International Relations Director

Raízen

Comment Log Display

Here is the comment you selected to display.

Comment 20 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Graham
Last Name	Noyes
Email Address	graham@noyeslawcorp.com
Affiliation	Noyes Law Corporation for H Cycle
Subject	H Cycle's Comments RE: 15-Day Changes to LCFS Proposal

Comment

Dear Clerk of the Board,

Attached please find the comments of H Cycle regarding the 15-day proposed changes to the Low Carbon Fuel Standard. A summary of the comments is included here. Please contact me if there are any questions or issues relating to the filing. Thank you for your assistance.

H Cycle, LLC ("H Cycle") is pleased to submit comments pertaining to the California Air Resources Board's ("CARB") proposed 15-day changes ("15-Day Changes") to the Low Carbon Fuel Standard ("LCFS"). We support CARB's LCFS program as it sends a powerful market signal to decarbonize the transportation sector, is performance based, and provides long-term policy stability that supports investment. However, we respectfully encourage CARB not to bias the LCFS program structure to favor more energy intensive electrolytic hydrogen over H Cycle's non-electrolytic process that leverages waste streams from organics diversion to reduce emissions of the short-lived climate pollutant ("SLCP") methane, create a distributed hydrogen production network, and attract federal dollars to California to accelerate hydrogen production expansion.

Best Regards,

Graham Noyes
Noyes Law Corporation for H Cycle
419 Broad Street, Suite E
Nevada City, CA 95959
www.fuelandcarbonlaw.com

(530)264-7157 Direct
graham@noyeslawcorp.com

Attachment	www.arb.ca.gov/lists/com-attach/7306-lcfs2024-BW1RCABiUXsLbgJu.pdf
Original File Name	H Cycle LCFS Comment FINAL.pdf
Date and Time Comment Was Submitted	2024-08-23 10:49:00

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)



August 22, 2024

The Honorable Liane M. Randolph
Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

(Comment submitted electronically)

RE: H Cycle’s 15-Day Changes Comment Requesting that CARB Level the Playing Field by Giving all Hydrogen Producers Access to Book-and-Claim Accounting as was Originally Proposed

Dear Chair Randolph,

H Cycle, LLC (“H Cycle”) is pleased to submit comments pertaining to the California Air Resources Board’s (“CARB”) proposed 15-day changes (“15-Day Changes”) to the Low Carbon Fuel Standard (“LCFS”). We support CARB’s LCFS program as it sends a powerful market signal to decarbonize the transportation sector, is performance based, and provides long-term policy stability that supports investment. However, we respectfully encourage CARB not to bias the LCFS program structure to favor more energy intensive electrolytic hydrogen over H Cycle’s non-electrolytic process that leverages waste streams from organics diversion to reduce emissions of the short-lived climate pollutant (“SLCP”) methane, create a distributed hydrogen production network, and attract federal dollars to California to accelerate hydrogen production expansion.

15-Day Change

020.1 Cont

CARB’s Notice of Public Availability of Modified Text (“15-Day Notice”) states that regarding §95488.8(i)(1)(C), “staff proposes to add the word “electrolytic” to clarify the type of hydrogen production to which this subsection applies.” There is no further explanation given for the change. The lack of explanation is unfortunate given that the original LCFS regulatory proposal posted on December 19, 2023 (“Original LCFS Proposal”), affirmatively struck the word “electrolytic” from §95488.8(i)(1)(C). The Original LCFS Proposal was responsive to strong industry support for a technology neutral and consistent approach to carbon accounting for hydrogen production.

The reinsertion of “electrolytic” into §95488.8(i)(1)(C) would perpetuate the current regulatory structure which establishes two distinct LCFS carbon accounting approaches for hydrogen production. Electrolytic hydrogen is authorized to use book-and-claim accounting to access low carbon intensity (“Low-CI”) power. Non-electrolytic hydrogen production can only access Low-CI power through the establishment of a behind the meter direct connection to a renewable power generating facility and must meet the other requirements of §95488.8(h)(1).



**California's LCFS Program was Authorized by Executive Order to
Reduce the Carbon Intensity of California's Transportation Fuels and
Designed to be Technology Neutral**

In January 2007, California Governor Arnold Schwarzenegger issued Executive Order S-01-07 which ordered as its first two operative provisions:

1. *That a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020 ("2020 Target").*
2. *That a Low Carbon Fuel Standard ("LCFS") for transportation fuels be established for California. (...) ¹*

As former Board Member Professor Dan Sperling explained to the Carnegie Endowment for International Peace:

A low carbon fuel standard is a carbon intensity standard applied to a fuel's life cycle. This makes the low carbon fuel standard a technology neutral policy that harnesses market forces to stimulate innovation by allowing industry and consumers, instead of government, to choose winners among competing fuel technologies and products. ²

020.1 Cont Despite the centrality of technology-neutral carbon intensity within the LCFS program structure, CARB is proposing with this 15-Day Change that hydrogen should be subject to two distinct carbon accounting schemes depending on whether the hydrogen is produced through the electrolytic method which utilizes electricity and water, or through any other method.

**LCFS Policy Design Should
Incentivize Hydrogen Production that Uses Less Electricity**

020.1 Cont While there may be sound policy reasons to favor some production process over others, CARB has not provided any justification in the 15-Day Notice and none is readily apparent. In discussions with CARB on book-and-claim issues, one key issue of concern that has been emphasized is an insufficient supply of Low-CI power. This has been discussed as a reason to prioritize the use of Low-CI power for fuels for zero emission vehicles including battery electric vehicles and fuel cell electric vehicles.

However, an electricity consumption comparison of electrolytic hydrogen production versus hydrogen produced through H Cycle's process demonstrates that favoring electrolytic hydrogen via biased carbon accounting will waste rather than conserve power for zero emission vehicles. The H Cycle process is distinct from electrolytic pathways as it uses municipal solid waste ("MSW") from material recovery facilities ("MRFs") residuals as its feedstock and primary energy source to produce hydrogen. The H Cycle process is capable of taking what may be described as the "waste of the waste"- organic waste that is not suitable for anaerobic digestion or composting. One of H Cycle's primary uses of electricity in the process is to power plasma torches in the thermal conversion unit that enables the processing and conversion of organic waste in an environmentally friendly manner.

¹ California State Library, "Executive Order S-01-07," (January 22, 2007) at <https://www.library.ca.gov/wp-content/uploads/GovernmentPublications/executive-order-proclamation/5107-5108.pdf>

² Carnegie Endowment for International Peace, "A National Low-Carbon Fuel Standard," (July 19, 2012), at <https://carnegieendowment.org/events/2012/07/a-national-low-carbon-fuel-standard?lang=en>.



In the case of electrolytic hydrogen, the energy value of the hydrogen is derived solely from the electricity input with some of the energy value of the electricity lost due to energy inefficiency. The U.S. Department of Energy has set the technical targets for high temperature electrolyzer stacks and systems at 76% energy efficiency for 2026.³

020.1 Cont As a result of the inherent inefficiencies of electrolytic hydrogen production and H Cycle’s ability to capture the energy value of the waste in hydrogen, H Cycle can produce a kilogram of hydrogen using only one-third of the electrical power required by an electrolytic hydrogen facility. Thus, returning to CARB’s goal of strategically utilizing California’s Low-CI power sources to generate the maximum quantity of fuel for zero emission vehicles, the deployment of H Cycle facilities will yield 3x the amount of hydrogen than electrolytic facilities for the same electricity. Yet, the 15-Day Change proposal creates a carbon accounting disparity such that the electrolytic hydrogen producers will receive more favorable CI scores under the LCFS due to their ability to access Low-CI power via book-and-claim accounting. In the words of Professor Sperling, *this approach places the government in the position of choosing winners among competing fuel technologies and products.*

In addition to its ability to produce more hydrogen from less electricity, the environmental services that H Cycle provides further underscore the importance of providing H Cycle with equal access to Low-CI power via book-and-claim.

H Cycle is the Leading Company in Organic/Biogenic Waste-to-Hydrogen

H Cycle is a California company based in Concord that was founded in 2021. H Cycle is a developer of low-cost, low-carbon hydrogen production facilities that deploy an advanced waste-to-hydrogen thermal conversion technology. H Cycle is currently developing multiple projects in California. H Cycle facilities will be capable of utilizing a diverse composition of waste feedstocks including post-separated organic fractions of municipal solid waste, agricultural residues, and woody biomass from wildfire risk reduction projects to produce Low-CI hydrogen. The successful development of these projects will reduce methane emissions from landfill disposal and other waste streams and facilitate achievement of California’s waste diversion targets under Senate Bill 1383 (“SB 1383”). The H Cycle process delivers Low-CI hydrogen that can be used as a fuel for decarbonizing hard-to-abate sectors such as low-carbon fuel production, heavy-duty trucking, and sustainable aviation. H Cycle is excited to work with CARB and local communities to deploy our solution and support the State in meeting its climate, sustainability and air quality goals. H Cycle is the first company to have received a favorable Article 2 determination from CalRecycle.

Conclusion

Non-electrolytic hydrogen technologies have the potential to be a meaningful contributor to the State’s and CARB’s goals. Supporting waste-to-hydrogen as a technology and commercial pathway brings many benefits including achieving organics diversion targets and SB 1383 short-lived climate pollutant reductions; and job growth and investment tax base from new facilities.

³ Office of Energy Efficiency and Renewable Energy, “Technical Targets for High Temperature Electrolysis,” at <https://www.energy.gov/eere/fuelcells/technical-targets-high-temperature-electrolysis>.



For the reasons discussed in this comment, we respectfully request that CARB revert to the Original Proposal that utilizes consistent carbon accounting for hydrogen production technologies.

We appreciate the opportunity to submit these comments, and are available for further discussions on these important issues.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Quentin Foster', on a light gray background.

Quentin Foster
VP, Policy and Government Affairs

Comment Log Display

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Comment 21 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Andrew
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Affiliation	Georgia/Florida Soybean Association
Subject	See attached comments from GA/FL Soybean Association on LCFS proposal
Comment	See attached comments from GA/FL Soybean Association
Attachment	www.arb.ca.gov/lists/com-attach/7333-lcfs2024-BmVVMgNwBDUFXAAX.pdf
Original File Name	CARB 15 Day Comments State 8 26 24.pdf
Date and Time Comment Was Submitted	2024-08-26 06:17:52

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 27, 2024

Chair Liane Randolph & Members of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Via electronic submission

Re: Proposed 15-Day Changes to the Proposed Regulation Order

Dear Chair Randolph and Members of the California Air Resources Board,

On behalf of the Georgia/Florida Soybean Association, thank you for the opportunity to comment on the proposed 15-day changes (15-Day Changes) to the Low Carbon Fuel Standard (LCFS) program. Georgia/Florida Soybean Association represents soybean farmers across Georgia and Florida on public policy issues important to the soybean industry. Growers across Georgia and Florida have long been committed to producing the world's food, feed, fuel, fiber, and thousands of bioproducts in an environmentally and economically sustainable way.

CARB's 15-Day Changes to revise the LCFS was quite surprising, as the final package diverged significantly from what was included in the Initial Statement of Reasons (ISOR) and the April 10 public workshop. Of top concern for farmers across our state and the rest of the nation is a proposal that would cap the use of soybean oil and canola oil as feedstocks for biofuels at 20 percent by company.

Placing an artificial limit on the market, combined with the inclusion of sustainability guardrails, as proposed will fail to reduce emissions and will only increase costs. Georgia and Florida farmers remain frustrated that CARB insists on using data and methods that are over two decades old to set carbon intensity (CI) scores for soy, while refusing to consider new economic data and failing to consider the potential indirect emission impacts their expanding preference for waste is having.

Georgia/Florida Soybean Association opposes the proposed discretionary authority provided to the Executive Officer to stop accepting new pathways for biomass-based diesel. In addition to discriminating against the lipid-based fuel platform, we are concerned this could have unintended impacts for non-lipid pathways which could produce biomass-based diesel as a co-product. We are also concerned that the aggressive step-down of CI benchmarks, which partially result from the removal the proposed regulation of fossil jet fuel, combined with other changes, will reward importers of waste feedstocks while penalizing farmers across Georgia, Florida and the broader United States.

As CARB seeks to finalize updates to the LCFS program in the coming months, we strongly encourage the agency to ensure these updates are based on science as required by AB-32. The determination to make such drastic changes to previous CARB proposals so late in the game was shocking to the soybean and biofuels industries. For CARB to move from arguing that, based on the modeling, a vegetable oil feedstock cap was detrimental to the goals of the LCFS at the April public workshop, to now recommending a wildly stringent cap on those feedstocks without data or science, is quite difficult to comprehend. CARB's own April 10th analysis showed that a feedstock cap would increase greenhouse gas (GHG) emissions in California, which is contrary to requirements in AB-32.

Vegetable Oil Feedstock Cap

The inclusion of a virgin vegetable oil feedstock cap in the 15-Day Changes was alarming to farmers and the entire biofuels value chain, as reflected in market activity. You may understand our surprise based on the April 10 workshop in which CARB noted that liquid fuels would continue to be needed in the transportation sector in California for at least the next decade. In that same workshop, CARB also argued that the imposition of a virgin vegetable oil feedstock cap would increase the utilization of petroleum diesel in the transportation sector. In the staff's own presentation on April 10, staff noted that nearly eighty percent of vehicles on the road in California to still use combustion engines by 2030. Further, they noted that such a stringent cap on virgin vegetable oils may result in 2.8 billion gallons of fossil diesel utilization in 2030, versus 1.9 billion gallons using a scenario that does not impose the cap proposed by the Environmental Justice Advisory Committee.

In a full reversal of staff's prior analysis, which is only four months ago, staff is now essentially recommending to the board that more fossil diesel be sold into the market in 2030. This recommendation appears to not only go against the goals of AB-32, but also science. This recommendation seems to flatly disagree with the Intergovernmental Panel on Climate Change, which notes in its sixth assessment report that using existing low carbon technologies is a crucial component to avoiding catastrophic temperature increases, stating that "biodiesel and renewable diesel fuels...could offer important near-term reductions" for several technologies, including buses, rail, and long-haul trucking.¹

In our current interpretation, the cap may lock out of the market producers of the lowest cost, lowest carbon intensity soybean oil-based biofuel (soy methyl esters). Most soy methyl esters are produced at biodiesel plants adjacent to soybean processing plants. Often, the companies which own operate these soybean processing are not involved in the procurement and processing of non-crop-based oils, such as UCO and tallow. They exclusively make biofuels out of soy oil or canola oil. The current language limits crediting

¹ Jaramillo, P., S. Kahn Ribeiro, P. Newman, S. Dhar, O.E. Diemuodeke, T. Kajino, D.S. Lee, S.B. Nugroho, X. Ou, A. Hammer Strømman, J. Whitehead, 2022: Transport. In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_Chapter10.pdf

of soy and canola to 20 percent of reported gallons. This leaves integrated agriprocessing/biofuel producers two choices: 1) exit the market entirely, or 2) be denied a government benefit on 80 percent of their fuel. If this is the current interpretation of the proposed provision, it would significantly and arbitrarily disadvantage the sustainable oilseed biodiesel community.

We echo the concern of the American Soybean Association that new requirement appears to contradict the statutory guidance laid out in AB-32 to minimize costs.

Sustainability Guardrails

020.5

Georgia/Florida Soybean Association was surprised to find that not only was a feedstock cap in the 15-Day Changes, but the sustainability guardrails were also retained. The cap, sustainability guardrails and Indirect Land Use Change score all additively, and redundantly, address land use change. This has the equivalent effect of giving soy and canola a much higher CI score increasing the compliance cost associated with delivering the product, despite the lack of direct evidence.

Broadly we are concerned that the requirement proposed by CARB is unneeded given the longstanding, excessively high ILUC figure (relative to more recent modeling efforts). Furthermore, we are extremely disheartened that CARB has not followed the example of governments across North America, where farmers who submit data for compliance are also given the opportunity to be incentivized for conservation efforts. This additional cost without benefit contradicts language authorizing the LCFS. Section 38562 (b)(7) of AB-32 directs CARB to, "Minimize the administrative burden of implementing and complying with these regulations." Adding supply chain traceability to a bulk delivery system adds significant administrative burden without changing the GHG emissions of the pathway.

CARB's efforts could be improved and enhanced by outreach to U.S. Department of Agriculture (USDA) personnel who have engaged in activity regarding climate-smart farming practices. USDA recently closed a comment period on its Request for Information on Procedures for Quantification, Reporting, and Verification of Greenhouse Gas Emissions Associated with the Production of Domestic Agricultural Commodities Used as Biofuel Feedstocks. With the information received, USDA seeks to quantify and qualify the benefits of climate smart agriculture practices for biofuel programs at the state, national, and international level. Communication between CARB and USDA could be enlightening regarding ongoing agricultural sustainability practices.

Through the current sustainable aviation fuel (SAF) federal tax credit (40B), the CI of soy-based biofuels can improve through no-till and cover cropping on the field that the soybeans were produced. Other farming practices like low-till, nutrient management, enhanced efficiency fertilizers, buffers, wetland and grassland management, tree planting on working lands, planting for higher carbon sequestration, and soil amendments all can and should be accounted to assign a lower CI score to an agricultural feedstock. USDA

already tracks all these practices through several of their managed conservation programs. In addition, there are a variety of other practices that scientifically lower the CI score of soybean feedstocks for biofuels, and USDA is actively working to develop mechanisms to account for those.

Given the work being undertaken by USDA and EPA as part of the implementation of the Inflation Reduction Act, Georgia/Florida Soybean Association urges CARB to reconsider its proposed sustainability requirements to allow soybean growers the opportunity to participate in the California biofuels market through innovative and climate smart agriculture practices.

Outdated Scoring

020.2 Cont For the last several years, state soybean associations, national associations, and biofuel producers have urged CARB to consider updating its scoring methodology for crop-based biofuels. CARB has refused to even consider the request.

We remain deeply concerned that without a comprehensive update to the Global Trade Analysis Project model for biofuels (GTAP-BIO) that CARB utilizes, soy-based feedstocks will be phased out of the LCFS even without the additional limitations being proposed in the 15-Day Changes. Current data indicates a much lower CI score for soybeans, as growers continue to improve soil practices, limit water use, lower on-farm emissions and more. On the one hand, CARB is recommending stringent sustainability guardrails for U.S. soy, but on the other hand is still on track to likely phase-out soy-based biofuels from credit generation by approximately 2035 or sooner.

CARB has indicated plans to update all major models for lifecycle emissions calculations except for GTAP-BIO in the updated LCFS rulemaking. The soy industry has made vast improvements in sustainability and efficiency over the past two decades, with even greater improvement goals ahead. At the same time, CARB continues to rely on a 2014 model that uses data from 2004. The ILUC score accounts for half or more of the CI score for soy-based biofuels. CARB's current modeling assigns soy biomass-based diesel with an ILUC impact of 29.1g CO₂e/MJ whereas updated results from the model used to calculate ILUC scores indicate a value of between 9 and 10 gCO₂e/MJ for soybeans². The recently released 40BSAF-GREET 2024 model has an ILUC score of 12.2 for soy-based sustainable aviation fuel in federal programs.

The benefits of the LCFS can only be achieved if CI values are accurately captured. If land use change concerns are large enough to justify sustainability guardrails and capping virgin vegetable oil feedstocks, then the modeling should also be updated to reflect current land use change data.

² Taheripour, F., Karmai, O., and Sajedinia, E. (2023). *Biodiesel Induced Land Use Changes: An Assessment Using GTAP-BIO 2014 Data Base*. Purdue University

Entities Eligible to Apply for Fuel Pathways

021.3 Cont We are concerned about CARB's 15-Day Changes to give the Executive Officer discretion to stop accepting new pathways for biomass-based diesel starting in 2031. We do not understand what provision of AB-32 statute is served, or justifies, this arbitrary and highly selective change. CARB must under statute minimize costs and maximize GHG reductions. It is unclear how this is served by rejecting new pathways. In fact, the requirements of current law are met by allowing the most available pathways. If these pathways cannot achieve cost-effective GHG savings, they will not be utilized by the market in the LCFS. In essence, an increase in pathways can only serve to improve GHG benefits in California. Singling out a single fuel for prejudicial treatment is baffling given the goals of the LCFS and the authority that establishes it. Executive Order S-01-07 establishing the LCFS specifically cites diversity of fuels as a motivation for the program, and this proposal contradicts one of the stated purposes of the program. In addition, this provision if implemented could also significantly disadvantage other biofuel production processes which may produce biomass-based diesel as a co-product, for example in system where SAF is a main product.

Conclusion

Georgia/Florida Soybean Association is encouraged by the continued successes of programs that support the development of cleaner, low-carbon fuels. However, it is critical that CARB finalizes updates in a way that does not arbitrarily exclude agricultural feedstocks through policies that are not science-based and run afoul of CARB's mandate, including capping vegetable oil feedstocks and applying onerous sustainability guardrails that add cost without rewarding farming practices that lower CI.

CARB's 15-Day Changes, released in August 2024, is deeply concerning. CARB has singled out soybean and canola oil for adverse, prejudicial treatment. No scientific evidence is ever given for this treatment. In fact, CARB has refused to update the science as required by law for these feedstocks. This alone calls into question the integrity of a performance-based LCFS. On top of this, CARB is now proposing feedstock caps, traceability requirements and authority to reject applications for these fuels produced from them. Again, CARB has not shown any scientific justification. In fact, the LCFS is already over penalizing soy for any land use change requirements.

Farmers across Georgia and Florida remain eager to continue working with CARB to support the role of agriculture in diversifying the fuel supply while reducing GHGs and increasing clean air in California and beyond. On behalf of Georgia and Florida soybean farmers, we appreciate the opportunity to comment and look forward to collaborating with CARB and other relevant stakeholders

on implementation of policies that expand the use of soy-based biofuels and market opportunities for soybean farmers.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Andrew Moore', with a stylized, cursive script.

Andrew Moore - President
Georgia/Florida Soybean Association

Comment Log Display

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Comment 22 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Benjamin
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Affiliation	Beta Analytic
Subject	CA LCFS 2024 Update Comment Beta Analytic
Comment	<div>Please see Beta Analytic's comments on the proposed update to California's LCFS attached below. We appreciate the opportunity to provide our feedback very much, thank you.</div>
Attachment	www.arb.ca.gov/lists/com-attach/7335-lcfs2024-VTYBZlcJUG8BZAFn.pdf
Original File Name	CA LCFS 2024 Update Comment Beta Analytic.pdf

**Date and Time Comment Was
Submitted**

2024-08-26 08:41:09

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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California Air Resources Board (CARB)
California Low Carbon Fuel Standard (LCFS) | Stakeholder Feedback

022.1

This comment is intended to recommend the use of the carbon-14 testing method to determine the share of biogenic carbon content of feedstocks, fuels and emissions under California’s Low Carbon Fuel Standard (LCFS). Biogenic content measurements following methods such as ASTM D6866 Method B currently provide critical value to prominent clean fuel standard programs including California’s LCFS.

Included here you will find:

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Recommendations for California’s Low Carbon Fuel Standard

Our recommendation is that California’s Low Carbon Fuel Standard (LCFS) should include direct biogenic content testing requirements following the ASTM D6866 Method B standard for any fuels or feedstocks seeking recognition of renewable (biogenic) content. Routine direct biogenic testing requirements are the only reliable method of incentivizing the use of biomass derived content and guaranteeing compliance. Routine biogenic testing requirements currently play a critical role in California’s LCFS and prominent similar programs.

California’s LCFS currently requires testing following ASTM D6866 for any fuels produced from co-processing and recommends testing for fuels produced from municipal solid waste (MSW). Several of the updates being considered by the program could benefit from the introduction of similar testing requirements and offer opportunities to strengthen the existing requirements.



022.2

Require Routine Biogenic Testing for Fuels Produced from MSW

Beta's first recommendation for this update to this LCFS is to introduce routine biogenic testing requirements for fuels produced from MSW in line with the program's requirements for co-processing. Given the heterogeneous nature of MSW, it is critical that routine testing requirements be maintained to make sure the program only rewards the renewable portion of those fuels.

Implementing routine testing for these fuels would be in line with the requirements of the US Renewable Fuel Standard (RFS), Canada's Clean Fuel Regulations (CFR), Oregon's Clean Fuels Program (CFP) and other leading programs.¹ As CARB updates the program, it is important to improve this policy from a recommendation to a requirement.

Update the Certification Framework for Biogas, Biomethane & RNG

022.3

Beta also recommends that CARB introduce routine biogenic testing requirements for fuels produced from biogas, biomethane and RNG. As CARB considers the best way to move forward with biogas, biomethane and RNG in the program, we recommend reviewing the [Biogas Regulatory Reform Rule \(BRRR\)](#), which the EPA included in the RFS Set Rule, the EU's updated methodology for biogas under the Renewable Energy Directive (RED), and Canada's Clean Fuel Regulations (CFR) Quantification Method (QM) for Co-Processing.² These recent policies reflect the leading best practices for regulating this sector under clean fuel programs.

The US introduced biogenic testing requirements for fuels produced from biogas in the 2023 Set Rule update to the US Renewable Fuel Standard (RFS), in a section called the [Biogas Regulatory Reform Rule](#).³ This update requires routine biogenic testing for any biogas or RNG fuels seeking to generate RINs under the RFS. Starting on July 1st, 2024 for new facilities and January 1st, 2025 for existing facilities, fuels produced from biogas will need to submit biogenic test results of the biogas at the point of production from the digester/landfill, at the point of upgrading, and after upgrading prior to pipeline injection.

The EU introduced biogenic testing requirements for fuels produced from biogas in a June 2023 update to the EU Renewable Energy Directive (RED) titled, ["Renewable energy- method for calculating the share of renewables in the case of co-processing."](#)⁴ This update was specifically issued in response to the discovery of a major case of fraud within the RED program stemming from biodiesel submissions from China which were approved by mass balance calculations.⁵ The EU investigation into this issue is still

¹ 2010. "40 CFR Part 80 Subpart M– Renewable Fuel Standard." *National Archives Code of Federal Regulations*

2023. "Renewable energy- method for calculating the share of renewables in the case of co-processing." *European Commission*

2022. "Clean Fuel Regulations: Quantification Method for Co-Processing in Refineries." *Environment and Climate Change Canada*

² 2023. "40 CFR Parts 80 and 1090– Renewable Fuel Standard (RFS) Program: Standards for 2023–2025 and Other Changes." *EPA*

³ 2023. "40 CFR Parts 80 and 1090– Renewable Fuel Standard (RFS) Program: Standards for 2023–2025 and Other Changes." *EPA*

⁴ 2023. "Renewable energy- method for calculating the share of renewables in the case of co-processing." *European Commission*

⁵ 2023. "ISCC Press Release July 27, 2023." *International Sustainability & Carbon Certification*



ongoing, and the full extent of the damage is not yet known, but this was a significant setback for the program and quickly plummeted biodiesel prices in the EU.

The EU tied biogas, biomethane and RNG into the update in order to address these concerns for any fuels containing a mixture of biogenic and fossil content. The advantage of this framework is that the EU was able to continue to accept calculation based methodologies like mass and energy balance by requiring routine direct biogenic testing to validate the data. However, calculation based approaches are much more common for co-processing, where all inputs and outputs are concentrated in a single facility, as opposed to biomethane and RNG which are often produced, upgraded and blended at multiple facilities.

Canada's CFR introduced routine biogenic testing requirements for hydrocarbon gas fuels alongside co-processing in July 2022.⁶ The program's QM for co-processing requires routine direct testing following ASTM D6866 for, "each co-processed fuel, product and hydrocarbon co-product produced in the project," including gasses beyond biogas, biomethane and RNG, such as renewable propane. Introducing these requirements for biogas, biomethane and RNG alongside co-processing in 2022 when the RFS, RED and LCFS only required testing for co-processing has allowed the CFR to avoid many of the sustainability and verification concerns currently impacting the market for these fuels in California, the US and the EU. We recommend that CARB use this update to apply the same requirements in place for co-processing under the LCFS to biogas, biomethane and RNG.

Require Biogenic Testing as Sustainability Criteria for Waste Feedstocks

We recommend that CARB also consider the BRRR Set Rule update when updating the program's sustainability criteria for waste feedstocks. The BRRR requires testing at the point of biogas production, at the point of upgrading to a fuel and at the point of blending with any non-renewable components prior to pipeline injection.⁷ This approach provides a simple but comprehensive framework to apply for waste feedstocks. By testing the initial feedstock, the fuel at the point of upgrading and the final blended fuel, there is a clear demonstration of biogenic content from the waste feedstock to the final product. Given that these feedstocks need initial verification and that biogenic content ends up in various co-products during production, this approach provides a holistic way to incentivize only the renewable portion of fuels produced from these feedstocks.

It is critically important that this program require direct testing rather than allow calculation based approaches such as mass balance, which make claims based on material inputs in production. These calculations allow producers to assume that all of their biomass inputs end up in their facilities' outputs, despite it being well understood in the industry that the input of renewable feedstocks is not the same

⁶ 2022. "Clean Fuel Regulations: Quantification Method for Co-Processing in Refineries." *Environment and Climate Change Canada*

⁷ 2023. "40 CFR Parts 80 and 1090– Renewable Fuel Standard (RFS) Program: Standards for 2023–2025 and Other Changes." *EPA*



as the output. Renewable feedstocks will often have different activity than their fossil counterparts and won't necessarily produce the same quantity of outputs.⁸ By basing their calculations solely on production inputs rather than outputs these methods systematically over-report the renewable share of fuels.

We encourage CARB to review the recent mass balance fraud challenges faced by the EU Renewable Energy Directive (RED) program as an example of this risk, particularly pertaining to waste feedstock attestation.⁹ In July 2023 the program discovered rampant fraudulent biodiesel submissions from China, which had been certified by ISCC mass balance. The discovery quickly "caused a dramatic fall in biodiesel prices in European markets."¹⁰ In response to this situation the EU quickly updated the RED's rules to uniformly require routine direct testing, including for producers choosing calculation based approaches to verify their calculations.¹¹

Implement Biogenic Testing Requirements for Intrastate Jet Fuels

022.5

As CARB looks to introduce intrastate fossil jet fuel to the program, we recommend that routine biogenic testing requirements be applied to these fuels as well. Routine biogenic testing requirements are the only way to reliably verify the renewable content included in mixed fuels, and therefore encourage the displacement of fossil content. Especially given the importance co-processing currently plays in the SAF industry's early development, requiring routine testing is the best way to incentivize renewable content and penalize fossil content.

Demand Legitimate Vetting From Certification Programs Leveraged by LCFS

022.6

In the workshop on these updates CARB specifically mentioned its intention to rely on existing certification programs such as "ISCC, RBS, REDcert, Bonsucro, etc." Beta would like to emphasize that not all of these certification programs are equally stringent or reliable, and encourage CARB not to rely on any certifications which would invite risk to the LCFS. It is critical that only certifications relying on internationally recognized testing standards be relied on by the program.

Beta would again urge CARB to review the recent case of fraudulent biodiesel fuels which were certified in the EU RED using ISCC mass balance. These calculations are preferred by the industry because they enable producers to systematically over-report their renewable content, allowing them to receive more government incentives and greenwash their products. We re-iterate with emphasis that these calculations ignore the fact that renewable feedstocks will often have different activity than their fossil counterparts and won't necessarily produce the same quantity of outputs.¹² By basing their calculations

⁸ 2006. "Determining the modern carbon content of biobased products using radiocarbon analysis." *Bioresource Technology*, 97(16), 2084-2090.

⁹ 2023. "ISCC Press Release July 27, 2023." *International Sustainability & Carbon Certification*

¹⁰ 2023. "ISCC Press Release July 27, 2023." *International Sustainability & Carbon Certification*

¹¹ 2023. "Renewable energy- method for calculating the share of renewables in the case of co-processing." *European Commission*

¹² 2006. "Determining the modern carbon content of biobased products using radiocarbon analysis." *Bioresource Technology*, 97(16), 2084-2090.



solely on production inputs rather than outputs these methods systematically over-report the renewable share of fuels. As a result relying on any certification based on these calculations would leave the program susceptible to embellished claims and potentially duplicated counting.

022.4 Cont Certifications relying on mass balance such as the ISCC also allow producers to use book and claim, or free allocation, meaning they do not have to guarantee that there is any renewable content in a given fuel. Producers prefer this because if 10% of their feedstocks are biogenic they can claim that 10% of their products are biogenic, even if that's not the case because biobased can go in different amounts to different products in the co-process. Even further, book and claim also allows them to claim that 10% of their products are 100% biogenic and the rest are 0%, even if all of the products should be 10% biogenic based on calculations (and would likely C14 test below that).¹³

This system is designed to allow producers to maximize the incentives they can receive from programs such as the LCFS, without guaranteeing that they are actually providing the sustainability benefits those incentives are meant to produce. Facilities certified using these calculations are also extremely difficult to audit as a result. There are multiple facilities across the globe using successfully Carbon-14 analysis of the actual output and it is the easiest and most trustworthy method.

022.6 Cont Certifications which rely on direct testing following internationally recognized standards, such as the Roundtable on Sustainable Biomaterials (RSB) must be prioritized to protect the integrity of the LCFS.¹⁴ As CARB considers which certifications to rely on, it is imperative that only programs which have demonstrated a commitment to creating stringent, scientifically proven frameworks be admitted.

Conclusion

022.7 California's LCFS is a critical tool for the state's decarbonization journey and an example relied on by other programs around the US and the entire world. By implementing best practices for verification established by a wide range of fuel decarbonization programs led by the LCFS, CARB can protect and strengthen its ability to successfully achieve and measure the goals of this program. Routine direct testing following ASTM D6866 Method B is the most effective way to incentivize and validate biogenic content under this program.

What is Biogenic Testing (Carbon-14)?

Carbon-14 analysis is a reliable method used to distinguish the percentage of biobased carbon content in a given material. The radioactive isotope carbon-14 is present in all living organisms and recently expired material, whereas any fossil-based material that is more than 50,000 years old does not contain any

¹³ 2024. "The Mass Balance Approach." *International Sustainability & Carbon Certification*

¹⁴ 2023. "RSB Standard for Advanced Fuels." *Roundtable on Sustainable Biomaterials (RSB)*



ISO/IEC 17025:2017-Accredited Testing Laboratory

carbon-14 content. Since Carbon-14 is radioactive, the amount of carbon-14 present in a given sample begins to gradually decay after the death of an organism until there is no carbon-14 left. Therefore, a radiocarbon dating laboratory can use carbon-14 analysis to quantify the carbon-14 content present in a sample, determining whether the sample is biomass-based, fossil fuel-derived, or a combination.

The analysis is based on standards such as ASTM D6866 and its international equivalents developed for specific end uses, such as ISO 13833. ASTM D6866 is an international standard developed for measuring the biobased carbon content of solid, liquid, and gaseous samples using radiocarbon dating.¹⁵ There are also many international standards based on the specific use of direct Carbon-14 testing, such as ISO 13833, which is an international standard developed for measuring the biogenic carbon content of stationary sources emissions.¹⁶

Carbon-14 analysis yields a result reported as % biobased carbon content. If the result is 100% biobased carbon, this indicates that the sample tested is completely sourced from biomass material such as plant or animal byproducts. A result of 0% biobased carbon means a sample is only fossil fuel-derived. A sample that is a mix of both biomass sources and fossil fuel sources will yield a result that ranges between 0% and 100% biobased carbon content. Carbon-14 testing has been incorporated into several regulations as the recommended or required method to quantify the biobased content of a given material.

ASTM D6866 Method B - The Most Reliable Method

Carbon-14 is a very well-established method which has been in use by many industries (including the fossil fuel industry) and academic researchers for several decades.

Carbon-14 measurements done by commercial third party testing is robust, consistent, and with quantifiable accuracy/precision of the carbon-14 amount under **ASTM D6866 method B**. The EN 16785 is the only standard that allows a variant of the Mass Balance (MB) method of 'carbon counting' under EN 16785-2. The EN 16785-1 requires that the biocarbon fraction be determined by the carbon-14 method. However, when incorporating this EN 16785 method, certification schemes like the "Single European Bio-based Content Certification" **only** allow the use of EN 16785-1 due to its reliability and the value of a third-party certification. <http://www.biobasedcontent.eu/en/about-us/>

In ASTM D6866 method B, the carbon-14 result is provided as a single numerical result of carbon-14 activity, with graphical representation that is easily understood by regulators, policy

¹⁵ 2021. "Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis." *ASTM International (D6866-21)*

¹⁶ 2013. "ISO 13833:2013 Stationary source emissions: Determination of the ratio of biomass (biogenic) and fossil-derived carbon dioxide." *International Organization for Standardization*



makers, corporate officers, and more importantly, the public. The overwhelming advantage of carbon-14 is that it is an independent and standardized laboratory measurement of any carbon containing substance that produces highly accurate and precise values. In that regard, it can stand alone as a quantitative indicator of the presence of biobased vs. petroleum feedstocks. When carbon-14 test results are challenged, samples can be rapidly remeasured to verify the original reported values (unlike mass balance).

The quantification of the biobased content of a given product can be as low as 0.1% to 0.5% (1 relative standard deviation – RSD) based on Instrumental error for Method B (AMS). This error is exclusive of indeterminate sources of error in the origin of the biobased content, and manufacturing processes. As such a total error of +/-3% (absolute) has been assigned to the reported Biobased Content to account for determinate and indeterminate factors.¹⁷

It is also important that the program should always require ASTM D6866 Method B, rather than allow Method C for any use. Where ASTM D6866 Method B uses the AMS Instrument to measure ¹⁴C, Method C uses Liquid Scintillation Counting (LSC). In Method B, the AMS Instrument directly measures the ¹⁴C isotopes. However, in Method C, scintillation molecules indirectly absorb the beta molecules that release with the decay of ¹⁴C and convert the energy into photons which are measured proportionally to the amount of ¹⁴C in the sample. Since Method B directly measures the ¹⁴C isotopes and Method C measures them indirectly, Method B is significantly more precise and should be prioritized in regulations.¹⁸ LSC measurements, like those used in Method C, are commonly used as an internal testing tool when samples are limited and accuracy does not need to be extremely high.

About Beta Analytic

Beta Analytic was among the originators of the use of Accelerator Mass Spectrometry (AMS) for the ASTM D6866 biobased / biogenic testing standard using Carbon-14 to distinguish renewable carbon sources from petroleum sources. Beta began testing renewable content in 2003 at the request of United States Department of Agriculture (USDA) representatives who were interested in Beta's Carbon-14 capabilities for their BioPreferred[®] Program (www.biopreferred.gov). At their request, Beta joined ASTM under subcommittee D20.96. Beta's previous president, Darden Hood, was positioned as a technical contact for the USDA and within 3 months completed the ASTM D6866-04 standard. The Carbon-14 technique is now standardized in a host of international standards including ASTM D6866, CEN 16137, EN 16640, ISO 16620, ISO 19984, BS EN ISO 21644:2021, ISO 13833 and EN 16785. Carbon-14 analysis can be used on various types of samples (gas, liquids and solids). Beta Analytic continues to be a

¹⁷2021. Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis. *ASTM International (D6866-21)*. pp 1-19. doi: 10.1520/D6866-21.

¹⁸2022. "Testing the methods for determination of radiocarbon content in liquid fuels in the Gliwice Radiocarbon and Mass Spectrometry Laboratory." *Radiocarbon*



ISO/IEC 17025:2017-Accredited Testing Laboratory

technical contact for ASTM D6866 with current president Ron Hatfield and is involved with all their latest ASTM D6866 versions.

The Carbon-14 standardized method is also incorporated in a variety of regulatory programs including the California AB32 program, US EPA GHG Protocol, US EPA Renewable Fuels Standard, United Nations Carbon Development Mechanism, Western Climate Initiative, Climate Registry's Greenhouse Gas Reporting Protocol and EU Emissions Trading Scheme.

We are currently technical experts on Carbon-14 in the following committees:

ASTM D6866 (D20.96) Plastics and Biobased Products (Technical Advisor)
ASTM (D02.04) Petroleum Products, Liquid Fuels and Lubricants (Technical Advisor)
ASTM (061) US TAG to ISO/TC 61 Plastics (Technical Expert)
USDA BioPreferred Program TAC (Technical Advisor)
ISO/TC 61/SC14/WG1 Terminology, classifications, and general guidance (Technical Expert)
CEN/TC 411 Biobased Products
CEN/TC 411/WG 3 Biobased content
CEN/TC 61/SC 14/WG 1 Terminology, classifications, and general guidance (Technical Expert)

ISO/IEC 17025:2017 Accredited Laboratory

To ensure the highest level of quality, laboratories performing ASTM D6866 testing should be ISO/IEC 17025:2017 accredited or higher. This accreditation is unbiased, third party awarded and supervised. It is unique to laboratories that not only have a quality management program conformant to the ISO 9001:2008 standard, but more importantly, have demonstrated to an outside third-party laboratory accreditation body that Beta Analytic has the technical competency necessary to consistently deliver technically valid test results. The ISO 17025 accreditation is specifically for natural level radiocarbon activity measurements including biobased analysis of consumer products and fuels, and for radiocarbon dating.

Required tracer-free facility for Carbon-14

For carbon-14 measurement to work, be accurate, and repeatable, the facility needs to be a tracer-free facility, which means artificial/labeled carbon-14 is not and has never been handled in that lab. Facilities that handle artificial carbon-14 use enormous levels relative to natural levels and it becomes ubiquitous in the facility and cross contamination within the facility, equipment and chemistry lines is unavoidable. Results from a facility that handles artificial carbon-14 would show elevated renewable contents (higher pMC, % Biobased / Biogenic values), making those results invalid. Because of this, Federal contracts and agency programs (such as the USDA BioPreferred Program) require that AMS laboratories must be 14C tracer-free facilities in order to be considered for participation in solicitations.



To learn more about the risks associated with testing natural levels Carbon-14 samples in a facility handling artificially enhanced isotopes please see the additional information provided after this comment.

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2024. "The Mass Balance Approach." *International Sustainability & Carbon Certification* <https://www.iscc-system.org/certification/chain-of-custody/mass-balance/>

Demand a Tracer-Free Laboratory for Radiocarbon Dating

As part of its commitment to provide high-quality results to its clients, ISO/IEC 17025-accredited Beta Analytic does not accept pharmaceutical samples with “tracer Carbon-14” or any other material containing artificial Carbon-14 (^{14}C) to eliminate the risk of cross-contamination. Moreover, the lab does not engage in “satellite dating” – the practice of preparing individual sample graphite in a remote chemistry lab and then subcontracting an AMS facility for the result.

High Risk of Cross-Contamination

Pharmaceutical companies evaluate drug metabolism by using a radiolabeled version of the drug under investigation. AMS biomedical laboratories use ^{14}C as a tracer because it can easily substitute ^{12}C atoms in the drug molecule, and it is relatively safe to handle. Tracer ^{14}C is a well-known transmittable contaminant to radiocarbon samples, both within the AMS equipment and within the chemistry lab.

Since the artificial ^{14}C used in these studies is phenomenally high (enormous) relative to natural levels, once used in an AMS laboratory it becomes ubiquitous. Cross-contamination within the AMS and the chemistry lines cannot be avoided. Although the levels of contamination are acceptable in a biomedical AMS facility, it is not acceptable in a radiocarbon dating facility.

Biomedical AMS facilities routinely measure tracer-level, labeled (Hot) ^{14}C samples that are hundreds to tens of thousands of times above the natural ^{14}C levels found in archaeological, geological, and hydrological samples. Because the ^{14}C content from the biomedical samples is so high, even sharing personnel will pose a contamination risk; “Persons from hot labs should not enter the natural labs and vice versa” (Zermeño et al. 2004, pg. 294). These two operations should be absolutely separate. Sharing personnel, machines, or chemistry lines run the risk of contaminating natural level ^{14}C archaeological, geological, and hydrological samples.

Avoid the Risks

Find out from the lab that you are planning to use that they have never in the past and will never in the future:

- accept, handle, graphitize or AMS count samples containing Tracer or Labeled (Hot) ^{14}C .
- share any laboratory space, equipment, or personnel with anyone preparing (pretreating, combusting, acidifying, or graphitizing) samples that contain Tracer or Labeled (Hot) ^{14}C .
- use AMS Counting Systems (including any and all beam-line components) for the measurement of samples that contain Tracer or Labeled (Hot) ^{14}C .

Tracer-Free Lab Required

Recently, federal contracts are beginning to specify that AMS laboratories must be ^{14}C tracer-free facilities in order to be considered for participation in solicitations.

A solicitation for the National Oceanic and Atmospheric Administration (NOAA) has indicated that “the AMS Facility utilized by the Contractor for the analysis of the micro-samples specified must be a ^{14}C tracer-level-free facility.” (Solicitation Number: WE-133F-14-RQ-0827 - Agency: Department of Commerce)

As a natural level radiocarbon laboratory, we highly recommend that researchers require the AMS lab processing their samples to be Tracer-free.

No Exposure to Artificial Carbon-14

According to ASTM International, the ASTM D6866 standard is applicable to laboratories working without exposure to artificial carbon-14 routinely used in biomedical studies. Artificial carbon-14 can exist within the laboratory at levels 1,000 times or more than 100 % biobased materials and 100,000 times more than 1% biobased materials. Once in the laboratory, artificial ^{14}C can become undetectably ubiquitous on materials and other surfaces but which may randomly contaminate an unknown sample producing inaccurately high biobased results. Despite vigorous attempts to clean up contaminating artificial ^{14}C from a laboratory, isolation has proven to be the only successful method of avoidance. Completely separate chemical laboratories and extreme measures for detection validation are required from laboratories exposed to artificial ^{14}C . Accepted requirements are:

- (1) disclosure to clients that the laboratory working with their products and materials also works with artificial ^{14}C
- (2) chemical laboratories in separate buildings for the handling of artificial ^{14}C and biobased samples
- (3) separate personnel who do not enter the buildings of the other
- (4) no sharing of common areas such as lunch rooms and offices
- (5) no sharing of supplies or chemicals between the two
- (6) quasi-simultaneous quality assurance measurements within the detector validating the absence of contamination within the detector itself.

ASTM D6866-22 – Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis.

Useful Reference

1. Memory effects in an AMS system: Catastrophe and Recovery. J. S. Vogel, J.R. Southon, D.E. Nelson. Radiocarbon, Vol 32, No. 1, 1990, p. 81-83 doi:10.2458/azu_js_rc.32.1252 (Open Access)

"... we certainly do not advocate processing both labeled and natural samples in the same chemical laboratory." "The long term consequences are likely to be disastrous."

2. Recovery from tracer contamination in AMS sample preparation. A. J. T. Jull, D. J. Donahue, L. J. Toolin. Radiocarbon, Vol. 32, No.1, 1990, p. 84-85 doi:10.2458/azu_js_rc.32.1253 (Open Access)

"... tracer ^{14}C should not be allowed in a radiocarbon laboratory." "Despite vigorous recent efforts to clean up the room, the "blanks" we measured had ^{14}C contents equivalent to modern or even post -bomb levels."

3. Prevention and removal of elevated radiocarbon contamination in the LLNL/CAMS natural radiocarbon sample preparation laboratory. Zerneño, et. al. Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms Vol. 223-224, 2004, p. 293-297 doi: 10.1016/j.nimb.2004.04.058

"The presence of elevated ^{14}C contamination in a laboratory preparing samples for natural radiocarbon analysis is detrimental to the laboratory workspace as well as the research being conducted."

4. High level ^{14}C contamination and recovery at XI'AN AMS center. Zhou, et. al. Radiocarbon, Vol 54, No. 2, 2012, p. 187-193 doi:10.2458/azu_js_rc.54.16045

"Samples that contain high concentrations of radiocarbon ("hot" samples) are a catastrophe for low background AMS laboratories." "In our case the ion source system was seriously contaminated, as were the preparation lines."



Beta Analytic

www.radiocarbon.com

Comment Log Display

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Comment 23 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Jean
Last Name	Tepperman
Email Address	action@sunflower-alliance.org
Affiliation	Sunflower Alliance
Subject	Proposed updates on the Low Carbon Fuel Standard
Comment	See attachment
Attachment	www.arb.ca.gov/lists/com-attach/7339-lcfs2024-UzBTOgBsUG4CYQBu.pdf
Original File Name	comments on LCFS - 7339 - Sunflower Alliance.pdf
Date and Time Comment Was Submitted	2024-08-26 10:15:25

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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P.O. Box 1932
El Cerrito, CA
August 26, 2024

Clerks' Office, California Air Resources Board
1001 I Street, Sacramento, California 95814

Re: **Proposed Updates to the Low Carbon Fuel Standard**

Dear Members of the Board:

We at Sunflower Alliance appreciate the Board's acknowledgement that the LCFS is in need of significant revision. However, we are also disappointed that the proposed revisions continue many of the harmful measures of the current program.

The Low Carbon Fuel Standard Program has provided much-needed support for zero-emission transportation, especially the rapid conversion to electric transportation. We urge you to further revise

the LCFS program to focus on incentivizing these approaches, rather than continuing support for biomethane and combustion fuels.

Specifically:

- 023.1
- Removing credits for hydrogen produced from fossil fuel is a positive step forward. But delaying implementation of this measure until 2030 means another five-plus years of financial rewards for its production. This serves to further the harm we should be preventing. We would like to encourage far more immediate implementation to prevent any further reliance on dirty, greenhouse gas-intensive hydrogen.
- 023.2
- The proposed draft continues to provide credits for the production of industrial dairy “biogas” despite the many harmful effects of this financial support. It incentivizes the expansion of large-scale factory dairy farms¹, causing harmful effects on the health of surrounding communities, including increased release of ammonia, water pollution, and increased truck traffic²; encourages the inevitable leakage of methane during storage and transportation³; and generates greenhouse gas emissions created by combustion of the product. We urge you to phase out support for biomethane as rapidly as possible^{4,5}.

- 023.3
- Unlike previous versions of the LCFS, the new proposal does not require the aviation industry to take any responsibility for the combustion of fossil fuel–based jet fuel, even for intrastate travel. This is a step backward, excluding a major source of greenhouse gases and pollution from fossil fuel combustion.
- 023.4
- It can't be said enough that biorefining is still a species of refining, and, as such, releases dangerous emissions with dire impacts on frontline communities. The production of renewable diesel is *at best* an interim solution, whose necessity we hope will be short-lived.
- 023.5
- Biofuels manufactured from virgin soy or canola oil are particularly problematic, with major negative consequences that include increased food prices, global deforestation, and the incentivization of industrial agriculture, which generates high quantities of greenhouse gas and toxic pollution. We are truly appreciative that the proposed revision acknowledges the seriousness of these problems. But we are dismayed that the LCFS revision continues to provide credits for the production of biofuel that includes up to 20 percent of this destructive feedstock.
- 023.6
- We are entirely unclear about the basis for this 20 percent “cap.” What likely quantifiable impact will this have on the rapidly

increasing utilization of soy and canola oils as renewable diesel feedstock? (In the first quarter of this year, biofuel from soybean and canola oil accounted for about 30 percent of the renewable diesel qualifying for LCFS credits.⁶ By all accounts, that percentage is expected to rise even further.) And what impact will the proposed 20 percent standard likely have on GHG reduction? We would like to see a more rigorous and science-based approach employed here—one that more effectively discourages, and not just somewhat reduces, the use of virgin oils in renewable diesel production.

Thank you very much for this opportunity to comment.

Very sincerely yours,

Jean Tepperman
Co-Coordinator
Sunflower Alliance

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Comment 24 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Alessandra
Last Name	Magnasco
Email Address	alessandra@cfca.energy
Affiliation	California Fuels & Convenience Alliance
Subject	CFCA - Opposition
Comment	Please see the attached opposition letter.
Attachment	www.arb.ca.gov/lists/com-attach/7340-lcfs2024-VzRQMFc1AjBXDIQ7.pdf
Original File Name	CFCA Opposition - LCFS Amendments.pdf
Date and Time Comment Was Submitted	2024-08-26 10:22:24

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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California Fuels and Convenience Alliance

2520 Venture Oaks Way, Suite 100

Sacramento, CA 95833

916.646.5999

August 19, 2024

California Air Resources Board
1001 I Street
Sacramento, California 95814

RE: Modified Text and Availability of Additional Documents and/or Information for the Proposed Low Carbon Fuel Standard Amendments

The California Fuels and Convenience Alliance (CFCA) represents about 300 members, including nearly 90% of all the independent petroleum marketers in the state and more than one half of the state's 12,000 convenience retailers. Our members are small, family- and minority-owned businesses that provide services to nearly every family in California. Additionally, CFCA members fuel local governments, law enforcement, city and county fire departments, ambulances/emergency vehicles, school district bus fleets, construction firms, marinas, public and private transit companies, hospital emergency generators, trucking fleets, independent fuel retailers (small chains and mom-and-pop gas stations) and California agriculture, among many others.

We must respectfully oppose the proposed amendments to the Low Carbon Fuel Standard (LCFS) program. Our analysis of the proposed changes reveals significant concerns about their potential impacts on fuel supply, consumer prices, and the overall effectiveness of the state's energy transition strategy. We specifically oppose the following amendments:

024.1

1. **Modification of Average Carbon Intensity Benchmarks:** The proposed increase in the carbon intensity (CI) reduction targets for gasoline, diesel, and jet fuels to a near-term increase in stringency to a 9% CI reduction in 2025 represents an abrupt shift in the regulatory framework. This accelerated target poses several substantial challenges that could impact various aspects of the fuel market and broader economy:

A. Feasibility and Technological Constraints

- I. **Technological Readiness:** Achieving a 9% reduction in carbon intensity within such a short timeframe requires advanced technological solutions that are not yet fully developed or commercially available. Many of the technologies necessary to meet these stringent targets, such as next-generation biofuels, carbon capture and storage, and advanced engine technologies, are still in the research or early deployment stages. The rapid escalation of targets may outpace the development and deployment of these critical technologies, making it difficult for industry stakeholders to achieve compliance.
- II. **Infrastructure Limitations:** Existing infrastructure, including refineries and distribution networks, may not be adequately equipped to support the rapid shift required by the new CI benchmarks. Upgrading infrastructure to handle new

types of fuels or technologies involves substantial investment and time. The lack of readiness in infrastructure could lead to bottlenecks and inefficiencies in fuel production and distribution.

B. Supply Shortages and Market Impact

- I. **Fuel Supply Disruptions:** The short timeline for achieving a 9% CI reduction could lead to significant disruptions in fuel supply. As companies scramble to meet the new standards, there could be a shortage of compliant fuels, affecting availability and reliability. This would particularly impact sectors that depend heavily on consistent fuel supplies, such as transportation and logistics.
- II. **Increased Fuel Prices:** Meeting the accelerated CI targets may involve higher production costs, which are likely to be passed on to consumers. The additional costs associated with adopting new technologies, reformulating fuels, and upgrading infrastructure could lead to higher prices at the pump. This price increase would disproportionately affect consumers, particularly those in lower-income and disadvantaged communities who are less able to absorb such costs.

C. Impact on Consumers and Disadvantaged Communities

- I. **Economic Burden:** The increased cost of fuels resulting from the rapid escalation of CI reduction targets could impose a significant economic burden on consumers. Low-income and disadvantaged communities are often more vulnerable to fluctuations in fuel prices and may struggle to cope with higher costs, exacerbating existing inequities.
- II. **Access to Affordable Energy:** Higher fuel prices could reduce access to affordable energy, affecting the cost of goods and services that rely on transportation and fuel. This could further strain household budgets and impact the overall quality of life for individuals in vulnerable communities.

D. Market Stability and Innovation

- I. **Regulatory Uncertainty:** Abrupt changes to CI benchmarks without adequate lead time can create regulatory uncertainty. Companies may face difficulties in long-term planning and investment, leading to reduced confidence in the market. This uncertainty could discourage investment in new technologies and infrastructure, potentially stalling innovation and progress in the sector.
- II. **Hindrance to Innovation:** Rapid regulatory changes may lead to a focus on short-term compliance measures rather than long-term innovation. Companies might prioritize meeting immediate targets over investing in more sustainable and innovative solutions that could offer greater benefits in the long run.

2. **Caps on Credits for Biomass-Based Diesel from Virgin Soybean and Canola Oils:** The proposed amendment introducing a company-wide 20% cap on credits for biomass-based diesel produced from virgin soybean and canola oils raises several significant concerns:

A. Market Distortion

- I. **Artificial Barriers to Market Access:** Imposing a cap of 20% on credits for biomass-based diesel from specific feedstocks, such as virgin soybean and canola oils, creates an artificial barrier that restricts market dynamics. This cap favors particular feedstocks over others, which could skew market incentives and lead to an imbalanced biofuel market. By limiting credit eligibility for certain feedstocks, the policy risks creating a market where only a few feedstocks are economically viable, reducing competition and innovation.
- II. **Stifling Innovation:** The proposed cap on credits for biomass-based diesel produced from virgin soybean and canola oils could unintentionally stifle innovation by creating an uneven playing field within the biofuel market. While the cap does not restrict biofuels produced from other feedstocks, it may still shift focus and resources toward optimizing the production of non-capped feedstocks, potentially diverting attention away from the exploration and development of new and innovative biofuel technologies. This could result in a market that prioritizes the use of available feedstocks rather than fostering a diverse and forward-thinking approach to biofuel development. An approach that avoids such specific caps and incentivizes a wider range of biofuels would better support a competitive and innovative market, driving advancements across various technologies and more effectively contributing to California's clean energy goals.

B. Compliance Burden

024.3

- I. **Uneven Implementation Timeline:** The proposed amendment introduces additional compliance complexities by setting different timelines for companies. Those with existing certified pathways prior to the adoption of the amendment have until January 1, 2028, to adjust their feedstock contracts, while other companies must comply immediately. This uneven timeline creates a competitive disadvantage for companies that must adapt quickly without the benefit of a transition period.

024.2 Cont

- II. **Administrative and Financial Strain:** Companies will face increased administrative and financial burdens as they navigate the new compliance requirements. The need to renegotiate feedstock contracts, adapt production processes, and manage the associated costs can strain resources, particularly for smaller or less resourced companies. This added complexity could lead to operational inefficiencies and increased costs, further impacting the overall market.
- III. **Market Uncertainty:** The discrepancy in compliance timelines may lead to uncertainty in the market. Companies may be hesitant to invest in long-term projects or make strategic decisions due to the potential for regulatory changes and the associated risks. This uncertainty can undermine confidence in the biofuel market and impede progress toward clean energy objectives.

C. Price Increases

- I. **Disruption of Long-Term Contracts:** The shift in feedstock requirements imposed by the cap could disrupt existing long-term contracts for feedstocks. Companies that have invested in and committed to contracts based on the

previous regulations may face financial losses or supply chain disruptions as they adjust to the new requirements. This disruption can lead to increased production costs for biodiesel and renewable diesel.

- II. **Higher Fuel Prices:** As a result of increased production costs and potential supply shortages, fuel prices are likely to rise. Higher costs for biodiesel and renewable diesel would be passed on to consumers, directly impacting the affordability of lower-carbon alternatives. This price increase could diminish the economic benefits of transitioning to lower-carbon fuels and potentially reduce consumer adoption of these cleaner options.
- III. **Impact on Consumer Affordability:** The increased fuel prices resulting from the proposed changes will disproportionately affect consumers, particularly those in lower-income communities. The rise in fuel costs can strain household budgets and exacerbate existing financial challenges, making it harder for these communities to benefit from cleaner, lower-carbon energy options.

D. Program Integrity

- I. **Slowing the Transition from Petroleum Diesel:** The proposed cap on credits could undermine the effectiveness of the LCFS program by potentially slowing the pace at which petroleum diesel is displaced. By focusing on limiting credit eligibility for specific feedstocks, the program may divert resources and attention away from more comprehensive and innovative low-carbon solutions.
- II. **Compromising Long-Term Goals:** The potential diversion of focus and resources away from broader, more effective clean energy solutions could compromise the long-term goals of the LCFS program. Ensuring that the program remains effective requires a balanced and inclusive approach that encourages the development of various low-carbon technologies and maintains momentum toward achieving comprehensive clean energy targets.

024.4

- 3. **Exclusion of Hydrogen Produced from Fossil Fuel Gas:** The proposed amendment to exclude hydrogen produced using fossil fuel gas from LCFS credit eligibility, effective January 1, 2031, presents several issues:

A. Supply Constraints

- I. **Drastic Reduction in Supply:** Hydrogen produced from fossil fuels, specifically through methods such as steam methane reforming (SMR), currently represents a substantial portion of the hydrogen supply in the market. This production method is well-established and forms the backbone of the existing hydrogen infrastructure. Removing this source could lead to a significant reduction in available hydrogen, as renewable hydrogen production capacities are still developing and are not yet able to meet current demand levels.
- II. **Increased Costs:** With a reduced supply of hydrogen, the costs associated with hydrogen production are likely to rise. The infrastructure and economies of scale that currently support fossil-based hydrogen production are not as advanced for renewable hydrogen. Consequently, excluding fossil-based hydrogen could result in higher prices for hydrogen, which would be passed on to end-users.

- III. **Market Instability:** The sudden exclusion of a major hydrogen source could cause volatility in the hydrogen market, affecting not only supply but also pricing stability. This could create uncertainty for businesses and investors, potentially stalling further investments in hydrogen infrastructure.

B. **Transitional Challenges**

- I. **Infrastructure Development:** Building the infrastructure necessary to produce, transport, and distribute renewable hydrogen at scale requires substantial time and investment. Renewable hydrogen technologies such as electrolysis are still emerging, and their infrastructure is not yet sufficient to replace fossil-based hydrogen in the short term. Excluding fossil-based hydrogen prematurely could disrupt ongoing efforts to develop this infrastructure and slow down the transition process.
- II. **Technological Advancements:** The renewable hydrogen sector is evolving, but the pace of technological advancements and cost reductions is not uniform across all areas. Immediate exclusion of fossil-based hydrogen may outpace the development and commercialization of new technologies, impeding the smooth transition to fully renewable hydrogen solutions.
- III. **Strategic Planning:** Energy policy should provide a gradual and strategic path towards renewable alternatives. Abrupt policy shifts can create misalignment between current capabilities and future goals, making it difficult for stakeholders to plan and implement the necessary changes effectively.

C. **Consumer Impact**

- I. **Increased Costs:** As the supply of hydrogen decreases and production costs rise, the price of hydrogen will inevitably increase. This price hike will directly affect consumers and businesses that use hydrogen as a transportation fuel.
- II. **Impact on Decarbonization Efforts:** Many industries are investing in hydrogen technologies to reduce their carbon footprints. The increased cost and reduced availability of hydrogen could slow down the adoption of hydrogen technologies, hampering efforts to achieve broader decarbonization goals.
- III. **Economic Disruption:** Higher hydrogen costs could lead to increased operational expenses for companies that rely on hydrogen as a transportation fuel, potentially resulting in higher prices for goods and services. This economic impact could be particularly severe for small and medium-sized enterprises that may struggle to absorb the increased costs.

In light of these concerns, we urge the California Air Resources Board to reconsider these proposed amendments. An effective energy transition strategy should support a diverse array of lower-carbon alternatives while balancing environmental goals with practical industry realities. Implementing a more measured and inclusive approach will help ensure a reliable, accessible, and affordable energy future for all Californians.

We welcome the opportunity to engage in further discussions and provide additional insights on these critical issues. If you have any questions, please contact Alessandra Magnasco at alessandra@cfca.energy.

Sincerely,

A handwritten signature in black ink, appearing to read "Alessandra Magnasco". The signature is fluid and cursive, with the first name and last name clearly distinguishable.

Alessandra Magnasco
Governmental Affairs & Regulatory Director

Comment Log Display

Here is the comment you selected to display.

Comment 25 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Jeffrey
Last Name	Pekrul
Email Address	Jeffrey.Pekrul@messages.fwwatch.org
Affiliation	
Subject	Stop rewarding dirty factory farms
Comment	Please see attached
Attachment	www.arb.ca.gov/lists/com-attach/7342-lcfs2024-WyhdLwZoUHNXDlcl.pdf
Original File Name	Stop Rewarding Dirty Factory Farms.pdf
Date and Time Comment Was Submitted	2024-08-26 11:03:35

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

Levrini, Shelby@ARB

From: Jeffrey Pekarul <Jeffrey.Pekarul@messages.fwwatch.org>
Sent: Saturday, August 24, 2024 9:10 AM
To: gavin@gavinnewsom.com
Cc: ARB Clerk of the Board
Subject: Stop rewarding dirty factory farms

Categories: SHELBY

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Governor Newsom,

I'm writing to express deep concern about the current state of California's Low Carbon Fuel Standard (LCFS) and to implore you to take immediate action to address the environmental injustices embedded in the program. Staff's recent changes continue to double down on dirty factory farm gas, a false solution that has infected California's climate policies.

Originally intended as a tool to combat climate pollution in the transportation sector, the LCFS has been manipulated by powerful industries, particularly Big Ag and Big Oil. It has become the nation's largest and most lucrative pollution trading scheme for factory farm biogas, perpetuating harmful practices rather than serving its environmental objectives.

Incentivizing the buildout of dirty factory farms not only enables pollution but disproportionately harms low-income communities and communities of color. Factory farms, predominantly situated in these marginalized areas, inflict severe damage on air, water, public health, rural economies, and overall quality of life. Collecting methane from factory farm cesspits does nothing to alleviate the massive harm mega-dairies and other large factory farms do to these communities.

Instead of doubling down on dirty factory farm gas, we demand a future free from the clutches of Big Oil and Big Ag and to prioritize Californians over corporate profits.

Sincerely,
Jeffrey Pekarul
1164 Church St
San Francisco, CA 94114-3420

cc: Clerk of the Board California Air Resources Board

Comment Log Display

Here is the comment you selected to display.

Comment 26 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Gordon
Last Name	Russell
Email Address	GORDON.RUSSELL@ldc.com
Affiliation	LDC
Subject	Comments LCFS Amendments – 15-Day Changes
Comment	Please See Attached
Attachment	www.arb.ca.gov/lists/com-attach/7343-lcfs2024-Am5RNANKWXIQCVAz.pdf
Original File Name	LCFS Comments LDC.pdf
Date and Time Comment Was Submitted	2024-08-26 12:09:58

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)



August 26, 2024

California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Comments LCFS Amendments – 15-Day Changes

Dear California Air Resources Board,

Louis Dreyfus Company (LDC) appreciates the opportunity to comment on the California Air Resources Board's (CARB) proposed amendments to the California Low Carbon Fuel Standard (LCFS). Louis Dreyfus Company is a leading merchant and processor of agricultural goods, founded in 1851. Our activities span the entire value chain, from farm to fork, across a broad range of business lines (platforms): Carbon Solutions, Coffee, Cotton, Food & Feed Solutions, Freight, Global Markets, Grains & Oilseeds, Juice, Rice and Sugar. Louis Dreyfus Company is active in over 100 countries across six geographical regions and employs approximately 18,000 people globally. We're processors of both soy and canola in North America, producers of both biomass-based diesel and ethanol and our customer base includes all Renewable Diesel producers selling product into the California markets today.

We commend CARB's continued efforts to drive decarbonization in the liquid fuels sector through the LCFS. This program has been highly successful over the last several years in encouraging significant investment throughout the value chain, enabling industry stakeholders to support California in achieving its emission reduction goals.

026.1 However, we have concerns regarding the proposed 20% cap on soy and canola oil as feedstocks in the latest regulatory text. As outlined below, we believe the proposed changes run contrary to the program's design and goals. They could undermine the health of the broader US renewable fuels market, disrupt the synergies between California's and other US state and federal policies, and adversely affect American farmers, while increasing Californian's dependence on imported foreign feedstocks. **Given these concerns, we urge CARB to reconsider this accelerated cap on virgin oils.**

Request for Additional Review

026.2 Additionally, LDC believes this proposal warrants an additional public workshop, environmental impact analysis, and 45 day comment period. These changes are substantial and not reasonably foreseeable based on previous notices. Notably, the Initial Statement of Reasons (ISOR) there is only a single mention of a vegetable oil cap, and only within the context of the Comprehensive Environmental Justice Scenario, which was found to increase overall GHG emissions.

Misalignment with LCFS Design and Goals

The LCFS is designed to reduce the carbon intensity of California's transportation fuel pool and provide an increasing range of low-carbon and renewable alternatives.¹ The program's structure naturally phases out higher carbon intensity feedstocks through progressively stricter emissions reduction targets.

026.3

Recent data indicates that 35% of California's diesel fuel pool still comprises conventional diesel.² Capping the use of soybean and canola oils would remove viable, clean, and renewable alternatives to these fossil fuels. As shown in the figure below, the current share of soy and canola oil is well above the prescribed 20% threshold; soybean and canola oil made up 31% of reported biomass based diesel feedstock during the first quarter of 2024. Given the short timeline for implementation, the only practical replacement for the gallons currently derived from these feedstocks would be conventional diesel.

This cap works contrary to CARB's goal of increasing the range of renewable alternatives as it directly limits certain alternatives. As shown below, the existing mix of feedstocks demonstrates a healthy diversity without overreliance on any single source. The proposed cap would narrow the market's focus, increasing dependence on imported feedstocks. During the previous amendments, then transportation fuels branch chief Sam Wade was once quoted as saying, "one of the nice things about the LCFS is we don't have to have a perfect crystal ball because the program doesn't pick winners. It basically sets up this system of tradable credits and provides value to the lowest carbon fuels that can come to market. So the framework really does facilitate us to look across a wide variety of options and to hopefully drive the best option to market."³ Here CARB itself is acknowledging the program functions as intended when market economics dictate the various use of feedstocks.

Additionally, this proposed change undermines the integrity of the program's fundamental design. As reported by CARB staff in April,⁴ the compliance curve naturally causes soy and canola oil BBD to become deficit generating fuels sometime between 2030 and 2033. Up until that point, BBD produced from these two feedstocks generate ever decreasing LCFS credits. The existing program structure already incentivizes the market to gradually shift away from these feedstocks making an artificial cap unnecessary.

This change to the fundamental program design affects far more than use of soy and canola oil in BBD production; it sends a clear signal that the long-term CARB objective is to eliminate the use of all liquid fuels in the market, irrespective of any new scientific basis. This is further evidenced by potential phasing out of new BBD pathways in 2031. Whether or not this is the intent; this marked shift in program design will work to discourage any further investments in the renewable liquid fuels space.

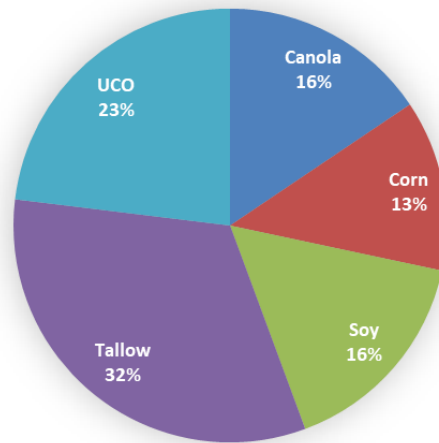
¹ Excerpt from <https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard>

² LCFS Quarterly Summary Q2 2023 - Q1 2024

³ <https://transportenergystrategies.com/2017/05/09/sam-wade-carb-excited-progress-lcfs/>

⁴ <https://ww2.arb.ca.gov/sites/default/files/2024-04/LCFS%20April%20Workshop%20Slides.pdf> slide 40

BBD Feedstock Mix in the Previous Year⁵



Broader Market Implications

026.3 cont

In 2023, LCFS-compliant gallons accounted for 51% of total BBD consumption in the US. Despite the majority share, the feedstock slate represented in gallons reported under California's LCFS program is materially different than that of the broader US Renewable Fuels Standard program (shown below). In 2023, soybean and canola oil made up 46% of feedstocks used nationwide whereas under the LCFS, the share amounted to just 31%. This feedstock use distribution shows that the LCFS is working as designed. Low-CI fuels are being imported or produced in California at a much higher rate than for other regulatory programs.

Introducing a vegetable oil cap in the U.S.'s largest BBD market would undermine the federal government's goal of reducing dependence on foreign energy and feedstocks. It would also compromise billions of dollars invested in US agricultural processing geared towards expanded domestic use of US produced crops. This accelerated pivot away from sustainable, renewable vegetable oil feedstocks fades synergies between California's state programs, the EPA's RFS and broader national level energy independence goals.

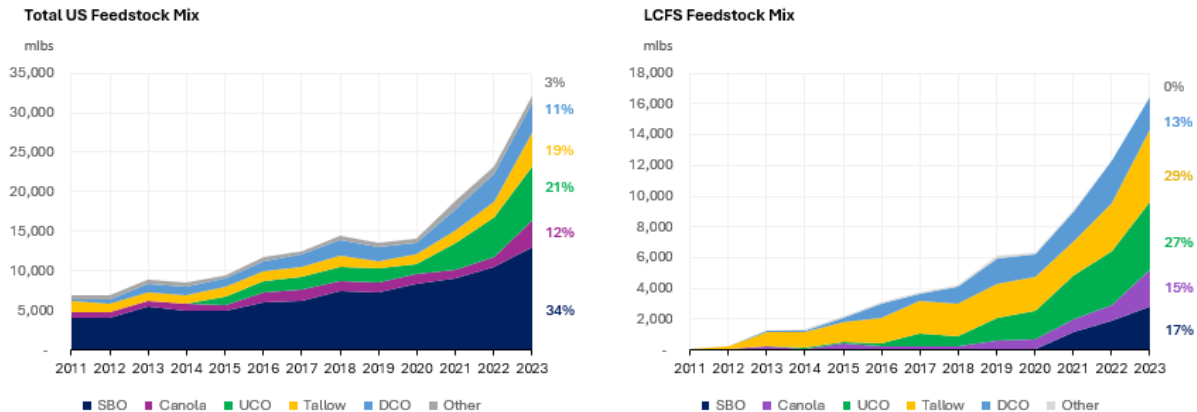
Given that row crop prices are at 24month+ lows, this cap also comes at the worst time for the US farmer. While prices had been elevated due to COVID as well as other supply chain shocks, these factors are no longer supporting markets. US farm incomes are at multi-year lows and the bright light for many US farmers had been the outlook for expanded domestic processing of US grown crops. The proposed veg-oil cap compromises existing and planned investments alike.

To add to this, inland US BBD plants without access to water born imports will be disproportionately affected by this veg-oil cap as logistics limitations make it cost prohibitive to access waste feedstocks, much of which is sourced by vessel from outside of the US. This cap compromises the economic viability of existing land-locked BBD producers and will drive additional BBD producers out of business, hurting rural

⁵ LCFS Quarterly Summary Q2 2023 - Q1 2024; assigning "other" renewable diesel as canola oil

economies as jobs are lost. We do not believe it was the intent of CARB to pick winners and losers with this update to the LCFS program.

US vs LCFS Feedstock Mix⁶



Shift in Energy Dependence to Foreign Feedstocks

From 2022 to 2023, imports of used cooking oil for BBD production tripled, largely driven by imports from China.⁷ Over the same period, imports of tallow for fuel BBD have more than doubled.⁸ Imported waste feedstocks now constitute 16% of the total used in U.S. BBD production, up from 9% in 2022 and 5% in 2021. Data suggests the sources of US used cooking oil and tallow have been fully accessed, meaning the LCFS program update puts the onus on imports to bridge the gap between the “ineligible” soybean and canola oil feedstocks currently used.

A key concern raised in prior comments submitted to CARB is the risk of chain-of-custody issues associated with these waste feedstocks. Recently, the EPA has open investigations into UCO supply chains due to potential mixing of palm and UCO.⁹ The environmental impact of this potential palm oil BBD is particularly alarming, as CARB’s own analysis suggests that the carbon intensity of palm oil-derived BBD could surpass that of conventional diesel.

While LDC appreciates CARB’s goal of increasing utilization of waste feedstocks, CARB cannot discount or overlook the fungibility and substitutability of BBD feedstocks. For instance, in the last year, 38% of tallow imports to the U.S. were sourced from South America.¹⁰ When South American tallow is shipped to the

⁶ EIA for total US; CARB Quarterly Summary

⁷ <https://theicct.org/the-case-for-a-lipids-cap-in-californias-low-carbon-fuel-standard-may24/>

⁸ EIA monthly reports

⁹ https://www.maritec.com.sg/news-detail/US_EPA_Investigates_Biodiesel_Supply_Chains_as%20Concerns_Grow_on_Feedstock_Sources

¹⁰ USDA Global Agricultural Trade System



026.3 cont

U.S. for BBD production, soybean oil backfills this exported tallow; both as an animal feed and a biofuel feedstock to meet Brazil and Argentina's biodiesel mandates. As a result, the intended reduction in indirect land use change is not fully realized; instead, the environmental impact is merely shifted to other jurisdictions with less stringent regulations. The proposed LCFS revisions, therefore, compromise the long term health and viability of the U.S. agricultural industry, while simultaneously benefitting agricultural sectors in other countries.

In closing, LDC appreciates the opportunity to comment on these proposed LCFS updates. We trust that CARB will carefully consider these concerns to ensure that the US farmer & the North American oilseed processing industry can continue to be a partner in California's LCFS. If CARB has any questions concerning this letter, please feel free to reach out to me at GORDON.RUSSELL@ldc.com.

A handwritten signature in blue ink, appearing to read "G Russell", is positioned above a horizontal line.

Gordon Russell
Head of US Grains & Oilseeds

Comment Log Display

Here is the comment you selected to display.

Comment 27 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Yaniv
Last Name	Scherson
Email Address	yaniv.scherson@anaergia.com
Affiliation	Anaergia
Subject	Food Scraps Definition and Landfill Capture Rate

Comment

Two issues:

027.1

1. Landfill capture rate: still 75% (wrong figure according to multiple scientific studies, EPA and CA studies show 36% and Canadian Clean Fuel Program adopted the 36% figure to match science). Changing landfill capture rate of methane from 75% (1997 EPA incorrect number) to 36% (correct scientific number, EPA 2023, NASA/JPL Nature 2020, numerous other studies) properly values and appropriately incentivizes California food waste AD plants. The 75% is also dangerous because it sets incorrect standard and precedent for CI calculation in SB 1440. Canadian CFR has referenced the latest science and determined landfill capture rate of 36% (see slide 19 of presentation in this link:

https://drive.google.com/file/d/10oJXYAsApJI7MDH4PyU1lGjWMLHKfonQ/view?usp=drive_link)

027.2

2. Food scraps: definition that is considered landfill diverted includes only post consumer food waste in solid form (only what's in trash cans). If food waste is in liquid form, doesn't count (ketchup or salad dressing or soda that goes to landfill). If food waste comes from a distribution center or food manufacturing facility, doesn't count, even though this waste goes to landfill. All food waste regardless of source should be assigned the statewide average of total fraction that goes to landfill. We should not cherry pick sources that are all in or all out of landfill destiny, particularly since all food waste is regulated by SB 1383 regardless of source. The attached document has suggested redlines on the definition to conform with SB 1383 and treat all food waste the same with a suggestion to simply revise the statewide fraction of food waste landfilled that should be adjusted to account for those sources that have lower landfilling rates than

those sources that have higher landfilling rates. Now it's binary, either landfilled 97.5% or not at all and this is not reality.

Attachment	www.arb.ca.gov/lists/com-attach/7344-lcfs2024-VzYGblllyBzELfwZh.docx
Original File Name	Anaergia Food Scraps Defintion Adjustment.docx
Date and Time Comment Was Submitted	2024-08-26 12:05:49

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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From CARB

~~“Food Scraps” is the organic portion of municipal solid waste (MSW) that consists of wastes derived from plants or animals for the explicit preparation for consumption by humans or other animals that is predominantly disposed by landfilling. This includes inedible waste or post-consumer food collected from foods processed or consumed at residences, hospitality facilities (hotels, restaurants, amusement parks, stadiums, special events, etc.), institutions (hospitals, schools, prisons, etc.), and grocery stores. Food scraps Feedstocks that are not typically landfilled do not qualify as Food Scraps, which include liquid wastes, fat/oil/grease: fats, oils, or greases (FOG), liquids at the point of collection, and materials, or other by-products of from industrial food manufacturing or processing, manufacturing, and distribution facilities.~~

Current CARB Proposed Definition

“Food Scraps” is the portion of municipal solid waste (MSW) that consists of inedible or post-consumer food collected from residences, hospitality facilities, institutions, and grocery stores. Feedstocks that are not typically landfilled do not qualify as Food Scraps, which include fats, oils, or greases (FOG), liquids at the point of collection, and materials from industrial food manufacturing or processing.

Anaergia Suggested Redline

“Food Scraps” is the portion of municipal solid waste (MSW) that consists of inedible or post-consumer food collected from residences, hospitality facilities, institutions, commercial establishments, distribution centers, manufacturing facilities, and grocery stores. All food scraps are assumed to follow the State-wide average landfill disposal rate of [97.5%]. This definition excludes fats, oils, or greases (FOG)..

Note: Definition should not cherry pick which sources count as landfill destined. All food waste should be treated the same and follow the statewide fraction destined to landfill. All food waste regardless of source goes to landfill to some degree. Therefore, apply the statewide average % destined to landfill for all sources combined (Statewide total). This definitions would exclude food from manufacturing plant that does go to landfill and visa versa include post consumer food waste in a trash can that does not go to landfill (i.e. SSO going to compost).

Comment Log Display

Here is the comment you selected to display.

Comment 28 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Jennifer
Last Name	LeRow
Email Address	jlerow@brayafuels.com
Affiliation	Braya Renewable Fuels
Subject	Braya Comments on CARB's Proposed LCFS Amendments Updated 08/12/2024
Comment	<div></div>
Attachment	www.arb.ca.gov/lists/com-attach/7345-lcfs2024-BmQCdIlyACoAZ1UK.pdf
Original File Name	Braya Comments on CARB's Proposed LCFS Amendments Updated 08.12.2024.pdf
Date and Time Comment Was Submitted	2024-08-26 12:52:08

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)



August 26, 2024

Braya Renewable Fuels
Refinery Road, P.O. Box 40
Come by Chance, NL A0B 1N0

California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: August 12, 2024 Proposed Low Carbon Fuel Standard Amendments

Dear California Air Resources Board,

Braya Renewable Fuels (Newfoundland) LP (“Braya”) is the owner of the Come By Chance refinery in Newfoundland, Canada. In the first quarter of 2024 Braya completed the conversion of the previously idled conventional oil refinery to a world-class renewable diesel production facility. The refinery is strategically located to deliver renewable fuels to various end markets, including California, and has the ability to meet LCFS demand and California’s broader greenhouse gas initiatives. Renewable diesel helps decarbonize the heavy transport sector – a sector that is key to economic activity and has few other near-term, executable decarbonization solutions.

We appreciate the opportunity to provide feedback on the Proposed Low Carbon Fuel Standard Amendments published on August 12, 2024 (the “Proposal”).

028.1

The Proposed Method of Limitation on Soybean and Canola Oil as Feedstocks is Arbitrary and Discriminatory

Braya strongly believes that the proposed limitations on biomass-based diesel produced from virgin soybean and canola oil (the “BBD Limitation”) under subsection 95482(i) are misguided, arbitrary and should not be implemented. As a threshold matter, we note that this topic will be incredibly complicated to implement, implicates complicated supply chain logistics and contracts, will cause material unintended consequences in both the renewable fuel and agriculture markets and will negatively impact California consumer energy prices. Soybean oil and canola oil collectively represent approximately 53%¹ of the US-based biomass-based diesel feedstock mix and approximately 434 million gallons (20%) of the 2023 feedstock mix in California.² The subject matter of this proposal is of a magnitude that it demands adequate notice, planning and vigorous debate to ensure the proposed amendment is consistent with the goals and strong history of the Low Carbon Fuel Standard.

Braya’s understanding of the BBD Limitation is that it will limit the eligibility of biomass-based diesel produced from soybean oil and canola oil to produce LCFS credits to no more than twenty percent of the biomass-based diesel annual production reporting, by company. The BBD Limitation would apply as soon as the Proposal becomes effective unless a producer falls into a specific grandfathered

¹ <https://advancedbiofuelsusa.info/clean-fuels-alliance-america-clean-fuels-and-california-advanced-biofuels-alliance-caba2-comments-california-low-carbon-fuel-standard-lcfs-workshop>

² https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/dashboard/Fig6_2023.xlsx



028.1 cont

exception. We read the Proposal as deferring the implementation of the soybean and canola oil LCFS credit generation limitations until 2028 (the “2028 Deferral”) for producers that (i) produced at least 20% of their 2023 annual production from soybean and canola oil, collectively, and (ii) had a “certified” pathway for biomass-based diesel prior to the effective date of the Proposal. Braya assumes for the purposes of this letter that the effective date of the Proposal will be on or around the beginning of 2025. As discussed below, Braya believes that not only is the BBD Limitation fundamentally misguided, but the 2028 Deferral mechanism in particular is arbitrary and will result in unjust and undesirable outcomes.

CARB states in the Proposal that the rationale for the 2028 Deferral is “to provide time to adjust feedstock supply contracts as needed.” However, the proposed implementation of the BBD Limitation and the 2028 Deferral is fundamentally flawed in that it does not achieve CARB’s stated goal of allowing sufficient time to adjust for feedstock contracts for producers such as Braya and also omits to consider facility specific feedstock attributes.

Braya began converting its facility to renewable diesel production in 2021 and began producing renewable diesel in February 2024. Thus far in 2024, Braya has supplied the California market with renewable diesel based on a variety of renewable feedstocks, including amounts of soybean oil well in excess of 20% of Braya’s total production, under a temporary pathway issued by CARB. Braya is also preparing a Tier 2 application package for CARB review that will be filed imminently. Nonetheless, Braya will be disqualified from eligibility for the 2028 Deferral due to (i) Braya’s February 2024 production start date as opposed to the Proposal’s 2023 production requirement, and (ii) the Proposal’s requirement that Braya hold a “certified” pathway prior to the Proposal’s effectiveness. Braya notes that whether its imminent Tier 2 Application will satisfy the timing requirements of the 2028 Deferral will largely be dependent on CARB’s review schedule for the balance of 2024- an element that will be out of Braya’s control.

Notably, Braya:

- Began a refinery conversion process in 2021 that cost hundreds of millions of dollars and was specifically designed to accommodate soybean oil feedstock in reliance on the Low Carbon Fuel Standard’s historical technology-neutral approach;
- Produced over 58 million gallons of renewable diesel for the California market in 2024 under an effective temporary pathway applicable to soybean oil;
- Will apply for a fulsome Tier 2 provisional pathway in a matter of weeks;
- Has entered into tens of millions of dollars of soybean oil feedstock contracts for 2025 production that will need to be addressed at substantial cost if the 2028 Limitation is implemented as proposed; and
- Notwithstanding the above, would not qualify for the 2028 Deferral in its current form.

028.1 cont

Braya applauds CARB’s acknowledgement that the BBD Limitation should consider producers feedstock arrangements, but also believes it is important that CARB consider facility specific implications of running various feedstocks. Renewable diesel facilities are not universal in respect of feedstocks and the geographic location of a facility has a significant impact on feedstock availability. Many facilities are designed to accommodate specific feedstocks and may require capital investment



and modifications to process additional or different feedstocks. Braya anticipates needing to launch a material capital project to modify its facility to accommodate a different slate of feedstocks should the BBD Limitation be implemented. These modifications will be capital intensive and take time to complete. The BBD Limitation also assumes all producers will be able to source adequate alternative feedstocks without considering geographically imposed logistical challenges that are location and facility specific. Braya strongly believes that these facility specific concerns should be considered in the design and timing of the 2028 Deferral.

028.2

As a reference point on overall implementation timing, Braya notes that CARB has recognized a “breaking ground” timeline for avoided methane crediting periods associated with RNG projects and similar concepts have been used in the implementation of the Renewable Fuel Standard to introduce new regulatory concepts without unfairly disadvantaging certain producers. We believe such an implementation approach is superior to the 2028 Limitation and will avoid unjust outcomes for particular producers.

In short, Braya is exactly the type of producer that CARB’s proposal purports to accommodate with the 2028 Limitation, but certain flaws in its design will instead be incredibly punishing to Braya due to a backward-looking timing component that was first announced in August 2024 for virtually immediate implementation. Specific recommendations to address these design issues are at the bottom of this letter.

The BBD Limitation is Ambiguous and Will Be Difficult and Costly to Administer

028.3

Braya also believes that the BBD Limitation, as proposed, will be difficult to implement and administer. We believe that changes of this magnitude would benefit from a more fulsome review process as the current proposal contains significant ambiguities, among other material issues.

For example, there is ambiguity with respect to the terms “production reporting” and “company.” Production reporting is not a term used anywhere else in the LCFS and has no clear applicability to volumes of fuel for which the producer is not the first fuel reporting entity. Whether or not CARB’s intent is to create tracking obligations upstream of the first fuel reporting entity or to place new restrictions on non-producers that take on the reporting obligation, it is creating a situation that will significantly disrupt existing contracts and relationships while creating different paths to potentially game the system through creative allocation of feedstocks amongst entities. Compliance with this provision will require duplicate actions by multiple entities to generate the necessary reporting and tracking data.

Organizations are structured in a variety of ways to fulfill various operational and legal needs. There are many situations in which an organization that is colloquially referred to as a single company and operates under common control is nonetheless organized into separate legal entities. Too narrow of a definition of “company” can threaten the ability of an organization to operate in a commonsense manner while too broad of a definition also increases the likelihood of gaming the system and allowing affiliates of large market players to effectively circumvent the intent of the proposed cap at the expense of smaller companies and California consumers.



Even if additional guidance were provided regarding “production reporting” and “company,” to allow parties to adequately evaluate the impact of the Proposal, there will undoubtedly be additional cost and infrastructure required by both CARB and regulated parties that runs counter to AB 32’s statutory mandate to minimize administrative burden. As described further below, none of this is necessary to achieve CARB’s environmental goals because a sophisticated and technology-neutral mechanism is already in place.

028.4

Superior Mechanisms Already Exist for Limiting Biomass-Based Diesel in California

To date, the LCFS has maintained an unbiased, technology-neutral approach. CARB already has a stringent and ongoing review process in place to address indirect land use change (“iLUC”) applicable to biofuels. Braya supports stringent reviews of this iLUC mechanism particular to the applicable feedstock in use. CARB staff noted in previous workshops that this mechanism significantly penalizes producers that utilize crop-based feedstocks by elevating CI scores well above those of non-crop-based feedstocks. We note that the Proposal goes even further by increasing the CI scores for temporary pathways applicable to crop-based feedstocks. Braya believes the newly developed specified source feedstock documentation and traceability requirements that are based on actual feedstock data, including iLUC, is a more appropriate and accurate method of achieving meaningful CI reductions without jeopardizing the much-needed renewable diesel supply in California. Finally, Braya also notes that the reducing carbon intensity requirements over time inherent in the Low Carbon Fuel Standard addresses perceived excess of vegetable oil used as feedstocks. CARB’s own modeling shows that virgin oil feedstocks will become deficit generating as early as 2030, before even considering the increased CI step-down of 9% contained in the Proposal.³

The BBD Limitation Implementation Timeline Will Expose California to Fraudulent Feedstocks and Increased GHG Emissions

028.5

Braya is supportive of the overall transition to lower carbon intensity feedstocks while moving the state forward toward electrification, but care must be taken to do so in a responsible manner—which is not implementing the BBD Limitation in less than six months. As CARB is no doubt aware, significant concerns have been raised concerning the use of material amounts of fraudulent used cooking oil and palm oil, which is difficult to track. In fact, earlier this month the U.S. Environmental Protection Agency announced that it was auditing renewable fuel producers concerning potential fraudulent use of used cooking oil. In addition, material amounts of used cooking oil may become subject to the imposition of tariffs in the near-future. The rushed nature of the BBD Limitation will force producers into the morass of an ongoing fraudulent feedstock investigation and possible enforcement actions in a part of the feedstock market where verifiable quantities of feedstock are already significantly limited, defeating the purpose of a supposed transition to lower carbon intensity feedstocks.

Counter-intuitively, implementation of the BBD Limitation may increase greenhouse gas emissions. Vegetable oils are a significant portion of the feedstock mix and a significant driver of the impressive volume growth in California’s renewable diesel pool. In particular, we express concern that CARB’s evaluation of a scenario limiting biomass-based diesel contained in the April 10, 2024 California Low Carbon Fuel Standard Workshop resulted in (i) an overall increase of nearly 1,000 MMT CO₂e in

³ California Low Carbon Fuel Standard Workshop Presentation, April 10, 2024, slide 40.



greenhouse gases, (ii) an increase in 2030 fossil diesel usage of approximately 1 billion gallons and (iii) extended the overall life of fossil fuels in California, as compared to CARB's proposed scenario.⁴ Fundamentally, a reduction of feedstocks options will almost certainly result in decreased renewable diesel production.

The BBD Limitation Will Distort the California Renewable Fuel Market

028.1 cont

As described above, the 2028 Deferral will favor a certain set of historical producers to the detriment of certain other producers based on backward-looking time thresholds. Unsurprisingly, such a design is likely to have unintended consequences on the California renewable fuels market, including the *increase* of biomass-based diesel production by a certain subset of producers advantaged by the BBD Limitation. If implemented, historical producers that are granted deferred compliance under the 2028 Deferral will continue producing biomass-based diesel unabated while other producers are significantly restricted to a 20% limitation on production. This reduction in the number of producers able to process soybean oil and canola oil as feedstocks and still access the California market should lead to distressed prices for these feedstocks as the universe of buyers shrinks. These distressed feedstock prices will encourage this subset of grandfathered companies to produce as much biomass-based diesel from these feedstocks as possible to maximize the artificial advantage granted to them via the design of the 2028 Limitation. As a result, the implementation of the 2028 Deferral as constructed is likely to *increase* the relative supply of biomass-based diesel into California while also reducing the overall amount of renewable diesel coming into California as other producers are forced into other markets or reducing production.

The BBD Limitation Will Increase California Consumer Energy Costs

028.6

Braya also believes that the BBD Limitation will result in increased fuel prices for the California consumer. The price of renewable fuels is set in the marketplace by the cost of the marginal barrel produced. The BBD Limitation will force the marginal producer to procure more expensive low CI feedstock due to the aforementioned restrictions applicable to relatively cheaper soybean oil and canola oil. In turn, this increased cost of the marginal barrel will drive up the cost of the associated renewable fuel for the California consumer.

This price increase will be exacerbated by unrelated policy changes at the federal level. The planned elimination of the existing blender tax credit and replacement with the producer tax credit under the Inflation Reduction Act will also increase demand for lower CI feedstocks. The implementation of the BBD Limitation and the producer tax credit at roughly the same time is likely to result in a multiplier effect where the cost of low CI feedstocks significantly increases which will lead to a substantial and sudden increase to the cost of production to the marginal renewable fuel producer and, ultimately, to the California consumer.

Implementation of the BBD Limitation Will Deter Industry Investment in California Renewable Fuels

⁴ California Low Carbon Fuel Standard Workshop Presentation, April 10, 2024, slides 23, 29 & 31.



Finally, Braya asks CARB to consider the message it will be delivering to the market and potential investors in the renewable energy space should the BBD Limitation be implemented as proposed. That message will be clear - upon extremely limited notice and using arbitrary deadlines set in the past that effectively pick winners and losers, your investment in the energy transition could be jeopardized. Instead, a more constructive signal should be sent to existing and potential renewable fuel producers by allowing all producers to adjust to the feedstock supply changes, facility-specific modifications and accommodations to offtake contracts on a level playing field. This message should encourage innovation and investment in the renewable energy space. We firmly believe that message can only be delivered if the BBD Limitation is abandoned entirely or significantly modified as described below to avoid arbitrarily punishing recent and new market participants.

Timing of Implementation Should Reflect Underlying Electrification Progress

Braya understands that a significant contributor to the rationale underlying the BBD Limitation is the expectation of increasing electrification in medium- and heavy-duty transport vehicles. We note that, in this respect, the Proposal also contains limitations on new biomass-based diesel pathway applications under subsection 95488(d), where no new applications may be accepted if a certain threshold of zero or near-zero emission vehicles is achieved by the end of 2029. We believe such a deferred and performance-contingent approach is also appropriate for the BBD Limitation by ensuring the availability of affordable renewable fuels in California prior to mass electrification of these particular transport modes.

Recommendation

028.2 cont Braya strongly suggests eliminating the BBD Limitation completely given that it is (i) arbitrary and unnecessary considering the well-established iLUC mechanism, CI calculations (including proposed step-downs) and stringent feedstock documentation requirements and (ii) likely harmful to CARB's decarbonization goals and to the California consumer. If implemented, the BBD Limitation should be modified as described below to provide a level-playing field for producers.

Braya recommends the following modifications if the BBD Limitation is implemented:

- Either (a) adopt a “breaking ground” concept that would qualify a producer for the 2028 Deferral if physical construction or conversion of a facility began prior to January 1, 2024 or (b) move the required production timing for a producer's eligibility for the 2028 Deferral from the proposed 2023 to 2024;
- Modify the pathway certification requirement to include parties that have applied for a provisional pathway prior to the end of 2024 or have operated under a temporary pathway prior to the end of 2024; and
- Delay the implementation of the BBD Limitation in a manner that considers achievement of electrification milestones similar to those set forth in the newly proposed restrictions on biomass-based diesel pathways as described in subsection 95488(d).

Braya is also a member of the Advanced Biofuels Association (the “ABFA”) and supports and reiterates the recommendations and conclusions set forth in the ABFA's comment letter concerning the Proposal.



Thank you in advance for taking the time to review our comments and proposed solutions concerning these very important issues. We look forward to working with CARB and welcome any opportunity to discuss these matters further and provide additional assistance and insight.

Respectfully,

A handwritten signature in black ink, appearing to read 'TOM'.

Todd O'Malley
Chief Executive Officer
Braya Renewable Fuels

Comment Log Display

Here is the comment you selected to display.

Comment 29 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Zachary
Last Name	Kahn
Email Address	zkahn@tesla.com
Affiliation	Tesla
Subject	Tesla Comments on CARB's Proposed 15-Day Amendments to the Low Carbon Fuel Standard
Comment	<div>Please see attached comments from Tesla on CARB's 15-Day Amendments to the LCFS Regulation.</div>
Attachment	www.arb.ca.gov/lists/com-attach/7346-lcfs2024-UiZQM1UnV2gKbQBf.pdf
Original File Name	Tesla LCFS 15 Day Amendments Final Comments.pdf

Date and Time Comment Was Submitted 2024-08-26 13:07:51

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

August 25, 2024

Submitted electronically via <https://ww2.arb.ca.gov/applications/public-comments>

Chair Liane Randolph and Board Members
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Tesla Comments on CARB's Proposed Amendments to the Low Carbon Fuel Standard (August 12, 2024)

Dear Chair Randolph and Members of the Board:

Pursuant to the California Air Resources Board's (CARB's) Proposed Low Carbon Fuel Standards (LCFS) Amendments (Aug. 12, 2024) ("15-day Amendments"), Tesla respectfully submits the following comments. Tesla incorporates by reference its written comments in response to previous 2022 Scoping Plan and LCFS workshops and presentations.^{1 2 3 4} Tesla continues to support CARB and the state of California in defending the state's authority to implement the LCFS. Tesla appreciates the work of CARB staff in putting together the 15-day Amendments and strongly supports many of the proposed amendments, which will greatly improve the LCFS program moving forward. This includes assigning base credits to electric vehicle (EV) manufacturers, and improvements to the Fast Charging Infrastructure (FCI) program. Detailed below are several additional amendments that Tesla believes will further improve the program and ensure its near- and long-term success. This includes a further increase to the step change, adjusting the time frame for the Automatic Acceleration Mechanism, harmonizing the FCI program for hydrogen and electric charging, raising the per site power rating, and updating the verification process for EV charging.

I. Background - Tesla's Mission

Tesla's mission is to accelerate the world's transition to sustainable energy. Moreover, Tesla believes the world will not be able to solve the climate change crisis without directly reducing air pollutant emissions - including carbon dioxide and other greenhouse gases - from the transportation and power sectors.⁵ To accomplish its mission, Tesla designs, develops, manufactures, and sells high-performance fully electric vehicles and energy generation and storage systems, installs, and maintains such systems, and sells solar

¹ <https://ww2.arb.ca.gov/form/public-comments/submissions/3796>

² <https://www.arb.ca.gov/lists/com-attach/4195-scopingplan2022-BmVcO1IMAYMGYwBv.pdf>

³ https://www.arb.ca.gov/lispub/comm2/iframe_bccomdisp.php?listname=lcfs-wkshp-feb23-ws&comment_num=111&virt_num=98

⁴ <https://www.arb.ca.gov/lists/com-attach/7042-lcfs2024-AjBdb1VkVjcLP1Rk.pdf>

⁵ See, Tesla, Master Plan Part 3 (Apr. 5, 2023) available at https://www.tesla.com/ns_videos/Tesla-Master-Plan-Part-3.pdf
https://www.tesla.com/ns_videos/Tesla-Master-Plan-Part-3.pdf

electricity.⁶ Consistent with this effort, in May, 2023, Tesla was ranked as the world leader in the transition to vehicle electrification.⁷

II. The 9% Step Change Should be Increased to 12%

029.1 cont Tesla applauds CARB's long-term vision of setting a 90% reduction target by 2045. This cements California as the clear leader in the transportation decarbonization policy space, with the furthest-forward decarbonization target of any transportation decarbonization program globally. It also sets California on a path to reach Net Zero by 2045, as envisioned by Executive Order B-55-18. Currently, there are two principal factors in over-compliance that threaten the continuing stringency of the LCFS – the accelerating use of both renewable diesel and renewable natural gas. Tesla applauds the 15-day Amendments pushing for a 9% step change; however, Tesla continues to believe a higher step change is required and supports the adoption of a 12% step change.

As detailed in prior comments to the Board, the current LCFS market is not functioning in a sustainable manner. There is a glut of credits on the market that has driven down pricing, making the LCFS less supportive of electrification efforts in California. CARB's 9% step change proposal is unlikely to do enough to address this threat to the program. The clear near-term solution is implementation of a step change of at least 12%, as quickly as possible.

III. Trigger the Automatic Acceleration Mechanism (AAM) Off of 2025 Data

029.2 cont The inclusion of an Automatic Acceleration Mechanism (AAM) is an important step towards balancing the safeguards in the program which already includes multiple safeguards to help rebalance the program if it is underachieving its targets, including a Credit Clearance Market, Advanced Credits, Carryback Credits, and Accumulated Deficits. The AAM is an important counterbalance safeguard for times when the program is overachieving its targets.

However, absent a stronger step change proposed above, CARB should set up the AAM to trigger off 2025 data, allowing for the first year of AAM implementation in 2026, rather than 2027 as proposed in the draft regulations, and unchanged by the 15-day Amendments. This would ensure that credit prices rebound and the program continues to support transportation electrification in a meaningful way.

IV. Assignment of Base Credits to Original Equipment Manufacturers is Critical

029.3 cont Tesla strongly supports the 15-day Amendments allowing the Executive Officer to assign a portion of base credits to Original Equipment Manufacturers (OEMs). Tesla has long argued that OEMs should play a larger role in turning base credits for residential charging into drivers of additional adoption of electric vehicles (EV) and appreciates CARB staff's efforts to allow the Executive Officer to assign base credits to OEMs. CARB's proposal will lead to increased direct investment in EV deployment in California.

⁶ See, Tesla, Impact Report 2022 (Apr. 24, 2023) available at https://www.tesla.com/ns_videos/2022-tesla-impact-report-highlights.pdf

⁷ See, ICCT, The Global Automaker Rating 2022: Who Is Leading the Transition to Electric Vehicles? (May 31, 2023) available at <https://theicct.org/publication/the-global-automaker-rating-2022-may23/>

While the Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information is relatively clear cut in stating that the Executive Officer can act if “model year 2024 ZEV sales for vehicle classifications subject to the Advanced Clean Cars regulation are less than 30 percent of new vehicle sales,”⁸ the actual regulatory language is less clear, stating that the Executive Officer may act “if the share of new zero emission vehicle sales for model year 2024 zero emission vehicles certified under California Code of Regulations, title 13, section 1962.2 is less than 30 percent.”⁹ Tesla recommends modifying the regulatory language to add clarity: “if the share of new ~~zero emission~~ vehicle sales for model year 2024 **that are** zero emission vehicles certified under California Code of Regulations, title 13, section 1962.2 is less than 30 percent.” CARB should also clarify that this trigger for the Executive Officer to act is a one-time event and that OEMs will continue to receive base credits through the life of the program, or until there is a public amendment process.

In addition, the current language is discretionary when regulatory certainty is necessary. Instead of giving the Executive Officer the discretion (“may”) to direct base credits to OEMs for “up to 45%” of those credits, Tesla believes the regulation should affirmatively state that if zero emission vehicles do not make up 30% of Model Year 2024 sales in California, the Executive Officer *shall* direct 45% of base credits to eligible OEMs. Clarity is essential when designing a market-based program for all participants and the public and Tesla encourages CARB to create that certainty by making the above suggested amendments.

V. Existing Amendments to the Fast Charging Infrastructure Program Should be Approved

029.4 cont Tesla supports several of the amendments made to the Fast Charging Infrastructure (FCI) Program made in the 15-day Amendments. In particular, Tesla supports:

- extending the program application deadline for the Heavy-Duty (HD) FCI program to December 31, 2035;
- extending the minimum distance from an existing or pending electric vehicle Federal Highway Administration Alternative Fuel Corridor to five miles instead of one mile;
- removing the ten charger cap;
- matching the credit life of the FCI and hydrogen refueling infrastructure (HRI) programs at 10 years; and
- raising the MW cap per site.

Under these amendments, this program will accelerate deployment of charging infrastructure for HD electric trucks throughout California.

a. Proposed Additional Amendments to the FCI Program

029.6 i. Harmonize Hydrogen and EV Charging CIs for Capacity Credits

CARB should continue to focus on parity between incentives for EV charging and hydrogen fueling. As such, FCI and HRI programs should have the same formula for calculating credits. The formula for a shared HD-HRI station includes a 50% factor and a private HD-HRI station includes a 25% factor. However, a shared HD-FCI charging site has a 20% factor and an FSE at a private HD-FCI charging site has

⁸ https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_notice.pdf at 4.

⁹ https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_atta-1.pdf at 48.

a 10% factor. CARB should continue to harmonize the HRI and FCI programs by amending these factors to be the same for both programs.

Second, CARB currently gives preferential treatment to hydrogen stations – despite showing no signs of commercial success – over EV charging stations when assigning the CI for capacity credits. Hydrogen stations utilizing the HCI pathway receive a CI of the “Company-wide weighted average CI for dispensed hydrogen during the quarter or 0 g/MJ, whichever is greater” while electric vehicle charging stations utilizing the FCI receive a CI of the “California average grid electricity carbon intensity” regardless of whether the EV charging company is utilizing 0 CI RECs for the rest of their charging. CARB should treat hydrogen fueling and EV charging equally by either giving hydrogen HRI capacity credits a CI of the last reported industry average, or by allowing EV charging FCI capacity credits to be generated off of a 0 CI if the company is using REC matching for the rest of their charging.

ii. **Raise the Total FCI Power Rating at One Address to 3,000 kW**

029.7

The EV charging industry is growing rapidly but in the last few months there have been more and more reports of charging congestion, particularly during holiday travel or around specific large events. A recent article in Bloomberg aptly noted that the “US charging network is also entering its post-scarcity era” which will lead to “charging’s next challenge - redundancy.”¹⁰ As such, charging providers need to build larger and larger sites to ensure that during these high traffic events or peak travel times there is adequate charging to ensure customers are not waiting for long periods of time. Tesla anticipates that the average post count per site will continue to rise, leading to a growing number of sites with an installed capacity surpassing 2,500kW. To continue to support charging infrastructure deployments, CARB should consider amending the total FCI power rating for all LMD-FCI FSEs at one address to 3,000 kW from 2,500 kW.

VI. Update the Light Duty Battery Electric Vehicle Energy Efficiency Ratio (EER)

While not included in the 15-day Amendments, Tesla believes CARB should update the Energy Efficiency Ratio (EER) for Light Duty Battery Electric Vehicles. The current 3.4 EER was adopted by CARB in 2011 and has not been updated since then. California lags other jurisdictions which have more accurate EERs, such as The Netherlands (4.0 EER),¹¹ the European Union (4.0 EER),¹² and Canada (4.1 EER).¹³ As described in previous comments, a more thorough analysis would likely result in an EER over 4.0.¹⁴

In addition, CARB should allow an OEM to apply for an EER based upon that OEM’s real-world fleet. CARB has created a precedent for this by approving the Lime scooter Tier 2 pathway which included a

¹⁰ <https://www.bloomberg.com/news/articles/2024-08-20/america-s-ev-charging-network-faces-its-next-challenge-congestion>

¹¹ <https://www.rijksoverheid.nl/documenten/kamerstukken/2022/12/22/beantwoording-kamervragen-over-wijziging-van-de-stimuleringsfactoren-in-de-regeling-energie-vervoer>

¹² <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023L2413&qid=1699364355105>

See also, https://www.europarl.europa.eu/doceo/document/ITRE-AM-729929_EN.pdf

¹³ Page 86 of the Specifications for Fuel LCA Model CI Calculations, <https://datadonnees.az.ec.gc.ca/data/regulatee/climateoutreach/carbon-intensity-calculations-for-the-clean-fuelregulations/en/Resources/?lang=en>

¹⁴ <https://www.arb.ca.gov/lists/com-attach/7042-lcfs2024-AjBdb1VkVjclP1Rk.pdf>

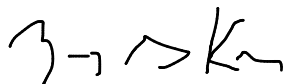
company-specific EER factor.¹⁵ Allowing OEMs to submit applications for company-specific EERs would better reflect the actual efficiency of electric vehicles in the market and allow those vehicles to be properly credited. This would also incentivize each OEM to focus on improving vehicle efficiency.

029.5 cont **VII. Remove the Unnecessary Third-Party Verification for Non-Residential EV Charging**

Proposed section 95501 of the original amendments includes a proposal to expand third-party verification for EV charging transactions. While Tesla appreciates the intent of CARB staff's proposal, it is unnecessary to create a separate third-party verification program regime for non-residential electricity transactions related to EV charging. Commercial EV charging infrastructure transactions fall under the purview of the CA Department of Agriculture, Division of Measurement Standards (DMS), under its state weights and measures program. CA DMS is responsible for verifying the accuracy of commercial EV charging infrastructure in California. This includes both a field verification process carried out by the CA counties as well as type evaluation program. While unchanged in the 15-day Amendments, it is unnecessary for CARB to add additional verification requirements for LCFS given the accuracy of commercial EV charging transaction is already regulated and verified in CA. We therefore recommend that no additional third-party verification is necessary for EV charging transactions.

Tesla appreciates the opportunity to express support for many of the 15-day Amendments to LCFS and urges CARB to incorporate the additional amendments described above to ensure continued success of the program and help meet California's transportation electrification policy goals.

Respectfully submitted,



Zachary Kahn
Senior Managing Policy Advisor
Public Policy & Business Development

¹⁵ https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/comments/tier2/b0467_cover.pdf

Comment Log Display

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Comment 30 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Hilary
Last Name	Primack
Email Address	hprimack@mahoneyeyes.com
Affiliation	
Subject	Mahoney Environmental Comments on August 2024 15-day Package
Comment	Please see attached letter.
Attachment	www.arb.ca.gov/lists/com-attach/7347-lcfs2024-VjtXMF17VWkHbwNm.pdf
Original File Name	Mahoney Environmental Comments on August 2024 15-day Package.pdf
Date and Time Comment Was Submitted	2024-08-26 13:45:08

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 27, 2024

Liane M. Randolph, Chair
California Air Resources Board (CARB)
1001 I Street
Sacramento, California 95814

Dear Chair Randolph,

As a stakeholder who recognizes the value that renewable diesel (RD), sustainable aviation fuel (SAF), and other liquid renewable fuels provide in reducing greenhouse gas (GHG) and air pollutant emissions, and delivering reliable, sustainable energy to California's economy, Mahoney Environmental Solutions, LLC (Mahoney) strongly urges CARB to adopt revisions to the Low Carbon Fuel Standard (LCFS) as soon as possible.

The current regulatory targets for carbon intensity (CI) reduction are outdated and must be strengthened to realize the maximum amount of GHG and pollutant emission reductions possible and send a strong signal to investors that California wants to remain a leader in generating jobs and economic development in sustainable energy.

The new draft regulatory proposal contains several elements to strengthen the program and maintain the incentives for renewable fuel producers to continue reducing the CI of their fuels and the resources used to make them. There are, however, some improvements that must be included in the final updated regulation to allow the state to reach its climate goals.

A robust and stable market for LCFS credits is critical in achieving the environmental and economic benefits for Californians. The following change is critical for the state to move forward with the best technologies needed to continue decarbonizing the transportation sector while protecting businesses, jobs, and the beautiful natural resources California has to offer.

030.1

Modifications to Section 95488(d)- Proposal to Stop Accepting RD Pathway Applications:

- Mahoney has concerns about the proposed sustainability certification requirements. CARB is requiring certifications for well-established and previously recognized waste biomass unless specifically enumerated in 95488(d).
- The proposed rules could preclude the use of used cooking oil (UCO) as a feedstock, despite the fact that UCO has been one of the cleanest and most reliable waste feedstocks for both RD and SAF supplies. SAF is produced alongside RD, and any limits on RD production inevitably will result in less SAF production. The phase out of these pathways would be detrimental to emissions reductions in the transportation sector and would potentially limit UCO for RD and SAF production in the future.

Below you will find further context regarding Mahoney and the importance of UCO collection and processing.

Background on Mahoney and UCO Collection

Since 1953, Mahoney Environmental® has helped foodservice establishments turn UCO and other waste products into useful products like renewable fuels. Mahoney manages the entire recycling process — from equipment set-up to collection, and processing. We share the benefit of UCO and pass that added value onto restaurant operators. We are a licensed EPA recycler, and all of our facilities recycle nearly 100% of the materials processed. Mahoney's goal is to be



the premier back-of-the-house service provider to foodservice operators nationwide — from national and regional chains to independent restaurants to airports throughout the United States.

Environmental & Economic Benefits

Mahoney is proud to service approximately 80,000 food service facilities nationwide, and approximately 13,400 in California. We also proudly employ over 100 employees in California, and we collect about 66,980,000 lbs. of UCO and recycle it. Our environmental impact from recycling UCO we collect in California is equivalent to:

- 73,452.10 Tons of Waste Diverted from a Landfill;
- 11,300,328 Trees Planted;
- 12,830 Cars Made Zero Emission; and
- 146,986,272 lbs. of CO₂ Prevented from Entering the Atmosphere.

Mahoney is also committed to transparency and good business practices throughout our value chain. We provide customers reports on the amount of UCO collected and the value of the product. This is extremely important, as we are then able to prove traceability records for where all of our UCO is derived and where it is delivered after our recycling process. This ensures both quality and safety for our customers and ensures UCO we collect is from a reliable and vetted source. Most importantly, this ensures that waste products are not thrown into landfills or polluting our water systems, thus protecting our most valuable natural resources. Our goal is simple: to make kitchens and the environment safer for future generations.

The potential for UCO has never been higher. This valued commodity has helped to transform the transportation sector in California and throughout the world, as it serves as a prime waste feedstock to create RD and SAF.

In closing, we urge you to adopt a strengthened proposal that includes the removal of the phase out of RD pathways as soon as possible. Thank you for your efforts to update the regulation.

Sincerely,

A handwritten signature in black ink, appearing to read "David Kimball", is written over a light blue horizontal line.

David Kimball, President and CEO
MAHONEY ENVIRONMENTAL SOLUTIONS, LLC

Comment Log Display

Here is the comment you selected to display.

Comment 31 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Laura
Last Name	Verduzco Flores
Email Address	laurav@chevron.com
Affiliation	Chevron
Subject	Comments on the LCFS calculators released in August 2024
Comment	Please refer to the attachment
Attachment	www.arb.ca.gov/lists/com-attach/7348-lcfs2024-AGEBcgFnA2IEMIdl.pdf
Original File Name	Aug2024 Comments on LCFS Calculators.pdf
Date and Time Comment Was Submitted	2024-08-26 14:08:41

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 26, 2024

LCFS staff
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Subject: Feedback on newly proposed LCFS calculators

Dear CARB staff:

First, I would like to thank you for your work in the new LCFS calculators. The new versions of the calculators will help the industry streamline the pathway applications process for low carbon energy projects. In particular, we appreciate the new hydrogen calculator, building separate calculators for biodiesel and HEFA, and increasing the number of feedstocks that can be specified in the biodiesel calculator. I would also like to thank you for incorporating some of our previous comments into the new versions of the calculators. Below are our comments on specific calculators:

Hydrogen calculator:

- It is unclear how the CI of RNG is entered in the calculator when there's a direct connection instead of B&C? Are we expected to use the B&C section with 0 as the distance from RNG injection to H2 facility (5.4). Please clarify.
- This statement is confusing:

4.7 Submetered Electricity for Liquefaction (kWh)	Enter the quantity of submetered electricity used by the hydrogen production facility for liquefaction, if available. Electrolysis submetering is used to evaluate the quantities of grid electricity attributed to GH2 and LH2 pathways.
---	---

4.7 refers to kWh demand for liquefaction, yet the description specifies that the value will be used to evaluate electricity demand for both gaseous and liquid pathways.

- Please clarify whether we can use our own energy usage values, e.g. mmBTU of NG / kg of H2 or kWh/kg H2 in CA-GREET 4.0 tab without having to submit a Tier 2 application?
- Pathway Summary Tab: A T&D loss factor is applied to calculate the mass of H2 dispensed even if the H2 is produced and dispensed on-site. This factor should be proportional to the miles traveled and transloading OR use a conditional formula to apply it only when H2 is transported.



Our Family of Brands

Chevron Products Company
A Division of Chevron U.S.A., Inc.

5001 Executive Parkway, Suite 200, San Ramon, CA 94583
925 842 8903
laurav@chevron.com



In the example below, all transportation distances are set to zero, yet the pathway gets penalized with a 0.5% T&D loss factor:

Hydrogen Production Quantities						
		Unit	Total	Gaseous Hydrogen (GH2)		Liquified Hydrogen (LH2)
Total Hydrogen Produced		kg	400,000	400,000		
		MJ, LHV	48,000,000	48,000,000		
H2 for LCFS Pathway(s)	Produced	kg	400,000	400,000		
	T&D Loss Factor	%	0.5%	0.5%		
	Dispensed (Calculated)	kg	398,000	398,000		
		MJ, LHV	47,760,000	47,760,000		
			Without B&C		With B&C RNG	Without B&C
Maximum Matchable B&C		MMBtu, HHV	100,000		100,000	
Hydrogen Reportable by Pathway		kg	400,000	80,000	320,000	
Delivered H2 for CI Calculations		MJ, LHV	47,760,000	9,552,000	38,208,000	

In the example above, 2,000 kg of H2 are subtracted from the dispensed H2 total due to T&D losses even though the H2 was produced on-site.

- CA-GREET 4.0 Tab: The following units are incorrect

Process Fuels	Natural Gas	Combusted in Boiler or CHP	75,496	MMBtu, LHV
---------------	-------------	----------------------------	--------	------------

The correct units are gCO₂e/mmBTU, LHV

- There isn't an option to input sub-metered compression or regasification or to change their emission factors, as they are lumped together. Please break out each component for transparency and to make it easier for the user to substitute default values with operational data, as needed.

Fueling Station	GH2	Compression, Precooling and Pumping	3.41	gCO ₂ e/MJ H ₂ , LHV
	LH2	Storage and Dispensing	4.22	

Biodiesel and HEFA Calculator:

- The flat tailpipe CI has changed from 0.76 to 3.497 gCO₂e/MJ for BD/RD (a delta of 2.74 gCO₂e/MJ) due to recent data from CARB's EMFAC2021 (v1.0.2), mainly N₂O increases
 - We request that CARB staff provide a clear and detailed explanation for assigning the same tailpipe score determined for ULSD to biodiesel and renewable diesel.
 - We request that staff provide details on the assumptions driving the emission changes between the prior tailpipe emission factor of 0.76 gCO₂e/MJ to the new tailpipe emission factor of 3.497. The explanation of the assumptions should be in plain language so that program participants who are not familiar with the EMFAC2021 model can understand the rationale. This explanation can be referenced in the GREET4.0 explanatory document since the relevant reference (7) is a placeholder and provides no information.



Our Family of Brands

Chevron Products Company

A Division of Chevron U.S.A., Inc.

5001 Executive Parkway, Suite 200, San Ramon, CA 94583

925 842 8903

laurav@chevron.com



- The Simplified Calculators released for the 15 day comment period in August 2024 do not appear to have been updated with the feedstock emission factor information present in the updated CA-GREET4.0 model. The table below shows an example of the different values:

December 2023 Release		August 2024 Release	
Soy-Oil Based Biodiesel (per MMBTU)		Soy-Oil Based Biodiesel (per MMBTU)	
Feedstock (K451)	Fuel (L451)	Feedstock (K451)	Fuel (L451)
20,765	20,005	9,999	18,384

- We request that CARB update the simplified calculators so that participants can use simplified calculators that match the CA-GREET4.0 calculator from the start of implementation. We want to avoid any unnecessary delays from known inconsistencies.

HEFA Calculator:

- The wording in section 6 of the manual does not match the spreadsheet:

Section 6: Monthly Operational Data					
Coproducts Exported Outside Fuel Pathway			Renewable Diesel (RD)		
6.6	6.7	6.8	6.9	6.10	
Hydrogen Produced On-Site	Light Hydrocarbons Used as H2 Feedstock	Light Hydrocarbons For Alternate Use	Beginning RD Inventory	Ending RD Inventory	
kg	MMBtu, HHV	MMBtu, HHV	gallons @ 60°F	gallons @ 60°F	
1,000	300				

6.5 Alternate Fuel (MMBtu, HHV)
6.6 Imported Hydrogen (kg)
6.7 Hydrogen Produced On-Site (kg)
6.8 Light Hydrocarbons Used as H2 Feedstock (MMBtu, HHV)

We request that the manual reflects the exact section numbers in the spreadsheet to avoid confusion.

Field Name
6.9 Light Hydrocarbons with Alternate Use (MMBtu, HHV)
6.10 Beginning RD Inventory (gallons @ 60°F)
6.11 Ending RD Inventory (gallons @ 60°F)

RNG – DSM Calculator:

- L1.(1-6).14 Retention Time and Drainage – Required Annual Lagoon/Digester Cleanout
 - After production, many facilities remove excess water but do not fully cleanout the lagoon/digester to keep the microbes active. The requirement to clean out the system annually in September per the calculator is inconsistent with many baseline scenarios.

031.4



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We request that the lagoon/digester cleanout be optional, and if one occurs, it should be modeled in the month when the cleanout takes place.

Thank you very much in advance for addressing our concerns.

Best regards,

A handwritten signature in black ink, appearing to read "Laura Verduzco", with a long horizontal stroke extending to the right.

Laura Verduzco, D.Sc.
Chevron Corporation



Chevron Products Company
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Comment Log Display

Here is the comment you selected to display.

Comment 32 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Kevin
Last Name	Deinert
Email Address	kdeinert@sdsoybean.org
Affiliation	
Subject	CARB LCFS Comments
Comment	See the attached PDF document with comments from the South Dakota Soybean Association.
Attachment	www.arb.ca.gov/lists/com-attach/7349-lcfs2024-ATNXYVdkUjVQewk5.pdf
Original File Name	2024-08-26 California Air Resources Board.pdf
Date and Time Comment Was Submitted	2024-08-26 14:21:04

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 27, 2024
Chair Liane Randolph & Members of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814
Via electronic submission

Re: Proposed 15-Day Changes to the Proposed Regulation Order

Dear Chair Randolph and Members of the California Air Resources Board,
On behalf of the South Dakota Soybean Association (SDSA), thank you for the opportunity to comment on the proposed 15-day changes (15-Day Changes) to the Low Carbon Fuel Standard (LCFS) program. SDSA represents soybean farm families across South Dakota on public policy issues important to the soybean industry. Growers across South Dakota have long been committed to producing the world's food, feed, fuel, fiber, and thousands of bioproducts in an environmentally and economically sustainable way.

CARB's 15-day changes to revise the LCFS were quite surprising, as the final package diverged significantly from what was included in the Initial Statement of Reasons (ISOR) and the April 10 public workshop. Of top concern for farmers across our state and the rest of the nation is a proposal that would cap the use of soybean oil and canola oil as feedstocks for biofuels at 20 percent by company.

- 032.1 Artificial restrictions on the market, combined with the inclusion of sustainability limits being proposed, will significantly increase costs, but will not reduce emissions. South Dakota farmers
- 032.2 remain frustrated that CARB relies on decades-old data and methods to set carbon intensity (CI) scores for soy while neglecting new economic data. CARB needs to seriously consider the potential indirect emission impacts their expanding preference for waste is having.
- 032.3 SDSA opposes the proposed discretionary authority provided to the Executive Officer to stop accepting new pathways for biomass-based diesel. In addition to discriminating against the lipid-based fuel platform, we are concerned about the unintended impacts on non-lipid pathways, which could produce biomass-based diesel as a co-product. We are also worried that the
- 032.4 aggressive step-down of CI benchmarks, which partially result from the removal of the proposed regulation of fossil jet fuel, combined with other changes, will reward importers of waste feedstocks while penalizing farm families across the United States.

As CARB seeks to finalize updates to the LCFS program in the coming months, we respectfully encourage the agency to ensure these updates are based on the most up-to-date science as required by AB-32.

032.1 cont

The determination to make such drastic changes to previous CARB proposals so late in the process was shocking to the soybean and biofuels industries. That CARB has changed from arguing that, based on the modeling, a vegetable oil feedstock cap was detrimental to the goals of the LCFS at the April public workshop, to now recommending a strict cap on those feedstocks without employing recent data or science, is confusing to grasp. CARB's own April 10th analysis showed that a feedstock cap would increase greenhouse gas (GHG) emissions in California, which conflicts with requirements in AB-32.

Vegetable Oil Feedstock Cap

The inclusion of a virgin vegetable oil feedstock cap in the 15-day changes was alarming to farm families and the entire biofuels value chain, as reflected in market activity. You may understand our surprise based on the April 10 workshop in which CARB noted that liquid fuels would continue to be needed in the transportation sector in California for at least the next decade. In that same workshop, CARB also claimed that the imposition of a virgin vegetable oil feedstock cap would increase the utilization of petroleum diesel in the transportation sector. In the staff presentation on April 10, they noted that nearly eighty percent of vehicles on the road in California will use combustion engines through 2030. Further, they noted that such a stringent cap on virgin vegetable oils may result in 2.8 billion gallons of fossil diesel utilization in 2030, versus 1.9 billion gallons using a scenario that does not impose the cap proposed by the Environmental Justice Advisory Committee.

In a complete reversal of their prior analysis only four months ago, the CARB staff is now essentially recommending to the board that more fossil diesel be sold into the market in 2030. This recommendation appears to not only go against the goals of AB-32, but it also defies the best science available today. The recommendation seems incongruent with the Intergovernmental Panel on Climate Change, which notes in its sixth assessment report that using existing low-carbon technologies is a crucial component to avoiding catastrophic temperature increases, stating that "biodiesel and renewable diesel fuels...could offer important near-term reductions" for several technologies, including buses, rail, and long-haul trucking.¹

In our current interpretation, the cap may lock the lowest cost and lowest carbon intensity soybean oil-based biofuel (soy methyl esters) producers out of the market. Most soy methyl esters are produced at biodiesel plants adjacent to soybean processing plants. Often, the companies that own and operate soybean processing facilities are not involved in the procurement and processing of non-crop-based oils, such as UCO and tallow.

¹ Jaramillo, P., S. Kahn Ribeiro, P. Newman, S. Dhar, O.E. Diemuodeke, T. Kajino, D.S. Lee, S.B. Nugroho, X. Ou, A. Hammer Strømman, J. Whitehead, 2022: Transport. In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_Chapter10.pdf

They exclusively make biofuels out of soy oil or canola oil. The current language limits the crediting of soy and canola to 20 percent of reported gallons. This leaves integrated agriprocessing/biofuel producers two choices: 1) exit the market entirely, or 2) be denied a government benefit on 80 percent of their fuel. If this is the current interpretation of the proposed provision, it would significantly and arbitrarily disadvantage the sustainable oilseed biodiesel community.

We echo the concern of the American Soybean Association that the new requirement appears to contradict the statutory guidance laid out in AB-32 to minimize costs.

Sustainability Limits

032.5

SDSA was surprised not only to find a feedstock cap in the 15-day changes, but the sustainability limits were also retained. The cap, sustainability limits and Indirect Land Use Change score all additively, and redundantly, address land use change. This has the equivalent effect of giving soy and canola a much higher CI score, increasing the compliance cost associated with delivering the product, despite the lack of direct evidence.

South Dakota farm families are concerned that the requirement proposed by CARB is unneeded given the longstanding, excessively high ILUC figure (relative to more recent modeling efforts). Furthermore, we are extremely disheartened that CARB has not followed the example of governments across North America, where farmers who submit data for compliance are also given the opportunity to be incentivized for conservation efforts. This additional cost without benefit contradicts the language authorizing the LCFS. Section 38562 (b)(7) of AB-32 directs CARB to, "Minimize the administrative burden of implementing and complying with these regulations." Adding supply chain traceability to a bulk delivery system adds a significant administrative burden without changing the GHG emissions of the pathway.

CARB's efforts could be improved and enhanced by outreach to U.S. Department of Agriculture (USDA) personnel who have engaged in activity regarding climate-smart farming practices. USDA recently closed a comment period on its Request for Information on Procedures for Quantification, Reporting, and Verification of Greenhouse Gas Emissions Associated with the Production of Domestic Agricultural Commodities Used as Biofuel Feedstocks. USDA seeks to quantify and qualify the benefits of climate-smart agriculture practices for biofuel programs at the state, national, and international levels using the information received. Communication between CARB and USDA could be enlightening regarding ongoing agricultural sustainability practices.

Through the current sustainable aviation fuel (SAF) federal tax credit (40B), the CI of soy-based biofuels can improve through no-till and cover cropping on fields where the soybeans were produced.

Other farming practices like low-till, nutrient management, enhanced efficiency fertilizers, buffers, wetland and grassland management, tree planting on working lands, planting for higher carbon sequestration, and soil amendments all can and should be accounted to assign a lower CI score to an agricultural feedstock. USDA already tracks all these practices through several of its managed conservation programs. In addition, there are a variety of other practices that scientifically lower the CI score of soybean feedstocks for biofuels, and USDA is actively working to develop mechanisms to account for those.

Given the work being undertaken by USDA and EPA as part of the implementation of the Inflation Reduction Act, SDSA urges CARB to reconsider its proposed sustainability requirements to allow soybean growers the opportunity to participate in the California biofuels market through innovative and climate-smart agriculture practices.

Outdated Scoring

032.2 cont

For the last several years, state soybean associations, national associations, and biofuel producers have urged CARB to consider updating its scoring methodology for crop-based biofuels. CARB has refused to consider the best available science and methodology.

We remain deeply concerned that without a comprehensive update to the Global Trade Analysis Project model for biofuels (GTAP-BIO) that CARB utilizes, soy-based feedstocks will be phased out of the LCFS even without the additional limitations being proposed in the 15-day changes. Current data indicates a much lower CI score for soybeans as farm families continue to improve soil practices, limit water use, lower on-farm emissions and many of the best practices that deserve reward. On the one hand, CARB is recommending stringent sustainability guardrails for U.S. soy, but on the other hand, it is still likely to phase out soy-based biofuels from credit generation by approximately 2035 or sooner.

CARB has indicated plans to update all major models for lifecycle emissions calculations except for GTAP-BIO in the updated LCFS rulemaking. The soy industry has made vast improvements in sustainability and efficiency over the past two decades, with even greater improvement goals ahead. At the same time, CARB continues to rely on a 2014 model that uses data from 2004. The ILUC score accounts for half or more of the CI score for soy-based biofuels. CARB's current modeling assigns soy biomass-based diesel with an ILUC impact of 29.1g CO₂e/MJ, whereas updated results from the model used to calculate ILUC scores indicate a value of between 9 and 10 gCO₂e/MJ for soybeans². The recently released 40BSAF-GREET 2024 model has an ILUC score of 12.2 for soy-based sustainable aviation fuel in federal programs.

² Taheripour, F., Karmai, O., and Sajedinia, E. (2023). *Biodiesel Induced Land Use Changes: An Assessment Using GTAP-BIO 2014 Data Base*. Purdue University

The benefits of the LCFS can only be achieved if CI values are accurately captured. If land use change concerns are large enough to justify sustainability guardrails and capping virgin vegetable oil feedstocks, then the modeling should also be updated to reflect current land use change data.

Entities Eligible to Apply for Fuel Pathways

032.3 cont

We are concerned about CARB's 15-Day Changes to give the Executive Officer discretion to stop accepting new pathways for biomass-based diesel starting in 2031. We do not understand what provision of the AB-32 statute is served or justifies this arbitrary and highly selective change. CARB must, under statute, minimize costs and maximize GHG reductions. It is unclear how this is served by rejecting new pathways. In fact, the requirements of current law are met by allowing the most available pathways. If these pathways cannot achieve cost-effective GHG savings, they will not be utilized by the market in the LCFS. In essence, an increase in pathways can only serve to improve GHG benefits in California. Singling out a specific fuel for prejudicial treatment is baffling, given the goals of the LCFS and the authority that establishes it. Executive Order S-01-07 establishing the LCFS specifically cites diversity of fuels as a motivation for the program, and this proposal contradicts one of the stated purposes of the program. In addition, this provision, if implemented, could also significantly disadvantage other biofuel production processes, which may produce biomass-based diesel as a co-product, for example, in a system where SAF is a predominant product.

Conclusion

SDSA is encouraged by the continued success of programs that support the development of cleaner, low-carbon fuels. However, it is critical that CARB finalize updates in a way that does not arbitrarily exclude agricultural feedstocks through policies that are not science-based and conflict with CARB's mandate, including capping vegetable oil feedstocks and applying onerous sustainability guardrails that add cost without rewarding farming practices that lower CI.

CARB's 15-day changes, released in August 2024, are deeply concerning for farm families. CARB has singled out soybean and canola oil for adverse, prejudicial treatment. No up-to-date scientific evidence has been presented to justify the decision. In fact, CARB has refused to update the science as required by law for these feedstocks. This alone calls into question the integrity of a performance-based LCFS. Even more frustrating for farm families, CARB is now proposing feedstock caps, traceability requirements and authority to reject applications for these fuels produced from them. Again, CARB has not shown any scientific justification. In fact, the LCFS is already aggressively punishing soy farm families for land use change requirements.

Farmer families across South Dakota remain eager to continue working with CARB to support the role of agriculture in diversifying the fuel supply while reducing GHGs and increasing clean air in California and beyond. On behalf of South Dakota soybean farm families, we appreciate the opportunity to comment and look forward to collaborating with CARB and other relevant stakeholders on the implementation of policies that expand the use of soy-based biofuels and market opportunities for farm families that produce soybeans.

Sincerely,



Kevin Deinert
President
South Dakota Soybean Association

Comment Log Display

Here is the comment you selected to display.

Comment 33 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Shelby
Last Name	Neal
Email Address	shelby.neal@darlingii.com
Affiliation	Darling Ingredients
Subject	Comments on 15-day changes
Comment	<div><p>Thank you to CARB staff for their continued work on this issue and for considering our comments.</p><p>Sincerely,</p><p>Shelby Neal VP - Renewables & Energy Policy</p></div>

Attachment	www.arb.ca.gov/lists/com-attach/7350-lcfs2024-VDACZVckAzxRPIQ6.pdf
Original File Name	Darling Final Comments on 15-Day Change 8-26-2024.pdf
Date and Time Comment Was Submitted	2024-08-26 14:37:24

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 26, 2024

Steven S. Cliff, Ph.D.
Executive Officer
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Comments on Proposed 15-Day Changes to Proposed LCFS Regulation

Dear Dr. Cliff:

We are writing to provide comments on the proposed 15-day change document that was published on August 12, 2024. Thank you for considering our views on this important issue.

Darling Ingredients is North America's largest purveyor of waste fats and oils and is a 50% owner of the nation's largest renewable diesel production facility through a joint venture. Most of the fats that Darling Ingredients processes from its North American factories (used cooking oil and animal fat) are used as feedstocks for domestically produced renewable diesel. We have collection, recycling, and processing operations at several locations in California¹. According to CARB, our renewable diesel reduces greenhouse gasses (GHGs) by as much as 80%, particulate matter by 30%, and NOx by 10%. Renewable diesel is compatible up to 100% in all existing vehicles, equipment, and infrastructure. Following substantial investment, one of our joint venture's renewable diesel plants will be converted to produce approximately 235 million gallons of sustainable aviation fuel (SAF) beginning later this year.

After reviewing the 15-day change document, we have several comments we wish to share.

Carbon Intensity Benchmarks

033.1

We were encouraged by the increased ambition reflected in the 2025-2029 carbon intensity (CI) benchmarks, particularly the 9% step-down set for 2025. This more aggressive implementation schedule offers the potential to restore a healthy balance to the credit market, while also better aligning with the state's capacity for meaningful carbon reductions across a broad spectrum of technologies.

As shown in the following charts, the program has been significantly outperforming the current CI benchmarks. While this overperformance is a positive development for the climate, it has inadvertently led to a decrease in credit prices and slowed investment in the clean technology sector. The proposed 9% step-down, coupled with the possibility of activating the Automatic Acceleration Mechanism (AAM), will address this fundamental issue more effectively than the original proposal, helping ensure the program continues to drive substantial carbon reductions while maintaining economic viability in the clean technology market.

¹ Fresno, Los Angeles, San Diego, San Francisco, Santa Ana, and Turlock.

Figure 1 below shows that since 2021 obligated parties have been decarbonizing at a rate well beyond the requirements of the LCFS regulation².

Figure 1

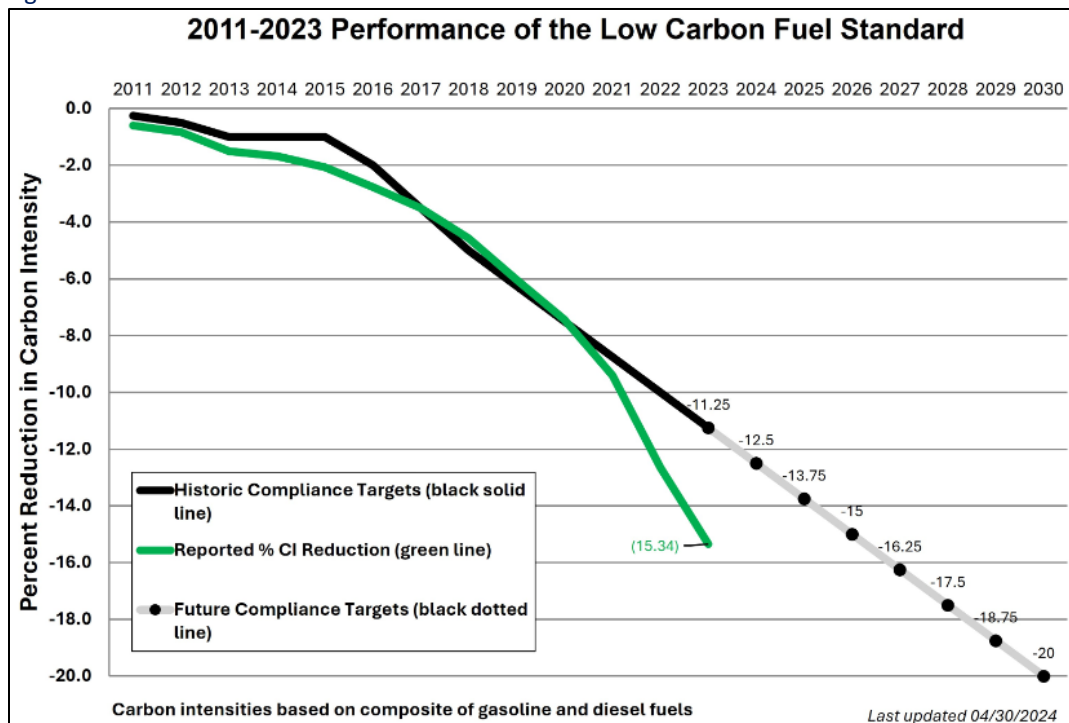
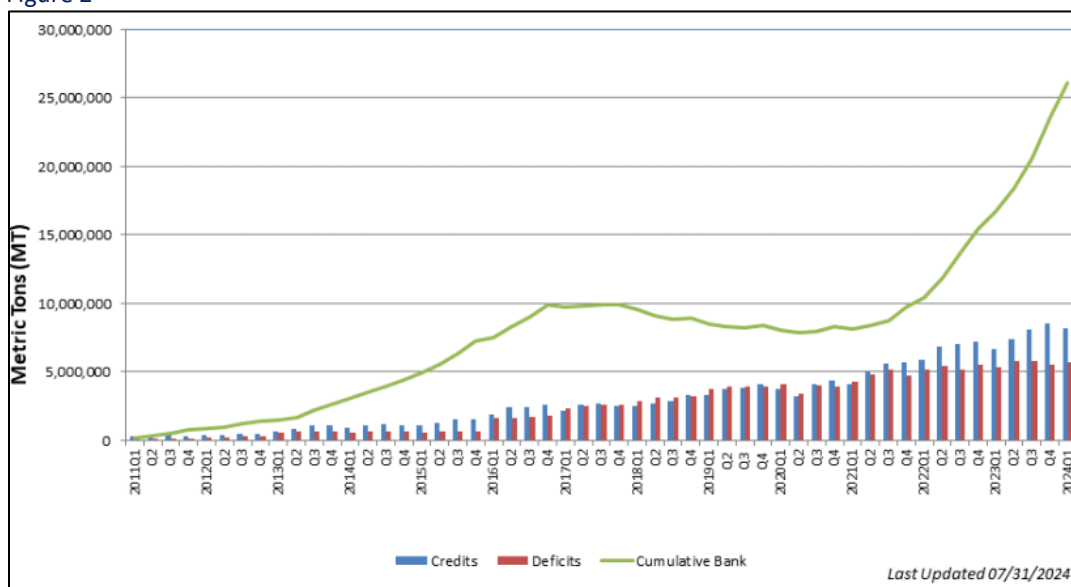


Figure 2 below highlights how overcompliance has dramatically affected the LCFS credit bank.

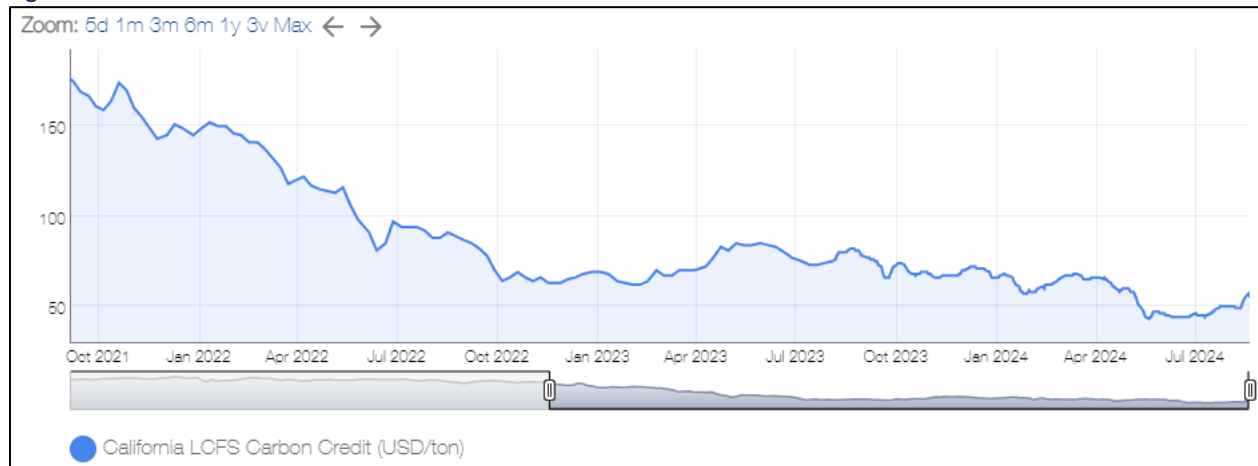
Figure 2



² All charts sourced from the CARB LCFS Data Dashboard.

Figure 3 below illustrates the impact of overcompliance on LCFS credit prices since 2021.

Figure 3



Sustainable Aviation Fuel

033.2

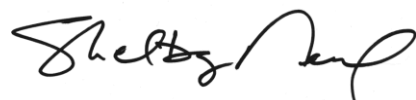
While we are pleased to see the rulemaking moving forward, we must also express our disappointment that intrastate jet fuel remains exempt from obligations under the LCFS program. We believe this decision could hinder SAF adoption in the state and prevent Californians from realizing substantial air quality benefits, including reduced emissions of PM, NOx, and SOx. If Governor Newsom's goal of 20% SAF uptake is to be achieved, we believe additional measures are necessary³. Fortunately, policy options are available, and we hope to work with CARB to explore and potentially implement those strategies.

Timeliness of Action

This regulatory process, including the informal workshop period, has been ongoing for nearly three years. While there are recommendable improvements that could be considered, time is running out under the Administrative Procedure Act (APA). Given the urgency of the situation and the severe consequences of missing the regulatory deadline, we strongly recommend proceeding without further changes to the proposed regulation and moving swiftly toward finalization. This would allow the credit market to begin recovering and enable decarbonization efforts to accelerate under the more ambitious carbon intensity benchmarks outlined in the proposal.

Once again, thank you for considering our comments. If you should have any questions, please feel free to contact me at any time at shelby.neal@darlingii.com.

Sincerely,



Shelby Neal
VP - Renewables & Energy Policy

³ <https://www.gov.ca.gov/wp-content/uploads/2022/07/07.22.2022-Governors-Letter-to-CARB.pdf>

Comment Log Display

Here is the comment you selected to display.

Comment 34 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Amy
Last Name	Lilly
Email Address	amy.lilly@mercedes-benz.com
Affiliation	
Subject	Comments on LCFS 15-Day Notice
Comment	Attached are comments from Mercedes-Benz on CARB's LCFS 15-day notice.
Attachment	www.arb.ca.gov/lists/com-attach/7351-lcfs2024-Uj9RNVULBDtXMgRi.pdf
Original File Name	MB LCFS 15 Day Comments.pdf
Date and Time Comment Was Submitted	2024-08-26 14:42:37

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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26 August 2024

Chair Randolph and Members of the Board
California Air Resources Board
1001 I Street
Sacramento, California 95814

RE: August 15, 2024 Proposed 15-Day changes to the Low Carbon Fuel Standard (LCFS)

SUBMITTED VIA ELECTRONIC MAIL TO [CARB'S PUBLIC COMMENT DOCKET](#)

Mercedes-Benz Research and Development North America, Inc., and Mercedes-Benz USA, LLC, on behalf of the manufacturer of Mercedes-Benz vehicles, Mercedes-Benz AG (hereinafter collectively referred to as "Mercedes-Benz" for purposes of this submission) would like to thank the California Air Resources Board (CARB) for the opportunity to provide comments on its August 15, 2024 proposal for changes to the Low Carbon Fuel Standard (LCFS). Mercedes-Benz strongly supports giving CARB's Executive Officer (EO) the authority to direct up to 45 percent of the base credits generated by light-duty (LD) electric vehicle (EV) residential charging to the automakers producing those vehicles.

Mercedes-Benz is guided by our "Ambition 2039," which includes goals for carbon neutrality¹ by 2039 throughout our supply chain and offers a complete set of electrified product offerings to meet our customers' needs. Mercedes-Benz continues its push to increase sales of electric vehicles in the U.S. with a portfolio that spans key market segments. In fact, electric vehicle sales comprised 11% of overall passenger vehicle

¹ Net carbon-neutral means that carbon emissions that are not avoided or reduced at Mercedes-Benz are compensated for by certified offsetting projects.

sales through Q2 2024.² Additionally, the Mercedes-Benz High-Power Charging network supports Mercedes-Benz's electrification efforts through the development of a public charging network that is open to all vehicle brands. The Mercedes-Benz High-Power Charging network recently announced a partnership with Starbucks which would expand the Mercedes-Benz network by installing DC fast chargers at 100 Starbucks' stores with initial focus along the I-5 corridor.³

034.1 The LCFS program is an important complement to CARB's GHG and criteria emission and zero emission (ZEV) regulations for light-duty and medium-duty vehicles. Additionally, the LCFS program has helped incentivize the transition to electric vehicles by allowing automakers to earn eRINs. The 15-day changes would provide additional benefit by allowing CARB's Executive Officer to "*direct up to 45% of base credits to eligible OEMs, if the share of new zero emission vehicle sales for model year 2024 zero emission vehicles certified under California Code of Regulations, title 13, section 1962.2 is less than 30 percent.*" Mercedes-Benz wholly supports this addition which would give automakers the opportunity to earn up to 45 percent of the base credits and suggests that CARB also add a minimum percentage that would be guaranteed to go to automakers. Mercedes-Benz would also ask CARB to specify the criterion to which this percentage will be based, and to hold this amount fixed over time to provide certainty for OEMs.

Lastly, it would be important to understand CARB's rationale for setting 30 percent as a threshold. We agree that "continued consumer facing support for the light duty vehicle sector is important," but we believe that support is needed well beyond this threshold due to continued concerns over adequate and reliable infrastructure and the need to incentivize the mainstream market.

034.2 Mercedes-Benz also supports the requirement that funds from these credits be put towards efforts to support transportation electrification and prefers that this requirement remain broad, including but not limited to charging infrastructure, vehicle incentives, etc. As mentioned above, Mercedes-Benz is investing in our own charging network to ensure adequate and reliable charging for our customers, as well as all EV drivers. The ability to select options on how to invest LCFS base credits, i.e., into charging stations or vehicle incentives, is an important flexibility that will enhance the funds as well as benefit all EV drivers. For example, if the funds would result in only a small vehicle incentive, then the ability to use these funds towards growing our charging network would enable us to expand it even further, again providing a benefit not only to Mercedes-Benz drivers but to any driver of an EV.

² [Mercedes-Benz USA Reports Q2 2024 Group Sales of 95,596 Vehicles \(mbusa.com\)](https://www.mbusa.com/newsroom/2024/02/2024-group-sales/)

³ [Mercedes-Benz High-Power Charging and Starbucks Team Up to Launch an Elevated EV Charging Experience Across America \(prnewswire.com\)](https://www.prnewswire.com/news-releases/mercedes-benz-high-power-charging-and-starbucks-team-up-to-launch-an-elevated-ev-charging-experience-across-america-301894888.html)

Thank you for considering Mercedes-Benz's comments. In addition to the Mercedes-Benz comments, Mercedes-Benz also supports the comments filed by our trade association, the Alliance for Automotive Innovation, as well as those filed by Bridge to Renewables (BTR).

Please let us know if you have any questions.

Sincerely,

MERCEDES-BENZ RESEARCH & DEVELOPMENT N.A., INC.

By: Amy Klinkenberger August 26, 2024
Amy Klinkenberger, Director, Safety, Fuels & Regulatory Affairs Date

MERCEDES-BENZ USA, LLC

By: Roopy August 26, 2024
Shaun Roopnarine, Manager, Safety Engineering Date

Comment Log Display

Here is the comment you selected to display.

Comment 35 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Michael
Last Name	Smith
Email Address	mike.smith@xealenergy.com
Affiliation	
Subject	Xeal Energy Comments on Proposed 15-Day Changes
Comment	<div>Comment letter attached.</div>
Attachment	www.arb.ca.gov/lists/com-attach/7352-lcfs2024-UTIBZIMgUGEDWgdr.pdf
Original File Name	CARB LCFS 15day Comment Letter_Xeal_FINAL.pdf
Date and Time Comment Was Submitted	2024-08-26 15:04:56

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

August 26, 2024

Clerks' Office, California Air Resources Board
1001 I Street,
Sacramento, California 95814

RE: Low Carbon Fuel Standards Amendments (15-Day Changes)

Dear California Air Resources Board Members and Staff,

Xeal Energy (Xeal) appreciates the opportunity to provide our input and support for the California Air Resources Board (CARB) rulemaking on the Low Carbon Fuel Standard (LCFS) to support increased investment in electric vehicle (EV) chargers and charging stations. Specifically, Xeal strongly supports greater EV charging investment in multifamily housing to meet California's climate goals.

Xeal has developed the next generation of EV chargers where users are provided unique and encrypted tokens that authorize, activate, and transact charging sessions without internet service directly between the charger and phone. This means chargers can operate anywhere – including multifamily housing (MFH), parking garages, and communities with limited internet connection, enabling a near 100% uptime and frictionless user experience, leading to strong consumer confidence and greater EV adoption.

Primarily focused on supporting multifamily housing and commercial real estate owners and operators, we strongly support the use of LCFS credits to incentive EV charging infrastructure investments and EV adoption. Providing reliable at-home charging in multi-family housing is critical to accelerating EV adoption and achieving the State's ZEV goals.

Xeal respectfully requests the following minor amendments to the proposed LCFS language:

1. Define all chargers located at MFH as non-residential regardless of parking arrangement

Xeal supports the continued inclusion of MFH EV charging within the LCFS program as well as removing barriers for property owners and operators to invest in EV charging infrastructure. We respectfully request all multi-family housing charging be considered "non-residential EV charging." Property owners own the chargers, regardless of whether they are on dedicated or non-dedicated parking spots and should be eligible to generate the credits. In addition, the parking spots may change from dedicated to non-dedicated, which would complicate reporting – but not change the benefits. Removing complexity and allowing credit parity will further incentivize EV charging development at multifamily housing where EV charging is critically needed.

035.2 2. **Amend verification for EV charging to include desktop review and remove requirements for site visits**

Xeal acknowledges the need to align the amount of electricity dispensed by EV charging stations with the amount reported to CARB by entities earning LCFS credits. To ensure accuracy, the most effective method is through data checks and reviews of electronic records of dispensed electricity. While site visits are useful for verifying large liquid fuel production facilities, they are not practical for EV charging networks for several reasons:

- 035.3 • **Data Management:** EV charging networks manage fuel transaction data through electronic platforms rather than at individual charging stations. Third-party verifiers cannot access cumulative transaction data from site visits alone, as EV chargers are unmanned and lack on-site data management systems. Instead, verifiers can review electronic data from centralized systems across the network, which generates reports for CARB. This method is more cost-effective and efficient, providing necessary information for compliance assessments without the need for physical inspections.
- 035.4 • **Regulatory Oversight:** The accuracy of EV chargers is already regulated by the California Department of Food and Agriculture Division of Measurement Standards (DMS), which oversees testing and approval under the California Type Evaluation Program. This framework ensures that accuracy requirements meet or exceed those in § 95491.2 of the LCFS regulation. Since EV chargers undergo rigorous lab and field testing by DMS, additional site visits by CARB would be redundant.
- 035.3 cont • **Logistical Challenges:** EV charging networks are extensive and dispersed. While third-party verifiers can manage annual site visits to a few large liquid fuel facilities, conducting site visits to hundreds or thousands of EV charging stations across various locations is costly and time-consuming.

Xeal appreciates the opportunity to support and provide input on LCFS 15-day Changes. We look forward to continuing to work with the CARB and other stakeholders to support the deployment, access, and reliability of light-duty charging infrastructure.

Sincerely,

Michael A. Smith

Michael A. Smith
Head of Deployments and Policy
Xeal

Comment Log Display

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Comment 36 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Christopher
Last Name	Malone
Email Address	robin@lcfccoalition.com
Affiliation	Low Carbon Fuel Coalition
Subject	Comments on 15 Day Package

Comment

See attached letter for comments from the Low Carbon Fuels Coalition, signed by:

- 3Degrees
- Adelante
- Bayer
- California Advanced Biofuels Alliance
- Clean Future
- Clean Fuels Alliance America
- Eco Engineers
- Gevo
- The Great Plains Institute
- Green Plains
- Indigo Ag
- Life Cycle Associates
- Neste
- Novozymes / Novonesis
- NXT Clean Fuels
- SHV Energy
- Solutions from the Land
- World Energy

Attachment

www.arb.ca.gov/lists/com-attach/7353-lcfs2024-WzdWMwZhAzNVDAdk.pdf

Original File Name

LCFC CSA committee letter to CARB - 22Aug24.pdf

Date and Time Comment Was Submitted

2024-08-26 15:05:46

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August 27, 2024

The Honorable Liane M. Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: 2024 Low Carbon Fuel Standard Amendments

Dear Chair Randolph:

036.1 The signatories of this letter appreciate the opportunity to provide comments regarding the 2024 amendments to the Low Carbon Fuel Standard (LCFS). We strongly support the increased focus by the California Air Resources Board (CARB) on ensuring that the fuels used in the LCFS program are produced in the most sustainable manner. We are strong advocates for rigorous lifecycle accounting (LCA) methods that precisely quantify the lifecycle emissions from biofuels and that recognize and incentivize lower carbon feedstocks. From a LCA perspective, “corn is not just corn.” To the contrary, corn and other crops can be grown on soil using a wide variety of techniques and inputs that substantially impact real-world carbon intensity (CI). We encourage the Board to direct staff to dedicate time and resources to analyze the lifecycle issues pertaining to crop-based feedstocks and report back to the Governing Board. This focused research, analysis, and reporting by CARB staff will enable and inform potential expansions to the LCFS regulations to include field-based practices, the recognition of soil organic carbon, and the harnessing of other CI-reducing techniques and technologies with the next update to the LCFS regulations.

The supporters of this letter represent a range of fuels, feedstocks, and technologies including agriculture trade associations, crop input companies, developers of LCFS credits, and other low-carbon fuel industry participants. This diverse group is united in its interest to provide high-quality fuels to the California transportation market with the lowest environmental footprint. This includes practices that encourage producers to reduce nitrous oxide and methane emissions and increase the carbon sequestered in the soil.

In 2018, the Intergovernmental Panel on Climate Change (IPCC) published a Special Report on the impacts of a 1.5°C global warming above pre-industrial levels. This report found that achieving global carbon neutrality by mid-century is critical to avoiding the most catastrophic impacts of climate change.¹ Moreover, the IPCC Sixth Assessment identified land-based emissions mitigation as “the only [sector] in which large-scale carbon dioxide removal may currently and short term be possible” and that it is

¹ IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 3-24, doi:10.1017/9781009157940.001.

“crucial to limit climate change and its impacts.”² The latest science finds that it is increasingly likely that the 1.5°C target will be exceeded³ and that large-scale greenhouse gas (GHG) reductions are critical to meeting the target.⁴

036.2

The recent modifications proposed by CARB to the LCFS regulations (the “15-Day Changes”) add stringency and oversight to the LCFS program and have the potential to facilitate more precise and accurate CI analysis. Unfortunately, certain aspects of the 15-Day Changes leverage this precision only to the detriment of biofuel CI scores rather than authorizing the adjustment of CI scores favorably or unfavorably depending on real-world performance. We encourage CARB to continue to embrace the fundamental LCFS principles of technology-neutrality and science-based performance measurement rather than introducing CI bias into the LCFS program structure.

In this final stage of the LCFS rulemaking, CARB has the opportunity to refine the 15-Day Changes so that the LCFS program will disincentivize less-sustainable biofuels and incentivize more-sustainable biofuels. Such an approach has the potential to expand and enhance the global sustainable fuels market and minimize the risk of unintended consequences at a time when the rapid phase down of petroleum-based fuels is an environmental imperative that has been codified into California law.

Already a leader in the response to climate change, CARB’s 2022 Scoping Plan Update details sector-by-sector roadmaps for California to achieve carbon neutrality by 2045 or earlier. One critical roadmap is for the aviation sector, where the scenario includes a transition of 20% of aviation fuel demand to zero-emission technologies by 2045 and sustainable aviation fuel (SAF) for the rest.⁵

036.3

The agriculture sector can play a significant role in helping California meet the goal of generating SAF. Practices including optimizing fertilizer application, reducing tillage, using enhanced-efficiency fertilizers, double-cropping and planting cover crops have the potential to reduce the CI of fuels by more than 40 g CO₂e/MJ.⁶ These practices are not limited to their GHG benefits; they provide “additional ecosystem service benefits, including watershed protection, increased biodiversity, and improved soil health and fertility.”⁷

² Nabuurs, G-J., R. Mrabet, A. Abu Hatab, M. Bustamante, H. Clark, P. Havlík, J. House, C. Mbow, K.N. Ninan, A. Popp, S. Roe, B. Sohngen, S. Towprayoon, 2022: Agriculture, Forestry and Other Land Uses (AFOLU). In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. doi: 10.1017/9781009157926.009

³ Mathews, D.H., Wynes, S. (2022) Current global efforts are insufficient to limit warming to 1.5°C. *Science* 376 (6600) 1404-1409. <https://www.science.org/doi/10.1126/science.abo3378>

⁴ Mace, M.J., Fyson, C.L., Schaeffer, M., Hare, W.L. (2021) Large-Scale Carbon Dioxide Removal to Meet the 1.5°C Limit: Key Governance Gaps, Challenges and Priority Responses. *Global Policy* 12 (51) 67-81. <https://doi.org/10.1111/1758-5899.12921>

⁵ CARB (2022) 2022 Scoping Plan for Achieving Carbon Neutrality. <https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>

⁶ Liu, X. et. al. (2020) Shifting agricultural practices to produce sustainable, low carbon intensity feedstocks for biofuel production. *Environ. Res. Lett.* <https://doi.org/10.1088/1748-9326/ab794e>

⁷ *ibid.*

There is significant opportunity to increase the adoption of these practices on U.S. farmland. A recent study found that no-till or strip-till is practiced on only 30% of cropland.⁸ Furthermore, these practices are not always maintained by farmers. While no-till practices were adopted on almost 8 million acres between 2012 and 2017, farmers on more than 5 million acres discontinued no-till during the same period for a net gain of only 3 million acres.⁹ Another practice that can reduce GHG emissions, the planting and cultivation of cover crops, has an even lower adoption rate than no-till. Unfortunately, only 5.1% of the approximately 300 million cropland acres planted cover crops in 2017.¹⁰ The LCFS program has the potential to provide a strong and long-term incentive for farmers to implement no-till, cover crops, double-cropping and other similar practices.

036.4

CARB is also proposing that all crop-based feedstock used for LCFS fuel pathways must obtain third-party sustainability certification by January 1, 2028, under an approved certification system. These certification systems “must consider environmental, social, and economic criteria,” an expansive list that is likely to place a significant financial burden and obligations on farmers that elect to continue to supply feedstocks for biofuels production. Given the broadness of these requirements and the significant additional administrative burden this will impose on farmers and the producers who buy from them, we urge CARB staff to clarify the specific environment, social and governance (“ESG”) criteria that these certifications are meant to address in the context of crop-based feedstocks and to seek further stakeholder feedback on development of these criteria after this rulemaking. This requirement is consistent with the verification of land use under the EU Renewable Energy Directive (RED). Under international policies such as RED, CORSIA, and RenovaBio, fuel producers are required to collect farm level data and are thus able to benefit from improved farming practices. CARB should also provide a 3-year grace period for any certification system that it plans to suspend or remove, to give stakeholders sufficient time to get certified under a different certification system.

036.5

Additionally, sustainability certifications that address these ESG criteria will often also include a rigorous GHG accounting for feedstock CI calculation. For example, both the Roundtable for Sustainable Biomaterials (RSB) and the International Sustainability & Carbon Certification (ISCC) are existing sustainability certification systems that may meet the requirements outlined in Section 95488.9(g); both systems have already developed GHG methodologies for feedstock CI calculation.^{11,12} If CARB requires farms to go through the rigorous process of third-party sustainability certification, then we respectfully request that CARB also consider accepting a feedstock CI score that is calculated and verified in accordance with certification system standards. This would provide a mechanism to compensate farmers adopting climate smart practices for the additional work of certification. Specifically, we ask the Board to

⁸ Pannell, D. J., & Claassen, R. (2020). The Roles of Adoption and Behavior Change. *Applied Economic Perspectives and Policy* 42 (1) 31–41.

⁹ Sawadgo, W., & Plastina, A. (2022). The Invisible Elephant: Disadoption of Conservation Practices in the United States. *Choices* 37(1) 1–13.

¹⁰ Wallender, S., Smith, D., Bowman, M., & Claassen, R. (2021). Cover Crop Trends, Programs, and Practices in the United States. <https://www.ers.usda.gov/publications/pub-details/?pubid=100550>

¹¹ RSB GHG Calculation Methodology v2.3 (2017). <https://rsb.org/wp-content/uploads/2020/06/RSB-STD-01-003-01-RSB-GHG-Calculation-Methodology-v2.3.pdf>

¹² ISCC EU 205 Greenhouse Gas Emissions (2021). https://www.iscc-system.org/wp-content/uploads/2022/05/ISCC_EU_205_Greenhouse-Gas-Emissions-v4.0.pdf

direct staff to evaluate existing GHG calculation methodologies and develop guidance around feedstock CI calculation.

036.6

We are asking the Board to direct staff to investigate how the agriculture sector can be optimized to produce low-carbon biofuels to meet the state's SAF goal. Specifically, we are requesting the Board to prioritize policy discussions and the associated technical analysis related to low-carbon feedstocks for the production of SAF. This technical analysis should include a thorough lifecycle analysis to determine the extent to which supplies of sustainable biofuels produced from various feedstocks can be expanded while not converting additional land to agricultural uses. This technical analysis should be informed by the other primary LCA methodologies including Argonne GREET. To ensure the timely analysis of this information, we request that the Board direct staff to report back to the Board by the end of 2025 on the results of lifecycle analysis and progress toward developing policies to encourage the production of SAF.

For the foreseeable future, liquid fuels will be required to power the majority of airflight thus necessitating a rapid expansion in the supply of SAF. In order to create demand for the fuels with the lowest actual CI possible, ARB needs to account for and incentivize field-based practices. Fortunately, the benefits of these sustainable agricultural practices go beyond their GHG savings, positively impacting our water, ecosystems, and soils.

CARB has been an international leader in developing and implementing programs to reduce GHG emissions across the California economy and the inclusion of climate smart agricultural practices will continue the State's leadership throughout the country. We thank CARB for this opportunity to offer these comments and look forward to continued collaboration to implement policies and strategies that further reduce emissions from the transportation sector.

Sincerely,




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Comment 37 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Christy
Last Name	Seyfert
Email Address	cseyfert@soy.org
Affiliation	American Soybean Association
Subject	Comments from the American Soybean Association
Comment	See attached comments from the American Soybean Association.
Attachment	www.arb.ca.gov/lists/com-attach/7354-lcfs2024-AmNTJllyBwtWPFQ3.pdf
Original File Name	ASA LCFS 15 Day Comments 8 26 24.pdf
Date and Time Comment Was Submitted	2024-08-26 15:26:23

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12647 Olive Boulevard, Suite 410, St. Louis, MO 63141 • PHONE: (314) 576-1770

August 26, 2024

Chair Liane Randolph & Members of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Via electronic submission

Re: Proposed 15-Day Changes to the Proposed Regulation Order

Dear Chair Randolph and Members of the California Air Resources Board:

The American Soybean Association (ASA) appreciates the opportunity to comment on the proposed 15-day changes (15-Day Changes) to the Low Carbon Fuel Standard (LCFS) program. ASA has welcomed engagement with the California Air Resources Board (CARB) and staff throughout this multi-year process to update the LCFS program.

ASA represents approximately 500,000 U.S. soybean farmers on domestic and international policy issues important to the soybean industry and has 26 affiliated state associations representing 30 soybean-producing states. U.S. soybean growers have long been committed to producing the world's food, feed, fuel, and thousands of bioproducts in a sustainable and climate-smart way.

CARB's 15-Day Changes to revise the LCFS was quite surprising, as it diverged significantly from what was included in the Initial Statement of Reasons (ISOR) and the April 10 public workshop. Of top concern for ASA is a proposal that would cap the use of virgin vegetable oils as feedstocks for biofuels at 20 percent by company. Another significant concern for ASA remains regarding sustainability guardrails: how sustainability guardrails will work with current soybean reporting infrastructure. ASA continues to oppose CARB using data over two decades old to set carbon intensity (CI) scores for soy. ASA opposes discretionary authority provided to the Executive Officer to stop accepting new pathways for biomass-based diesel. ASA is also concerned that the aggressive step-down of CI benchmarks, combined with other changes, will reward importers of waste feedstocks while penalizing U.S. farmers.

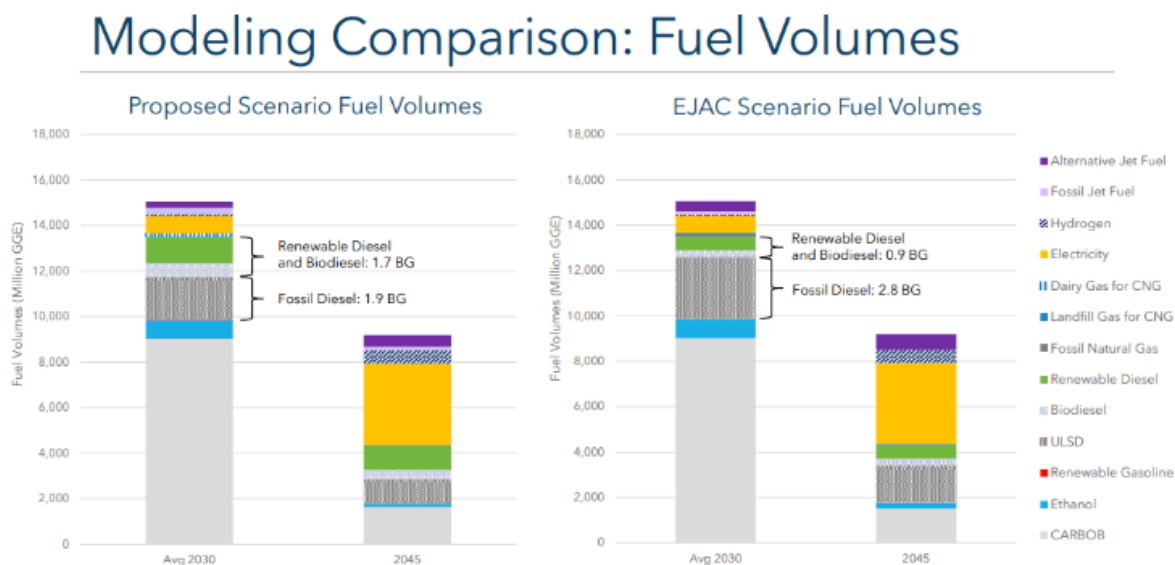
037.1
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As CARB seeks to finalize updates to the LCFS program in the coming months, ASA strongly encourages that these updates are based on science as required by AB-32. The determination to make such drastic changes to previous CARB proposals so late in the game was shocking to the soybean and biofuels industries. For CARB to move from arguing that a vegetable oil feedstock cap was detrimental to the goals of the LCFS based on the science at the April public workshop, to now recommending a wildly stringent cap on those feedstocks without data or science, is quite difficult to comprehend given the intention of the LCFS to be driven by science. CARB's analysis showed that a feedstock cap would increase greenhouse gas (GHG) emissions in California, which is contrary to requirements in AB-32.

Vegetable Oil Feedstock Cap

The addition of a virgin vegetable oil feedstock cap in the 15-Day Changes was alarming to ASA, and clearly to the entire biofuels value chain. In the April 10 workshop on proposed LCFS updates, CARB noted that liquid fuels would continue to be needed in the transportation sector in California for at least the next decade. CARB also argued that the imposition of a virgin vegetable oil feedstock cap would have an increase in the utilization of petroleum diesel in the transportation sector (Figure 1).

Figure 1



Source: California Air Resources Board

Currently, virgin vegetable oils make up approximately thirty percent of the feedstock portfolio used in the California biofuels market. In its 15-Day Changes, CARB has recommended imposing a combined twenty percent cap on vegetable oil feedstocks, per company. However, in its own presentation on April 10, CARB staff noted that it anticipates

nearly eighty percent of vehicles on the road in California to still use combustion engines by 2030. Further, CARB staff noted that such a stringent cap on virgin vegetable oils will result in 2.8 billion gallons of fossil diesel utilization in 2030, versus 1.9 billion gallons using a scenario that does not impose the cap proposed by the Environmental Justice Advisory Committee (Figure 1).¹ This is because biofuels made with virgin vegetable oils displace a significant volume of fossil diesel, acting as a bridge fuel that will naturally move to other markets as CI thresholds decline in the LCFS program.

Using CARB's own analysis, imposing a cap on virgin vegetable oils, which already receive an unfavorable score through old modeling data and would face restrictions through other sustainability measures in the proposal, will lead to an increase in fossil diesel usage compared to the status quo by 2030. Without proof to the contrary, CARB has determined that more fossil diesel on the market in 2030 as opposed to increasing virgin vegetable oil biofuel usage is better for the long-term goals of the LCFS. However, the Intergovernmental Panel on Climate Change notes in its sixth assessment report that using existing low carbon technologies is a crucial component to avoiding catastrophic temperature increases, stating that "biodiesel and renewable diesel fuels...could offer important near-term reductions" for several technologies, including buses, rail, and long-haul trucking.²

As steps are taken to address climate change both today and in the long-term, virgin vegetable oil biofuels will remain an important tool in the toolbox in both existing diesel engines and new ultra-low carbon liquid fuel engine technologies. Carbon emissions continue to accumulate, and increased utilization of biofuels can help mitigate increasing emissions occurring at present.

ASA is concerned that a 20 percent soybean and canola cap by company could be much more restrictive in practice. Some biofuel producers utilize little to no soybean or canola oil and will likely have spare allotment. Other biofuel producers use almost all soybean oil and have few options to switch. The 20 percent cap would largely shut them out of the California LCFS program. The combination of these extremes could easily produce a result much more restrictive than the 20 percent level initially implies.

037.6

We also note that the proposed vegetable oil cap contradicts the statutory guidance in AB-32, which establishes the authority for the LCFS. We refer to the following sections of AB-32:

¹ California Low Carbon Fuel Standard Workshop, Staff Presentation, Slide 23. April 10, 2024.
<https://ww2.arb.ca.gov/sites/default/files/2024-04/LCFS%20April%20Workshop%20Slides.pdf>

² Jaramillo, P., S. Kahn Ribeiro, P. Newman, S. Dhar, O.E. Diemuodeke, T. Kajino, D.S. Lee, S.B. Nugroho, X. Ou, A. Hammer Strømman, J. Whitehead, 2022: Transport. In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_Chapter10.pdf

38501(h)

It is the intent of the Legislature that the State Air Resources Board design emissions reduction measures to meet the statewide emissions limits for greenhouse gases established pursuant to this division in a manner that minimizes costs and maximizes benefits for California's economy, improves and modernizes California's energy infrastructure and maintains electric system reliability, maximizes additional environmental and economic co-benefits for California, and complements the state's efforts to improve air quality.

38560.5(c)

The regulations adopted by the state board pursuant to this section shall achieve the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions from those sources or categories of sources, in furtherance of achieving the statewide greenhouse gas emissions limit.

38562(b)(1)

Design the regulations, including distribution of emissions allowances where appropriate, in a manner that is equitable, seeks to minimize costs and maximize the total benefits to California, and encourages early action to reduce greenhouse gas emissions.

Multiple sections of the authorizing language for the LCFS instruct CARB to achieve the maximum technologically feasible reductions in GHG emissions. As CARB's own analysis presented in the April workshop has demonstrated, that is achieved without a soybean and canola feedstock cap. CARB's 15-Day Changes to institute the cap clearly contradicts the authorizing language of the LCFS and leads to worse emission and air quality³ outcomes for the state.

AB-32 also instructs CARB to minimize costs. Markets naturally do this, and CARB's 15-Day Changes that would implement a binding cap would increase costs. This is incongruous with the legislative mandate.

Furthermore, ASA is perplexed that CARB is partially justifying this decision by making sure that other states retain access to biomass-based diesel. Section 38501(h) explicitly directs CARB to maximize benefits in California. Even if current law were waived, CARB has not shown that the cap would benefit other states. ASA remains puzzled that CARB singles out soybeans and canola-based biomass-based diesel in the LCFS program for adverse treatment while also remaining concerned that other states retain access to these fuels.

Sustainability Guardrails

037.2 cont While ASA was very surprised to find the feedstock cap in the 15-Day Changes, we were also surprised to find the sustainability guardrails retained with the cap. The cap,

³ <https://cleanfuels.org/wp-content/uploads/trinity-nbb-transportation-health-risks-review-v1-03.pdf>

sustainability guardrails and Indirect Land Use Change score all additively, and redundantly, address land use change. This has the equivalent effect of giving soy and canola a much higher CI score despite lack of evidence from the LCA modeling.

As CARB seeks to formalize sustainability requirements first presented at the April 10 workshop, ASA appreciates that CARB has developed a timetable and phase-in requirements so that industry can adapt to changes. However, if CARB's goal is to address land use change concerns, they are already capturing land use change risk by the LUC score penalty from the GTAP model. From an aggregate standpoint, whether biofuels were produced from a U.S. acre in production in 2007 or thereafter is largely irrelevant for carbon intensity. The total change in the system is the important component. Simply shifting eligibility among domestic acreage only adds costs without a program benefit.

037.6 cont Furthermore, this additional cost without benefit contradicts language authorizing the LCFS. Section 38562 (b)(7) of AB-32 directs CARB to, "Minimize the administrative burden of implementing and complying with these regulations." Adding supply chain traceability to a bulk delivery system adds significant administrative burden without changing the GHG emissions of the pathway. As aforementioned, GTAP modeling captures land use change, so the additional, and potentially significant, administrative burden of the guardrails contradicts the statutory language of AB-32.

037.7 CARB's efforts could be improved and enhanced by outreach to U.S. Department of Agriculture (USDA) personnel who have engaged in activity regarding climate-smart farming practices. USDA recently closed a comment period on its Request for Information on Procedures for Quantification, Reporting, and Verification of Greenhouse Gas Emissions Associated with the Production of Domestic Agricultural Commodities Used as Biofuel Feedstocks. With the information received, USDA seeks to quantify and qualify the benefits of climate smart agriculture practices for biofuel programs at the state, national, and international level. Communication between CARB and USDA could be enlightening regarding ongoing agricultural sustainability practices.

Through the current sustainable aviation fuel (SAF) federal tax credit (40B), the CI of soy-based biofuels can improve through no-till and cover cropping on the field that the soybeans were produced. Other farming practices like low-till, nutrient management, enhanced efficiency fertilizers, buffers, wetland and grassland management, tree planting on working lands, planting for higher carbon sequestration, and soil amendments all can and should be accounted to assign a lower CI score to an agricultural feedstock. USDA already tracks all these practices through several of their managed conservation programs. In addition, there are a variety of other practices that scientifically lower the CI score of soybean feedstocks for biofuels, and USDA is actively working to develop mechanisms to account for those.

Given this work, ASA urges CARB to reconsider its proposed sustainability requirements to allow soybean growers the opportunity to participate in the California biofuels market

through innovative and climate smart agriculture practices. CARB should look to programs already developed through farmer input and provide improved scoring for feedstocks that employ sustainability practices to minimize the changes in comparative costs.

Outdated Scoring

037.3 cont

For the last several years, ASA has urged CARB to update its scoring methodology for soy-based biofuels, which uses outdated data that does not represent current U.S. soybean farming practices and environmental footprint.

ASA is concerned that without a comprehensive update to the Global Trade Analysis Project model for biofuels (GTAP-BIO) that CARB utilizes, soy-based feedstocks will be phased out of the LCFS even without the additional limitations being proposed in the 15-Day Changes. Current data indicates a much lower CI score for soybeans, as growers continue to improve soil practices, limit water use, lower on-farm emissions and more. On the one hand, CARB is recommending stringent sustainability guardrails for U.S. soy, but on the other hand is still on track to likely phase-out soy-based biofuels from credit generation by approximately 2035 or sooner.

CARB has indicated plans to update all major models for lifecycle emissions calculations except for GTAP-BIO in the updated LCFS rulemaking. The soy industry has made vast improvements in sustainability and efficiency over the past two decades, with even greater improvement goals ahead. At the same time, CARB continues to rely on a 2014 model that uses data from 2004. The ILUC score accounts for half or more of the CI score for soy-based biofuels. CARB's current modeling assigns soy biomass-based diesel with an ILUC impact of 29.1g CO₂e/MJ whereas updated results from the model used to calculate ILUC scores indicate a value of between 9 and 10 gCO₂e/MJ for soybeans⁴. The recently released 40BSAF-GREET 2024 model has an ILUC score of 12.2 for soy-based sustainable aviation fuel in federal programs.

The benefits of the LCFS can only be achieved if CI values are accurately captured. If land use change concerns are large enough to justify sustainability guardrails and capping virgin vegetable oil feedstocks, then the modeling should also be updated to reflect current land use change data.

037.6 cont

ASA remains concerned that CARB's refusal to update ILUC modeling runs afoul of AB-32. 38562(e) of AB-32 states, "The state board shall rely upon the best available economic and scientific information and its assessment of existing and projected technological capabilities when adopting the regulations required by this section." As GTAP has been updated with more recent data and CARB has not yet updated the LCFS program despite

⁴ Taheripour, F., Karmai, O., and Sajedinia, E. (2023). *Biodiesel Induced Land Use Changes: An Assessment Using GTAP-BIO 2014 Data Base*. Purdue University

years of requests, ASA is concerned that CARB is not utilizing the best available science as required by statute.

ASA continues to urge CARB to update its GTAP model to align with other modeling changes being made.

Entities Eligible to Apply for Fuel Pathways

037.4 cont ASA is concerned about CARB's 15-Day Changes to give the Executive Officer discretion to stop accepting new pathways for biomass-based diesel starting in 2031. ASA does not understand what statute of AB-32 is served, or justifies, this arbitrary and highly selective change. CARB must under statute minimize costs and maximize GHG reductions. It is unclear how this is served by rejecting new pathways. In fact, the requirements of current law are met by allowing the most available pathways. If these pathways cannot achieve cost-effective GHG savings, they will not be utilized by the market in the LCFS. In essence, an increase in pathways can only serve to improve GHG benefits in California. Singling out a single fuel for prejudicial treatment is baffling given the goals of the LCFS and the authority that establishes it. Executive Order S-01-07 establishing the LCFS specifically cites diversity of fuels as a motivation for the program, and this proposal contradicts one of the stated purposes of the program.

Updating Carbon Intensity Benchmarks

The 15-Day Changes included a more aggressive update to CI benchmarks under the LCFS program, shifting from a five percent CI reduction for diesel fuel to nine percent starting in 2025. However, CARB is setting ambitious benchmarks while limiting the available feedstock portfolio for biomass-based diesel. Instead of seeking to achieve these benefits through domestically sourced feedstocks regulated and overseen by the U.S. government, CARB is gambling on imported feedstocks they are assigning lower CI scores to, though the provenance and actual CI of those feedstocks remains veiled from proper stringent oversight. Strong concerns remain about the integrity of these imports.

The aggressive step-down of CI benchmarks in the next few years, paired with proposed limitations on domestic biomass-based diesel feedstocks creates a system that ultimately will reward China, Brazil, or other major importers of waste feedstocks while penalizing U.S. farmers. ASA believes that our domestic clean energy sector wins when programs utilize all tools in the toolbox and support domestic fuel security.

Conclusion

ASA is encouraged by the continued successes of programs that support the development of cleaner, low-carbon fuels. However, it is critical that CARB finalizes updates in a way that does not arbitrarily exclude agricultural feedstocks through policies that are not science-based and run afoul of CARB's mandate, including capping vegetable oil feedstocks and

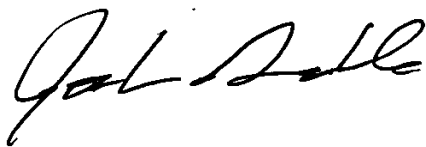
applying onerous sustainability guardrails that add cost without rewarding farming practices that lower CI.

CARB's 15-Day Changes, released in August 2024, is deeply concerning. CARB has singled out soybean and canola oil for adverse, prejudicial treatment. No scientific evidence is ever given for this treatment. In fact, CARB has refused to update the science as required by law for these feedstocks. This alone calls into question the integrity of a performance-based LCFS. On top of this, CARB is now proposing feedstock caps, traceability requirements and authority to reject applications for these fuels produced from them. CARB has not shown any scientific justification. In fact, the LCFS is already over penalizing soy for any land use change requirements.

CARB is required under law to achieve the maximum technically feasible and cost-effective reductions in GHGs. Markets minimize costs through the proper allocation of inputs. CARB's 15-Day Changes restricts those markets, thereby increasing GHG emissions and increasing costs in the program. CARB's own analysis has shown that GHG emissions are increased through a feedstock cap. While CARB is required under AB-32 to consider the cost effectiveness of the LCFS regulations, it has noticeably not shown how this proposal will affect costs. Not only does this proposal abandon a science-based approach, but it also appears to be at odds with CARB's statutory duties. We strongly urge CARB to conduct analysis on this proposal and hold a public hearing to allow for discussion prior to finalization.

ASA is eager to continue working with CARB to support the role of agriculture in diversifying the fuel supply while reducing GHGs and increasing clean air in California and beyond. On behalf of U.S. soybean farmers, we appreciate the opportunity to comment and look forward to collaborating with CARB and other relevant stakeholders on implementation of policies that expand the use of soy-based biofuels and market opportunities for soybean farmers.

Sincerely,

A handwritten signature in black ink, appearing to read "Josh Gackle", written in a cursive style.

Josh Gackle
President

Comment Log Display

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Comment 38 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Victoria
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Affiliation	Center for Biological Diversity
Subject	Organizational LCFS Comments
Comment	<div>The Center for Biological Diversity submits the attached comments on the California Air Resources Board's (CARB) proposed August 12, 2024 amendments to the Low Carbon Fuel Standard (LCFS). Please note that we are submitting the references cited for CARB's convenience. Those references are available here: https://diversity.box.com/s/8jcli9f2vwyof9cbq1qx5sna1m0d0hsb.</div>
Attachment	www.arb.ca.gov/lists/com-attach/7355-lcfs2024-WmgGNF1yBGdVawMt.pdf

Original File Name	24.08.26 Ctr Biol Div Comments LCFS Aug2024 Amends FINAL.pdf
Date and Time Comment Was Submitted	2024-08-26 15:31:55

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August 27, 2024

Chair Liane Randolph and
Members of the Board
California Air Resources Board
1001 I St.
Sacramento, CA 95814

RE: Proposed Low Carbon Fuel Standard Amendments (August 12, 2024 release)

Dear Chair Randolph and Members of the Board:

The Center for Biological Diversity submits the following comments on the California Air Resources Board's (CARB) proposed August 12, 2024 amendments to the Low Carbon Fuel Standard (LCFS). Please note that we are submitting the references cited herein for CARB's convenience. Those references are available here:

<https://diversity.box.com/s/8jcli9f2vwyof9cbq1qx5sna1m0d0hsb>.

I. CARB must end LCFS credits to out-of-state projects conducting EOR associated with CCS.

As we called for in our February 2024 comments, and as urged by the Environmental Justice Advisory Committee (EJAC), CARB must end credits to projects outside of California that produce oil using captured carbon dioxide (CO₂).

The EJAC specifically directed CARB staff to "Prohibit enhanced oil recovery as an eligible sequestration method."¹ Crediting CO₂-based enhanced oil recovery (EOR) is also at odds with California law. SB 905 (2022) prohibits operators in California from utilizing CO₂ from carbon capture and storage (CCS) in EOR.² Yet while the State decidedly took a stand against CCS-associated EOR within California, the LCFS door remains open to incentivizing this same harmful practice *outside* the State's borders.

Under the LCFS CCS Protocol, applicable CCS projects are those "that capture carbon dioxide (CO₂) and sequester it onshore, in either saline or depleted oil and gas reservoirs, or oil and gas reservoirs used for CO₂-enhanced oil recovery (CO₂-EOR).³ Thus, non-California regulated entities conducting EOR will be compensated by CARB for causing

¹ EJAC, Recommendations to the California Air Resources Board (CARB) on the Low Carbon Fuel Standard Regulation Updates (version August 28, 2023), <https://www.arb.ca.gov/lists/com-attach/1-lcfs2024-VjMFaQNjUGABWFA0.pdf>.

² SB 905 at Section 4(b) (Caballero, 2022), to be codified in Cal. Pub. Res. § 3132(b); see also Senate Bill 1314 (Limón, 2022) (also signed into law and prohibiting EOR using CO₂ derived from CCS operations).

³ CARB LCFS CCS Protocol at 7 (Aug. 13, 2018) (emphasis added). CCS projects are eligible for LCFS participation under the Tier 2 pathway. See 17 Cal. Code Regs. § 95488.1(d)(7)(B).

environmental and community health damage elsewhere. This asymmetry is simply wrong and must be corrected by removal of CCS-related EOR from the LCFS.

It is not too late to close the out-of-state LCFS EOR loophole. Below are possible changes to accomplish this:

A. Remove the underlined language below from the LCFS CCS Protocol:

- The CCS Protocol applies to projects “that capture carbon dioxide (CO₂) and sequester it onshore, in either saline or depleted oil and gas reservoirs, or oil and gas reservoirs used for CO₂-enhanced oil recovery (CO₂- EOR).”

B. Update the following regulations:

- In 17 Cal. Code Regs. section 95490(a)(1) (stating that eligible entities include “Alternative fuel producers, refineries, and oil and gas producers that capture CO₂ on-site and geologically sequester CO₂ either on-site or off-site”), make clear that, to be eligible, capture and sequestration of CO₂ does not include EOR.
- In 17 Cal. Code Regs. section 95490(a)(2) (stating that “If CO₂ derived from direct air capture is converted to fuels, it is not eligible for project-based CCS credits. However, applicants may apply for fuel pathway certification using the Tier 2 pathway application process as described in section 95488.7”), make clear that CO₂ derived from direct air capture may not be used for EOR.

II. **CARB must not encourage continued and/or prolonged use of fossil fuels through its petroleum-plus-CCS phase-out loophole.**

In the amendments proposed earlier this year, CARB explained it is seeking to “encourage existing petroleum facilities to deploy”⁴ CCS and to allow these fossil fuel projects to continue to generate credits beyond the phase-out date of December 31, 2040.⁵ CARB kept this loophole open in its August 2024 proposal, in its “Innovative Crude” section.⁶ Specifically, for all other “Innovative Crude” crediting methods *other than* CCS, credits will end “no later than December 31, 2040.”⁷ Credits for crude using CCS, however, continue indefinitely.

This loophole evidences a fundamental misunderstanding of how CCS works. CCS does not wholly eliminate GHG emissions from any industrial process. Simply putting CCS onto a refinery does not mean the climate intensity of that production is acceptable. No CCS project has, or is, promising 100% CO₂ capture. While modeling often relies on an

⁴ LCFS Proposed Amendments, Appendix E at page 88, Y.8, rationale for proposed §§ 95489(c)(1)(A)2 and 95489(e)(1)(D)1.

⁵ LCFS Proposed Amendments, Appendix E at page 93, X.19, proposed for §§ 95489(c)(5), 95489(d)(5)(C), 95489(e)(5)(B), and 95489(f)(5)(B).

⁶ LCFS Proposed Amendments, § 95489(c)(1)(A)2 (defining general requirements for “innovative crude”).

⁷ LCFS Proposed Amendments, § 95489(c)(5).

assumed 90% capture rate, this is far from what is achieved in reality.⁸ One recent real-world California example is the Aera CarbonFrontier project proposed in Kern County. That Project's CEQA review shows that for at least the first seven years, the project will be *net positive* in GHG emissions, even while running CCS on its natural gas-fired power plants.⁹

Providing a phase-out exemption for fossil fuel projects in California invites failed and under-delivering polluting facilities to continue to pollute communities and the climate, all without any end in sight. The Board must not set California's climate goals back by allowing crude operations using CCS to receive credits far beyond the 2040 phase-out date.

III. CARB Should Limit Incentives for Hydrogen and Restrict Crediting to Renewable-Fueled Hydrogen

038.3

We appreciate that the latest proposed amendments remove hydrogen produced from fossil gas from credit generation eligibility. However, given the climate imperative to phase out fossil fuels expeditiously, waiting until the end of 2030 to remove credit eligibility for fossil hydrogen is a mistake. Instead, credit eligibility should be removed from fossil hydrogen immediately upon completion of the current LCFS amendment process. Further, as we discussed at length in our comments from February 2024, limitations on hydrogen should extend beyond fossil hydrogen to that produced from biomass and biogas as well. Instead, with the proposed amendments, hydrogen produced through steam methane formation of biogas and biomass gasification would still be credited under the LCFS.

038.4

Steam methane reformation of biogas, including that paired with CCS, and gasification or pyrolysis of biogenic resources (e.g. woody biomass and biogas), should be explicitly excluded because of their associated harms. Woody biomass, as a feedstock (e.g. in gasification or pyrolysis) or energy source to make hydrogen, harms the climate,¹⁰ communities, and ecosystems with significant emissions of CO₂¹¹ and criteria and other health-harming pollutants.¹² As the IPCC, the federal Environmental Protection Agency's

⁸ See generally IEEFA, The Carbon Capture Crux (Sept. 1, 2022), <https://ieefa.org/resources/carbon-capture-crux-lessons-learned>.

⁹ See Draft EIR CarbonFrontier CCS Project by Aera Energy, LLC, SCH 2023060293, <https://ceqanet.opr.ca.gov/2023060293/2> at pages 4.8-32, 33. Moreover, the construction emissions to build the CCS infrastructure will release 27,975 MT CO₂/e. *Id.* at 4.8-24.

¹⁰ Sterman, John et al., Does wood bioenergy help or harm the climate?, 78 Bulletin of the Atomic Scientists 128 (2022), DOI: 10.1080/00963402.2022.2062933, available at <https://www.tandfonline.com/doi/full/10.1080/00963402.2022.2062933>; Partnership for Pol'y Integrity, *Air pollution from biomass energy* (updated April 2011), available at <https://www.pfpi.net/wp-content/uploads/2011/04/PFPI-air-pollution-and-biomass-April-2011.pdf>.

¹¹ Sterman, John et al., Does replacing coal with wood lower CO₂ emissions? Dynamic lifecycle analysis of wood bioenergy, 13 Env't Rsch. Letters 015007 (2018), DOI: 10.1088/1748-9326/aaa512, available at <https://www.tandfonline.com/doi/full/10.1080/00963402.2022.2062933>.

¹² Liu, Wu-Jun et al., Fates of chemical elements in biomass during its pyrolysis, 117 Chemical Reviews 6367 (2017), <https://pubs.acs.org/doi/10.1021/acs.chemrev.6b00647>; Yao, Zhiyi et al., Particulate emissions from the gasification and pyrolysis of biomass: Concentration, size distributions, respiratory deposition-based control measure evaluation,

Science Advisory Board, and other scientists have established, wood bioenergy should not be assumed to be carbon neutral;¹³ Using methane to produce hydrogen increases methane leakage risk, with one biogas plant study finding that leaked methane can be as high as 14.9% of total methane production.¹⁴ There is also a significant pollution burden from biogas facilities near communities.¹⁵ The LCFS should not incentivize and subsidize feedstocks that harm the climate and pollute the same communities that have historically borne the pollution burden of our status quo energy portfolio.

At most, the LCFS should only allow hydrogen production where hydrogen generators are powered by *new* sources of zero-emissions electricity (additionality or incrementality) that directly supply the grid electrolyzers are connected to (deliverability), within the same hour that generators are running (hourly matching).¹⁶ This is reaffirmed by the IRS's proposed rulemaking in which hydrogen producers could only receive the Section 45V clean hydrogen production tax credit by adhering to the 3 pillars.¹⁷ However, CARB staff's proposed amendments would allow the continued use of problematic feedstocks like dairy biogas and biomass, despite the emissions and environmental burdens they carry.

Even if produced via electrolysis in adherence to the three pillars, the use of hydrogen should be limited to those sectors without a viable present-day alternative, such as replacing existing dirty gray fossil-based hydrogen, crude oil refineries, or steel

242 Environmental Pollution 1108 (2018), <https://doi.org/10.1016/j.envpol.2018.07.126>; Saxe, Jennie Perey et al., Just or bust? Energy justice and the impacts of siting solar pyrolysis biochar production facilities, 58 Energy Research & Social Science 101259 (2019) <https://doi.org/10.1016/j.erss.2019.101259>; Pang, Yoong Xin et al., Analysis of environmental impacts and energy derivation potential of biomass pyrolysis via piper diagram, 154 Journal of Analytical and Applied Pyrolysis 104995 (2021), available at <https://doi.org/10.1016/j.jaap.2020.104995>.

¹³ IPCC Task Force on National Greenhouse Gas Inventories, Frequently Asked Questions, available at <https://www.ipcc-nggip.iges.or.jp/faq/faq.html>, at Q2-10 (IPCC Guidelines do not automatically consider biomass used for energy as 'carbon neutral,' even if the biomass is thought to be produced sustainably); EPA Science Advisory Board, SAB Review of Framework for Assessing Biogenic CO₂ Emissions from Stationary Sources (2019), at 2 (not all biogenic emissions are carbon neutral nor net additional to the atmosphere, and assuming so is inconsistent with the underlying science); Beddington, J. et al., Letter from scientists to the EU parliament regarding forest biomass (2018), available at <https://empowerplants.files.wordpress.com/2018/01/scientist-letter-on-eu-forest-biomass-796-signatories-as-of-january-16-2018.pdf>.

¹⁴ Scheutz, Charlotte & Anders M. Fredenslund, Total methane emission rates and losses from 23 gas plants, 97 Waste Mgmt. 38-46 (2019), <https://doi.org/10.1016/j.wasman.2019.07.029>.

¹⁵ Nicole, W., CAFOs and Environmental Justice: The Case of North Carolina, 121 Environmental Health Perspectives a182 (2013); Montford, K. and Wotherspoon, T., The Contagion of Slow Violence: The Slaughterhouse and COVID-19, 10 Animal Studies Journal 80 (2021); Domingo, N.G.G. et al., Air quality-related health damages of food, 118 PNAS e2013637118 (2021).

¹⁶ Ricks, Jenkins, *The Cost of Clean Hydrogen with Robust Emission Standards: A Comparison Across Studies*, Princeton University Zero-carbon Energy Systems Research and Optimization Laboratory (2023), available at <https://subscriber.politicopro.com/f/?id=00000187-9bb4-daaa-a5e7-bfbfff120000>; Dan Esposito et al., *Smart Design of 45V Hydrogen Production Tax Credit Will Reduce Emissions and Grow the Industry*, Energy Innovation Policy & Technology (2023); and Ben Haley, Jeremy Hargreaves, *Three-Pillars Accounting Impact Analysis*, Evolved Energy Research (2023), available at <https://www.evolved.energy/post/45v-three-pillars-impact-analysis>.

¹⁷ Section 45V Credit for Production of Clean Hydrogen: Section 48(a)(15) Election To Treat Clean Hydrogen Production Facilities as Energy Property, Proposed Rules, 88 Fed. Reg. 246, 89220-255 (Dec. 26, 2023)(to be codified at 26 C.F.R. Part 1)

manufacturing.¹⁸ Whenever direct electrification can be used instead of hydrogen, as with vehicles, it's the demonstrably better choice. Electricity made from solar and wind is more efficient, lower cost, lower in CO₂ emissions, and a mature energy resource.¹⁹ The LCFS should be incentivizing full electrification rather than hydrogen which is projected to have only a limited role in a carbon-free future.²⁰

IV. CARB Should Strictly Limit the Use of Crop-based Biofuels.

038.5

The latest amendments do little to address the concerns we raised in our February 2024 comments about the continued sanctioning of crop-based biofuels. The most recent amendment put forth by CARB is to “provide credits for biomass-based diesel produced from virgin soybean oil and canola oil for up to 20 percent of annual biomass-based diesel reported on a company-wide basis.” While this is a limitation on crediting for two problematic feedstocks, the measure is too limited in scope. It still allows crediting for the use of some soybean oil and canola oil, and it does not preclude expanded use of crop-based feedstocks outside of soybean oil and canola oil such as corn and other grains. Thus, crop-based biofuels are still, in effect, incentivized, despite the known risks.

Relying on crop-based biofuels results in both direct and indirect land use change emissions that worsen the climate crisis, counter to their intended purpose. For example, in an analysis of 17 potential alternative-fuel pathways looking at different feedstocks, technologies, and world regions, researchers found that using virgin vegetable oil had the highest indirect land-use change emissions because of links to high deforestation and peat oxidation in southeast Asia, driven by palm expansion.²¹ In the same study, it was found that producing biofuels from any vegetable oil in any region, including corn and soy in the U.S. context, would encourage palm oil expansion and associated peat oxidation in southeast Asia due to substitutions among vegetable oils and international trade.²² Thus,

¹⁸ See e.g., Michael Liebreich, *The Clean Hydrogen Ladder (v.4.1)* (2021), available at <https://www.linkedin.com/pulse/clean-hydrogen-ladder-v40-michael-liebreich/>; see also, Michael Liebreich, *The Unbearable Lightness of Hydrogen*, BloombergNEF (2022), available at <https://about.bnef.com/blog/liebreich-the-unbearable-lightness-of-hydrogen/>, and Michael Barnard, *Chemical Engineer Paul Martin Reflects on Liebreich's Hydrogen Ladder & #Hopium—Part 1*, Clean Technica (2021)(hydrogen is actually a decarbonization problem, not a decarbonization solution), available at <https://cleantechnica.com/2021/09/01/cleantech-talk-chemical-engineer-paul-martin-reflects-on-liebreichs-hydrogen-ladder-hopium-part-1/>.

¹⁹ Hydrogen Science Coalition, <https://h2sciencecoalition.com> (last accessed: February 8, 2024).

²⁰ IPCC, Technical Summary Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (2022), available at https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_TechnicalSummary.pdf; see also David Cebon and Johanne Whitmore, *Hydrogen's role in the energy transition to 2050—Three evidence-based recommendations*, The OECD Forum Network (2023), available at <https://www.oecd-forum.org/posts/hydrogen-s-role-in-the-energy-transition-to-2050-three-evidenced-based-recommendations>, and Michael Liebreich, *The Unbearable Lightness of Hydrogen*, BloombergNEF (2022), available at <https://about.bnef.com/blog/liebreich-the-unbearable-lightness-of-hydrogen/>.

²¹ Zhao, X. et al., *Estimating induced land use change emissions for sustainable aviation biofuel pathways*, 779 *Science and the Total Environment* (2021).

²² Zhao, X. et al., *Estimating induced land use change emissions for sustainable aviation biofuel pathways*, 779 *Science and the Total Environment* (2021).

038.5 cont high indirect land-use change emissions from virgin vegetable oil biofuel pathways undermine some, if not all, of the greenhouse gas savings from these fuels.²³

There could also be unforeseen harms to communities and the environment. For instance, a 2017 study found that increased production of crop-based biofuels heavily contributes to global water scarcity and is not the best option for bioenergy.²⁴ Meanwhile, a 2016 study found that, just in the United States, about 140 million people could be fed with the resources for bioethanol, and about 10 million people could be fed with the resources for biodiesel, indicating the threat of crop-based biofuels to global food security.²⁵ Also, with increased production of crop-based biofuels, there is the potential for increased nutrient and pesticide runoff to surface waters and contamination of groundwater due to crop cultivation.²⁶

Another harm from crop-based biofuels is the impact to communities from biofuel refining and resulting criteria pollutant emissions. Crop-based biofuels are most often produced using the Hydroprocessed Esters and Fatty Acids (HEFA) pathway, which reacts crop feedstock with hydrogen at high temperatures and pressures to form fuel.²⁷ Because of the high temperatures and extremely high pressures, runaway increases in temperature are common, which result in operators flaring refinery gases to bring conditions back under control. However, in doing so, toxic and smog-forming air contaminants are emitted such as particulate matter, sulfur dioxide, and hydrocarbons that worsen air quality. Because HEFA processes require more hydrogen than petroleum refining, it is expected that hydro-conversion-related flaring would be worse with HEFA refining, along with explosion and fire risk.²⁸ With refineries most often sited in low-income communities and communities of color,²⁹ environmental justice harms are exacerbated by the presence of HEFA refining and would worsen with crop-based biofuel expansion.

Many of the risks associated with crop-based biofuels would have been mitigated if CARB had accepted the amendments in the Comprehensive Environmental Justice Scenario proposed by CARB's Environmental Justice Advisory Committee (EJAC). The proposal was to "[c]ap the use of lipid biofuels (commonly known as crop-based biofuels) at 2020 levels, about 855 million gallons, pending an updated risk assessment to determine phase out

²³ Pavlenko, N. and Searle, S., Fueling flight: Assessing the sustainability implications of alternative aviation fuels, International Council on Clean Transportation (2021); Zhao, X. et al., Estimating induced land use change emissions for sustainable aviation biofuel pathways, 779 Science and the Total Environment (2021).

²⁴ Gerbens-Leenes, P.W., Bioenergy water footprints, comparing first, second and third generation feedstocks for bioenergy supply in 2040, 59 European Water 373 (2017).

²⁵ Rulli, M.C. et al., The water-land-food nexus of first-generation biofuels, 6 Nature Scientific Reports (2016).

²⁶ National Research Council 2011. Renewable Fuel Standard: Potential Economic and Environmental Effects of U.S. Biofuel Policy. Washington, DC: The National Academies Press. <https://doi.org/10.17226/13105>.

²⁷ Van Dyk, S. et al., Potential synergies of drop-in biofuel production with further co-processing at oil refineries, 13 Biofuels Bioproducts & Biorefining 760 (2019).

²⁸ Karras, G., Changing Hydrocarbons Midstream: Fuel chain carbon lock-in potential of crude-to-biofuel petroleum refinery repurposing, Prepared for: National Resources Defense Council (2021).

²⁹ Donaghy, T. et al., Fossil fuel racism in the United States: How phasing out coal, oil, and gas can protect communities, 100 Energy Research & Total Science 103104 (2023).

timelines for high-risk, crop-based feedstocks.”³⁰ Capping the use of lipid biofuels could spur the development of less deleterious alternatives such as the use of true waste products in biofuel production such as municipal solid waste and push the needed transition to battery-electric in shipping and trucking,³¹ all while preventing the expansion of crop-based biofuel harms. Instead, crop-based biofuels are treated as the unavoidable alternative to fossil fuels, locking in the threat to communities and the environment. CARB should revisit the amendments originally proposed by EJAC.

V. CARB Should Add Conventional Jet Fuel as a Deficit-Generator But Add Strong Guardrails on Crop-Based Biofuels.

The latest amendments completely remove conventional jet fuel (“CJF”) from consideration for inclusion under the LCFS. We supported the inclusion of CJF for intrastate flights, as put forth in the previously proposed amendments, and beyond that supported the inclusion of all CJF combusted in and over California, including by interstate and international flights. The latest amendments constitute a failure in holding the aviation industry accountable for its emissions.

It is beyond time to end the unfair advantages given to CJF that perpetuate the industry’s use of fossil fuels. Many state policies heavily subsidize the industry’s use of carbon-based jet fuels, which works against the state’s efforts at decarbonizing the sector and allows this fuel to be under-regulated. For example, fuel used in international flights are exempt from sales and use taxes in California, a practice that was estimated to cost state and local governments nearly \$300 million in revenue in 2021-2022.³² Commercial airlines are also exempt from the excise tax for jet fuel, a tax break that costs the state about \$23 million each year.³³ The carveout in the Low Carbon Fuel Standard for conventional jet fuel saves the airlines an estimated \$110 to \$360 million each year³⁴ on the cost of that fuel.

With the latest amendments, CARB is allowing CJF its status as an opt-in fuel to remain. This means that refiners will not be required to reduce the carbon intensity of CJF. Further, the current opt-in model is problematic because it allows alternative aviation fuel producers to generate and sell LCFS credits for revenue, despite the quality of alternative fuel feedstock used. Such alternative aviation fuels (“AJFs”), or so-called Sustainable Aviation Fuels (“SAFs”), are often not truly sustainable, being derived from problematic sources like crop-based feedstocks and other forms of biomass, with which we have already expressed our concerns.

³⁰ ISOR, p. 116.

³¹ Minjares, R. and Basma, H., Battery-electric trucks: The most affordable path to decarbonizing tractor-trailers, International Council on Clean Transportation (April 27, 2023), <https://theicct.org/event/battery-electric-trucks-the-most-affordable-path-to-decarbonizing-tractor-trailers/>.

³² CA Dept. of Tax and Fee Administration, Aircraft Jet Fuel - Frequently Asked Questions, available at <https://www.cdtfa.ca.gov/taxes-and-fees/aircraft-jet-fuel-faq.htm>.

³³ CA Dept. of Finance, Tax Expenditure Reports 2021-22, at p. 11, available at <https://dof.ca.gov/wp-content/uploads/sites/352/Forecasting/Economics/Documents/2021-22-Tax-Expenditure-Report.pdf>.

³⁴ State fuel use estimated using DoT T-100 data on available seat miles originating in state & DoT data on national airline fuel consumption for 2019.

Relying on such biofuels results in both direct and indirect land use change emissions that worsen the climate crisis, counter to their intended purpose. Rather than accept the true and full climate costs of aviation and invest more seriously in research for zero-emission technologies like electric aircraft, the industry has set its sights on SAFs, equating to delays in true climate progress in the aviation sector. To minimize harms from the aviation sector, CJF should be fully incorporated in the LCFS—including that for intrastate, interstate, and international flights—while eliminating from crediting crop-based and other problematic biomass biofuels, and only allowing other biofuels that meet strict and transparent sustainability criteria.

The purported reason for not including CJF in the LCFS is that “[a]viation fuel suppliers who would generate deficits under the initial proposal could simply acquire credits to meet that compliance obligation.”³⁵ This is not a valid reason for inaction. Instead, the LCFS program needs a full overhaul where fuels meet stringent criteria for sustainability, and bad actors are unable to buy their way out of true emissions reductions with surplus credits. Amendments should reflect this level of improvement to the LCFS.

VI. CARB Should Remove Woody Biomass Feedstocks from the LCFS Program.

038.7

In the latest amendments, the following definition of “forest biomass waste” is put forth, in place of “forestry residues”: “small-diameter, non-merchantable residues, limited to forestry understory vegetation, ladder fuels, limbs, branches, and logs that do not meet regional minimum marketable standards for processing into wood products.”³⁶ With this definition, CARB staff propose to include forest waste biomass feedstocks as a specified source feedstock. As noted in our previous comments, the allowance of any forest-derived material, whether designated as “waste” or “residues,” is ultimately problematic, polluting, and not climate beneficial.

First, the use of forest biomass to produce biofuels is likely to employ gasification and pyrolysis, two highly polluting techniques. The gasification of biomass at high temperatures (800-1200°C) produces a “syngas” containing large amounts of CO₂, as well as methane (CH₄), carbon monoxide (CO), and hydrogen (H₂), in addition to liquid hydrocarbons and tar, solid char and ash residues, and a wide array of air pollutants. The pyrolysis of biomass additionally produces pyrolytic oil and larger quantities of char.³⁷ Further, biomass gasification and pyrolysis produce a wide range of health-harming pollutants including fine particulate matter, NO_x, SO_x, benzene, toluene and xylenes (BTEX), tars and soot, and persistent organic pollutants such as polycyclic aromatic hydrocarbons (PAHs) (e.g., naphthalene), polychlorinated dibenzo-*p*-dioxins and

³⁵ Proposed LCFS Amendments (August 12, 2024), p. 3.

³⁶ Proposed LCFS Amendments, § 95481.

³⁷ Shayan, E. et al., Hydrogen production from biomass gasification; a theoretical comparison of using different gasification agents, 159 Energy Conversion and Management 30 (2018), <https://doi.org/10.1016/j.enconman.2017.12.096>.

dibenzofurans (PCDD/Fs).³⁸ Importantly, gasification and pyrolysis of biomass are significant sources of fine particulate matter (PM 2.5) that can penetrate deeply into the lungs, even enter the bloodstream, and cause serious health problems.³⁹ Fine particulate matter pollution is linked to a higher risk of premature death, heart disease, stroke, and aggravated asthma.⁴⁰ With biomass gasification and pyrolysis project proposals slated for Central Valley communities already overburdened with pollution,⁴¹ to sanction forest biomass under the LCFS would contribute to environmental injustice as well, given the overarching threats of air pollution, water pollution, noise pollution, CO₂ leakage, and ecosystem damage.

Similar to biomass combustion, gasification and pyrolysis of biomass produce large quantities of CO₂ as well as methane emissions that worsen the climate emergency. The claim that woody biomass is a carbon neutral feedstock has been thoroughly debunked,⁴² given the lost carbon storage and sequestration from extracting biomass, and the significant CO₂ emissions during biomass processing and gasification, pyrolysis, or combustion.⁴³ The combustion, gasification, and pyrolysis of trees and other forest material—including residues considered to be “waste”—leads to a net increase of carbon emissions in the atmosphere for decades to centuries.⁴⁴

CARB’s proposed specifications for forest biomass waste, however well-intentioned, are too vague to limit forest degradation, nor will they meaningfully reduce the significant

³⁸ Partnership for Policy Integrity, Air pollution from biomass energy, <https://www.pfpi.net/air-pollution-2/>; Liu, Wu-Jun et al., Fates of chemical elements in biomass during its pyrolysis, 117 *Chemical Reviews* 6367 (2017), <https://pubs.acs.org/doi/10.1021/acs.chemrev.6b00647>; Yao, Zhiyi et al., Particulate emissions from the gasification and pyrolysis of biomass: Concentration, size distributions, respiratory deposition-based control measure evaluation, 242 *Environmental Pollution* 1108 (2018), <https://doi.org/10.1016/j.envpol.2018.07.126>; Saxe, Jennie Perey et al., Just or bust? Energy justice and the impacts of siting solar pyrolysis biochar production facilities, 58 *Energy Research & Social Science* 101259 (2019) <https://doi.org/10.1016/j.erss.2019.101259>; Pang, Yoong Xin et al., Analysis of environmental impacts and energy derivation potential of biomass pyrolysis via piper diagram, 154 *Journal of Analytical and Applied Pyrolysis* 104995 (2021), <https://doi.org/10.1016/j.jaap.2020.104995>.

³⁹ Yao, Zhiyi et al., Particulate emissions from the gasification and pyrolysis of biomass: Concentration, size distributions, respiratory deposition-based control measure evaluation, 242 *Environmental Pollution* 1108 (2018), <https://doi.org/10.1016/j.envpol.2018.07.126>.

⁴⁰ U.S. Environmental Protection Agency, Health and Environmental Effects of Particulate Matter, <https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm>.

⁴¹ Clean Energy Systems, Clean Energy Systems Enters Into An Agreement to Acquire the Madera Biomass Power Plant (Jul. 12, 2022), available at <https://www.cleanenergysystems.com/clean-energy-systems-enters-into-an-agreement-to-acquire-the-madera-biomass-power-plant>; LLNL and DOE, Getting to Neutral: Options for Negative Carbon Emissions in California (2019), available at <https://livermorelabfoundation.org/2019/12/19/getting-to-neutral/>.

⁴² Booth, Mary S, Not carbon neutral: Assessing the net emissions impact of residues burned for bioenergy, 13 *Env’t Rsch. Letters* 035001 (2018), <https://doi.org/10.1088/1748-9326/aaac88>; Sterman, John et al., Does wood bioenergy help or harm the climate?, 78 *Bulletin of the Atomic Scientists* 128 (2022), <https://doi.org/10.1080/00963402.2022.2062933>.

⁴³ Climate Action Network International, Position: Carbon Capture, Storage, and Utilisation (January 2021), <https://climatenetwork.org/resource/can-position-carbon-capture-storage-and-utilisation/>; Fern, 2022, Six problems with BECCS, https://www.fern.org/fileadmin/uploads/fern/Documents/2022/Six_problems_with_BECCS_-_2022.pdf.

⁴⁴ Booth, Mary S., Not carbon neutral: Assessing the net emissions impact of residues burned for bioenergy, 13 *Env’t Rsch. Letters* 035001 (2018), <https://doi.org/10.1088/1748-9326/aaac88>; Laganieri, Jerome et al., Range and uncertainties in estimating delays in greenhouse gas mitigation potential of forest bioenergy sourced from Canadian forests, 9 *GCB Bioenergy* 358 (2017), <https://doi.org/10.1111/gcbb.12327>; Sterman, John et al., Does wood bioenergy help or harm the climate?, 78 *Bulletin of the Atomic Scientists* 128 (2022).

harms to the climate, communities and forests detailed above. Almost all forest logging and thinning projects are done under the justification that they will promote forest health and resilience and/or are needed for fuels reduction. Trees and other forest vegetation of any size can be lopped and masticated into “small-diameter” residues and called “non-merchantable.” Incentivizing the commodification of forest materials under the LCFS will lead to the removal of more biomass from the forest than would happen if these materials were not commodified, threatening forest ecosystems and forest carbon storage. Management practices should instead prioritize leaving residues or wastes in the forest to maintain soil organic carbon, retain vital nutrients in the ecosystem, and support wildlife habitat.

CONCLUSION

Thank you for consideration of these comments. The references cited herein are available here: <https://diversity.box.com/s/8jcli9f2vwyof9cbq1qx5sna1m0d0hsb>

John Fleming, PhD, Senior Scientist / jfleming@biologicaldiversity.org
Victoria Bogdan Tejeda, Staff Attorney / vbogdantejeda@biologicaldiversity.org
Center for Biological Diversity
Climate Law Institute
Oakland, CA 94612

Comment Log Display

Here is the comment you selected to display.

Comment 39 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Bradley
Last Name	Parvin
Email Address	Bradpar70@aol.com
Affiliation	
Subject	CARB

039.1 **Comment**

Keep putting small business out of business with your regulations then wonder why owners and consumers who don't want to pay for the associated additional costs are leaving California. Idiot Democrats and their socialist climate agenda raising costs for Californians and all Americans.

Attachment

Original File Name

**Date and Time Comment Was
Submitted**

2024-08-26 16:15:39

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Comment 40 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	John
Last Name	Andersen
Email Address	jandersen@mendoco.com
Affiliation	Humboldt and Mendocino Redwood Companies
Subject	LCFS Amendments - HRC/MRC Comments
Comment	<div></div>
Attachment	www.arb.ca.gov/lists/com-attach/7357-lcfs2024-WjZSNwR2ADUGX1My.pdf
Original File Name	LCSF Amendments Comment_HRC_MRC.pdf
Date and Time Comment Was Submitted	2024-08-26 16:33:55

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August 27, 2024

California Air Resources Board
Liane Randolph, Chair
Steve Cliff, Executive Officer
1001 I Street
Sacramento, CA 95814

RE: Comments Relating to Proposed 15-Day Changes to the Low Carbon Fuel Standard

Dear Chair Randolph and Executive Officer Cliff,

We write to you today with concerns regarding the proposed 15-day changes to the Low Carbon Fuel Standard. Humboldt and Mendocino Redwood Companies collectively own 440,000 acres of sustainably managed forestlands that are third-party certified as being well managed forests. We also own a sawmill in Ukiah, CA and a sawmill and biomass facility in Scotia, CA. The biomass facility uses the by-products from the sawmilling process to create renewable, baseload power for our sawmill complex with excess energy sold to a community choice aggregator in Humboldt County.

040.1

A significant portion of the management of our forests involves the reduction of excess fuels to create fire resilient forests. The acres treated by this work aid the state in achieving the million-acre goal of fuel reduction annually. Yet, it appears that we will be excluded from eligibility for a reduced CI as we will likely be considered as an industrial forestland owner (see 95488.8(g)(1)(A)(3)). If the larger landowners are excluded then that leaves eligible non-industrial forest owners the ability to participate except for the requirement in the 15-day language requiring biomass to be sourced from certified forestlands. Very few smaller forestland owners are third-party certified in California. Therefore, the proposed language disincentivizes biomass material removed from forests across a vast majority of forest ownerships. Obviously with the loss of hundreds of thousands of forested acres to wildfires annually (some years even more) this proposed language is ill-advised.

As we do not own a biomass facility at our sawmill in Ukiah, we are investigating the potential for a \$400 million biomass-to-hydrogen/5MW biomass facility at this location. We have received two grants from Cal Fire to explore this venture. To date, we have completed a techno-economic feasibility study. We are now 50% complete with initial project engineering (FEL2). Upon completion of the engineering package, we will have invested well over \$1,000,000 toward project development. The proposed language threatens the feasibility of this project due to the lack of or reduced eligibility of biomass feedstock from our timberlands and sawmills.

In closing, the biomass portion of the LCFS rulemaking package should be removed so a conversation can begin with forestry professionals and those state agencies and associations with expertise in this area. We look forward to working with CARB to address these issues.

Sincerely,

A handwritten signature in black ink, appearing to read "John Andersen". The signature is fluid and cursive, with the first name "John" being more prominent than the last name "Andersen".

John Andersen
Director, Forest Policy

Comment Log Display

Here is the comment you selected to display.

Comment 41 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Dan
Last Name	Evans
Email Address	Dan@promusenergy.com
Affiliation	Promus Energy
Subject	Comments on Proposed Low Carbon Fuel Standard 15-Day Changes
Comment	Please see comments attached.
Attachment	www.arb.ca.gov/lists/com-attach/7359-lcfs2024-BXVTJwNtBTsBcgFy.pdf
Original File Name	Promus Energy Comments on the Proposed Low Carbon Fuel Standard Amendments 8.27.24.pdf

Date and Time Comment Was Submitted	2024-08-26 16:59:18
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If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 26th, 2024



The Honorable Liane Randolph
Chair California Air Resources Board
1001 I Street
Sacramento, CA 95814

Dear Chair Randolph:

As a developer of dairy digester RNG and biogas-to-electricity projects for EV charging in West Coast states, Promus Energy appreciates the opportunity to comment on the 15-day proposed changes to the CA Low Carbon Fuel Standard (LCFS). Promus values CARB's serious consideration and incorporation of feedback provided by us and other stakeholders as revisions to the LCFS program have been carefully crafted over the last several years. We urge CARB to quickly finalize this urgently needed LCFS program rules package.

Carbon Intensity Target Adjustments

- 041.1 Promus supports CARB recommendation of a 9% CI reduction stepdown in 2025 to rapidly help bring credits and deficits into balance. However, as Promus and other interested parties have pointed out in past comment periods, a more aggressive 2030 target will be needed to prevent potential weakness in the credit market between 2025 and 2030. Promus recommends at least a 39% CI reduction target by 2030 to ensure both near- and medium-term strength in the credit market. A 39% CI reduction by 2030
- 041.2 is consistent with the 2 AAM trigger scenario CARB presented during the April 2024 workshop. While that scenario appeared very promising from the standpoint of drawing down the credit bank and keeping prices strong and stable long-term, the reliance in that scenario on the AAM triggering twice before 2030 adds an element of risk to investors looking at financing low carbon fuels projects. Rather than relying on AAM triggers – important as they are -- Promus believes that setting the 2030 target at a 39% reduction will give investors confidence that the credit market will be strong between now and 2030. CARB's August 12 Modification Uncertainty Scenario 1 with a single 2028 AAM triggering similarly presents short-term weakness in the credit market that would undermine investor confidence. Investors have not yet seen the AAM in action, therefore, setting a more aggressive 2030 target will ensure that credit price strength is not dependent on uncertain triggering of the AAM in the short-term.
- 041.3 The AAM proposed in the updated LCFS rules package is an absolutely essential reform to prevent a repeat of the boom-and-bust cycle that occurred after the 2017 LCFS amendments and to keep credits and deficits in balance. Promus joins other commentors in urging CARB to allow the AAM to trigger as soon as possible (before 2027) to prevent market instability within the next few years after the implementation of the new rules package.

Sustainability Guardrails on Crop-Based Biofuels

- 041.4 Sustainability guardrails on biofuels are appropriate to prevent adverse land use changes and to ensure that priority is placed on waste-based feedstock fuels that have a lower CI than crop-based biofuels. Biofuels play a critical role in decarbonizing the transportation sector, but CARB should place a priority

on leveling the playing field by fulling accounting for all externalities when calculating CI scores for biofuels in the GREET 4 calculator.

Dairy Biogas Avoided Emissions Crediting

041.5

Promus supports CARB's commitment to continue dairy biogas avoided emissions crediting. However, CARB's proposed elimination of a third crediting period raises the question of how dairy methane emission reductions will be sustained after 2045. An assured 20-year crediting period provides a solid foundation for biogas project financing, but the promise of longer-term crediting, or alternative incentives outside of the LCFS program, can prevent emissions backsliding and improve economics and investor interest in this space. Biomethane pathways (to RNG, hydrogen, electricity, etc.) are some of the only fuels that will be credit generators as the CI compliance curve approaches 90% by 2045. CARB's analysis and studies confirm that targeting avoided methane emissions produces the most bang for the buck and that it is needed to achieve the goal of a 90% reduction by 2045.

While CARB's support of avoided emissions crediting is necessary and appreciated, Promus strongly urges CARB to begin outlining and provide clarity around its desire to channel biomethane to other hard-to-decarbonize sectors. CARB has mentioned this multiple times during LCFS workshops over the past few years, but few details have been released thus far. Now that avoided emissions crediting has been reduced from a maximum of three crediting periods to two, digester developers need to understand what the future of their projects will be after their projects no longer receive critical support from the LCFS program. Without adequate incentives for the continued operation of digesters, CARB risks emissions backsliding with digester projects being abandoned after 20 years. Gaining certainty that there will be sectors outside of the transportation market that provide high value for biomethane will further incentivize the capture of methane and help California meet its emissions reductions goals.

We appreciate the opportunity to provide feedback on the proposed changes to the LCFS program and we encourage CARB to finalize the rules quickly and send them to the CARB Board for approval this November.

Thank you for your consideration.

Sincerely,

Dan Evans, President
Promus Energy LLC
1201 Third Ave., Suite 320
Seattle, Washington 98101
dan@promusenergy.com
206.300.0835

Comment Log Display

Here is the comment you selected to display.

Comment 42 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Don
Last Name	Gilstrap
Email Address	dgilstrap@chevron.com
Affiliation	
Subject	Chevron comments on August 2024 15-day package
Comment	
Attachment	www.arb.ca.gov/lists/com-attach/7360-lcfs2024-VTYFawZiAyYDdwlm.pdf
Original File Name	Chevron Comments on 08-2024 15-Day Package.pdf
Date and Time Comment Was Submitted	2024-08-26 17:09:56

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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Don Gilstrap
Manager, Fuels Regulations

August 26, 2024

Rajinder Sahota
Deputy Executive Officer – Climate Change and Research
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Dear Ms. Sahota:

Re: August 2024 15-Day LCFS Proposal

Chevron appreciates the opportunity to review and comment on the subject Low Carbon Fuel Standard rulemaking proposal.

Chevron is a major refiner and marketer of petroleum products and renewable fuels in the state of California and a regulated party under the Low Carbon Fuel Standard (LCFS). Chevron is also an international producer of lower carbon intensity fuels with a global integrated procurement, distribution and logistics network and 11 biorefineries in the U.S. and Europe.

Key Messages

- 042.1 • Several proposals in this package are not sufficiently related to what was proposed in the original 45-day package to be included in a 15-day package.
- 042.2 • In three years of workshops, hearings, and written comments, no reasonable evidence has been presented that the production of crop-based renewable fuels is causing environmental or economic harm or that the projected growth in such production would lead to those harms. Both the sustainability guardrails and feedstock cap are unnecessary and harmful, without providing benefits to the environment or consumers.
- 042.3 • The proposed sustainability guardrails introduce sweeping changes to the agriculture industry in the United States with almost no time to prepare. Further, they are burdensome and redundant, given the existing indirect land use change factors under the LCFS and the EPA's feedstock documentation requirements under the Renewable Fuel Standard.
- 042.4 • The implementation of the sustainability guardrails in 2026 impacts feedstocks from the 2025 harvest year. This provides little to no time to implement tracking systems in the United States that do not currently exist.
- 042.5 • The proposed cap on fuels produced from soybean and canola oil is arbitrary and political, without basis in science. It has no place in a program that is meant to be market-based and technology-neutral.
- 042.6 • The proposals to limit hydrogen crediting and reduce infrastructure incentives are counterproductive in a time when the industry is facing serious economic headwinds.
- 042.7 • CARB's proposal to accelerate the reduction in biogas and renewable natural gas incentives threatens existing investments and runs counter to state and international climate goals.
- 042.8 • The proposed penalty on an exceedance of a verified CI is excessively punitive.



Chevron Global Downstream LLC
5001 Executive Parkway, San Ramon, CA 94583

Amendments Not Related to the Original Proposal

042.1 cont

CARB has included several proposals in this 15-day package that significantly depart from the content of the original 45-day proposals in January. The 15-day comment period does not provide sufficient time for analysis and response warranted for newly introduced amendments that will result in significant impacts upon the regulated community. Consequently, several of the amendments appearing in the 15-day package are in violation of both the spirit and letter of the notice requirements of §11346.8(c) of the California Administrative Procedures Act. These include:

- **Proposed limits on soybean and canola oil-based fuels** – the original notice included a discussion of a potential cap on crop-based fuels and a reasoned rejection of the concept. No regulatory amendments were proposed related to capping these fuels. Therefore, the regulated community had no reason to anticipate the seismic reversal of this decision and the addition of this new section. A change of such substantial impact, the possibility of which was essentially rejected in the original proposed amendments, warrants a full 45-day comment period.
- **Cutoff for New Biomass-Based Diesel Pathways** – CARB's proposal to refuse the approval of new pathway applications based on ZEV adoption levels was not previously discussed or proposed.
- **Elimination of crediting for fossil hydrogen** – this is not a concept that was contemplated or proposed in the January notice. It is not appropriate for a 15-day package.
- **Restrictions on Hydrogen Refueling Infrastructure (HRI) Crediting** – sunseting the existing program prior to December 31, 2025 with the effective date of the 2024 amendments and requiring state and federal grant funding for program eligibility.
- **Awarding electricity credits to OEMs** – the proposal to divert base electric vehicle charging credits to OEMs was not part of the original notice and is not sufficiently related to any amendments that were proposed.
- **Increased credit for legacy rail** – the original package did not contemplate the change to crediting for pre-baseline fixed guideway systems.

These proposals should be withdrawn for potential consideration in a future 45-day package.

Sustainability Guardrails

042.2

We urge CARB not to finalize the changes made to the proposed sustainability criteria in section 95488.9 and land use change carbon intensity in section 95488.3 and believe they should be withdrawn. The proposed sustainability criteria and land use change penalty listed in these sections are effectively superseded by the federal Renewable Fuel Standard's aggregate compliance and traceability rules. We are unaware of any renewable fuels supplied in California that do not also generate credits through the Renewable Fuel Standard. As such, credit generating biofuels are already required to meet sustainability criteria under the federal Renewable Fuel Standard. Those rules require traceability and recordkeeping on the part of a biofuel producer for crop-based feedstock back to the individual farm if the cultivated land mass exceeds the acreage of cultivated land mass established in 2007 at 402 million acres.

In no time since aggregate compliance rules were established has the U.S. Department of Agriculture determined that the number of cultivated acreage in the U.S. exceeded the 2007 baseline. Satellite and land survey evidence suggests that land mass has been lost primarily due to urbanization and not cultivation. Cultivated land mass in the U.S. has been declining. The American Farmland Trust estimates that 11 million acres of cultivated land was

lost to the expansion of urbanization between 2010 and 2016.¹

For crops cultivated outside of the United States, federal traceability and record keeping requirements on behalf of biofuel producers apply. These rules require that biofuel producers document where the feedstock was cultivated to ensure that the crops were not sourced from lands not under cultivation prior to 2007. Assigning additional conservative land use change penalties for feedstock and fuel type from certain regions, as proposed in section 95488.3, are not needed.

We recognize that CARB currently assigns an indirect land use change penalty for crop-based biofuels. We encourage CARB to review the latest science concerning the indirect effect of land use change emissions. Estimated indirect effects may trend downwards. As an example, the most recent iteration of the Global Trade Analysis Project (GTAP) model assigns a carbon intensity penalty for soybean oil that is lower than previously modeled results based on economic data concerning global commodity trade flows.

042.3 cont

The sustainability requirements for crop feedstock cultivation listed in 95488.9 (g)(1)(B) and included below are much too broad to be used for compliance by a third party. The requirements encompass specific agricultural practices that lack an appropriate definition or metric at which point compliance would be satisfied. Biofuel producers and growers need to know which specific agricultural practices apply, or do not apply, in order to maintain assurance of compliance with the proposed provisions. Adequate consideration of these cultivation practices is too onerous and complicated to undertake in this rulemaking. CARB should abandon this requirement and consider this approach through a separate rulemaking.

- (B) Biomass must be produced according to best environmental management practices that reduce GHG emissions or increase GHG sequestration, including but not limited to:
1. Maintain or enhance biodiversity habitat on agricultural or forested lands;
 2. Enhance soil fertility and avoid erosion or compaction;
 3. Apply fertilizers in a manner that minimizes runoff, and soil and water contamination;
 4. Reduce unsustainable water use, and minimize diffuse and localized pollution from chemical residues, fertilizers, soil erosion, or other sources of ground and surface water contamination.

Many of the other sustainability criteria are also unworkable in the timeframe included and CARB should instead consider each through separate rules. These proposed amendments include the ability to rely on certifications that meet the European Union's Renewable Energy Directive (EU RED), but still require location data for the farms where feedstock was cultivated to be passed to the fuel producer which is inconsistent with the EU RED. Under the EU RED, the fuel pathway holder is not the holder of the Attestation letter regarding the point of origin of the biomass. The First Gathering Point holds this and provides proofs of sustainability. The

¹ Source: [Home - American Farmland Trust](#)

proposed language in these provisions would therefore impose more stringent requirements than the EU RED currently requires. Additionally, GPS coordinates of farms per 95488.9(g)(2) are not required and a phase-in a requirement in 95488.9(g)(2) would not be applicable under an EU RED certification system in 95488.9(g)(3)(C).

042.4 cont A 2026 implementation deadline for a new requirement in 95488.9(g)(2) is not feasible since we are not aware of an existing global system that would satisfy the proposed requirement. Additionally, implementing the program by 2026 for the 2025 harvest will give producers less than a year to implement these new requirements without subject matter expertise on compliance, data collection systems, or agreements with primary suppliers. As such, a 2026 timeframe is unrealistic and may result in significant costs and difficulties for renewable fuels that could affect pricing in the market at large.

CARB needs to provide more time and receive more feedback from the grower community concerning certain elements of the proposed sustainability requirements. Most US and Canadian farmers do not currently participate in European sustainability systems and may be hesitant to do so. However, many may participate in a program recently established in Canada as part of the Canadian Clean Fuels Rules since Canada is a close trading partner with the United States. We also maintain that the 2028 deadline for implementing a sustainability system in 95488.9(g)(3) will be challenging unless it explicitly allows for the Canada Clean Fuel Regulation's Land Use and Biodiversity criteria to be an Approved Certification System in 95488.9(g)(3)(C).

042.5 cont Arbitrary Restrictions on Specific Feedstocks
We urge CARB not to finalize the proposed addition of section 95482(i) that would limit a producer's ability to generate credits from soybean and canola oil-based fuels to no more than 20 percent of total biomass based diesel (BBD). CARB has not provided any basis for the proposed limitation on biofuels derived from these oilseeds other than to claim that fuels derived from crop oils should be available to markets outside of California.

Soybean and canola oil-based biofuels are already available in markets outside of California including expanding volumes in Midwest markets and West Coast clean fuel standard incentivized states, along with growing volumes of biomass-based home heating oil in certain Northeast markets. California's LCFS is not hindering the availability of these products to other states.

Efforts to cap the use of soybean and canola oil-based BBD out of a desire to promote food security are misdirected. Raw food commodities, that include soybean and canola oil, comprise a small share of the overall cost of food production and contribute a small share of the retail price of food. Packaging, marketing and logistics make up over 80% of the retail cost of food items.² Growing volumes of soybeans and canola, owing to expanded yields and processing capacity, are additive to the food supply as most pressed soybeans and canola become meal for animal protein cultivation. Efforts to limit soybean and canola cultivation by capping the use of these feedstocks to produce credit generating fuel for the LCFS program may provide little benefit to promote food security.

The credit generating mechanism of the LCFS program provides additional financial incentives to supply the California marketplace with waste-based biofuels. According to recent LCFS quarterly report data, over 60 percent of the biodiesel pool in California is waste-derived while

² Source: [USDA ERS - Documentation](#)

nearly 70 percent of the renewable diesel pool is waste-derived. In addition, the anticipated transition from the federal blender's tax credit to a federal clean fuel production credit that rewards lower carbon fuels with greater federal tax credit will provide further financial incentives to expand the supply of waste-based biofuels. This transition is expected to occur in early 2025.

State and federal incentives that reward lower carbon biofuels are important factors that lead many companies, including Chevron, to invest in lower carbon feedstocks including intermediate crops such as winter canola, camelina and CoverCress. These oilseed crops are cultivated as an intermediate crop that meets the definition of a cover crop and are planted and harvested on land that would otherwise be idle in a rotation pattern between main crops or in a fallow rotation and is primarily intended to provide low carbon feedstocks to produce renewable biofuels and other end uses.

If the proposed 20% cap is finalized, CARB should update the regulatory language to make it clear that it applies to spring canola as a primary crop and not winter canola.

Further, the proposed restriction described in 95482(i) applies to production reported under the LCFS. This is problematic language as most of the renewable fuel delivered to the California market is never reported as production. Further, CARB has not addressed the source of its legal authority to regulate the full production of out-of-state facilities, much of which is delivered to non-California markets.

Due to the annual reduction in the overall carbon intensity benchmarks, biofuel from soybean oil is expected to become a deficit generator as early as 2033, according to previous staff analysis; or by 2030 if the proposed automatic adjustment mechanism is finalized and triggered. Prematurely limiting or capping the use of soybean and canola oil-derived biofuels would only limit near-term carbon reductions in the service of a political message.

Hydrogen Fossil Fuel Feedstock Ineligibility

Chevron objects to the 2031 crediting restriction proposed for hydrogen from fossil feedstocks. Further, it is inappropriate to substitute the hydrogen carbon intensity with that of fossil diesel. Producers who can demonstrate a lower EER-adjusted CI than the substitute fuels' baseline, even if produced from fossil feedstock, should still be eligible to obtain credits in line with a technology-neutral, science-based approach. Many EER-adjusted pathway CIs for fossil-derived hydrogen are well below the conventional ULSD CI in table 7-1. If the proposed change is finalized, CARB should update the ULSD CI reference to Table 2 rather than table 7-1 to address this concern. This will mitigate an arbitrary market distortion and will keep costs down for consumers to enable FCEV technology adoption.

Over 95% of US production of hydrogen is produced from steam methane reforming of natural gas.³ While new technologies have promise, it will take considerable time to develop these commercially on a large scale. Construction of large-scale facilities takes, at minimum, a 10-year cycle time for full capital project execution. Given that there are virtually no large-scale projects through final investment decision and permitting in California today, 2031 is far too early to create an artificial crediting restriction, much less turn hydrogen into a deficit generator as proposed. The LCFS program already has the proper mechanisms in place to drive the development of renewable hydrogen production.

³ [USDOE FE Hydrogen Strategy July2020.pdf \(energy.gov\)](#)

Hydrogen Refueling Infrastructure Crediting

042.9

The modifications to the hydrogen refueling infrastructure (HRI) crediting program as part of the 15-day package do not address the concerns raised during the last comment cycle regarding incentivizing hydrogen infrastructure development. The hydrogen retail industry in California has hit a historic crossroads with high retail prices, falling vehicle sales, and station closures due to supply.^{4,5} This is not the time to be limiting zero emission vehicle fueling infrastructure enablement if CARB staff wishes to meet ACCII, ACT, and ACF milestones as well as goals laid out in AB8 reporting.⁶

Chevron urges CARB to alleviate the following constraints to enable meaningful progress in infrastructure development: 50% capacity limit for public stations, requiring state and federal grant funding for program eligibility, shortening crediting to a 10-year window, the increase in required renewable content from 40% to 80%, and the requirement to disclose all cost and revenue data. If CARB does not relax these constraints, this will hinder infrastructure development in the state as the prospect of lower returns will limit program participation. In addition, applicants should still be allowed to participate in the existing program through 2025 as many infrastructure projects currently under development have been operating under the assumption that the existing program would be in place through December 31, 2025.

042.10

The rationale that limiting HRI crediting to 50% of capacity will encourage wider scale growth is flawed. The current LD HRI program does not have a capacity constraint, yet it has still fallen short of hitting the 2.5% obligation maximum each quarter due to the economic, technological, and permitting challenges of building hydrogen infrastructure. Shell's recent announcement that they will close several stations is illustrative of the challenges faced in this space². For heavy duty (HD) fueling stations, these challenges are only amplified due to the high capital requirements, lack of available fueling technology, and large land use requirements. Combining LD and medium duty (MD) stations into one program doesn't address these challenges.

Chevron requests that CARB work with industry to develop a realistic solution to differentiate reporting between vehicle classes for HRI crediting purposes. Since these are public access locations, there are little to no means for tracking hydrogen vehicle size to identify if the vehicular weight is less than 8,500 lbs, or within 8,501 lbs to 14,000 lbs GVWR. Also, unlike CNG, separate nozzles are not used for light duty vs. MHD vehicles today. The newly developed NREL heavy duty fueling protocol may allow for separate nozzles for fueling, however it will take many years for the industry to transition.

For the HD program, requiring that stations receive capital funding from a State or Federal competitive grant program discourages private investment in the state, increasing taxpayer burden. In addition, requiring cost and revenue data for HD HRI crediting will similarly limit participation due to the onerous requirements for reporting and record keeping relative to the incentive provided by the program. These are both arbitrary requirements and do nothing to further CARB's goals as outlined in AB8 Reporting.⁴

The requirement to increase renewable hydrogen content from 40% to 80% is arbitrary, increases costs for end consumers, and creates a market distortion. The increased costs will

⁴ [California's Hydrogen Economy Dealt A Hammer Blow By Shell's Exit \(forbes.com\)](https://www.forbes.com)

⁵ [Logistical woes and high pump prices stall California H2 market development | S&P Global Commodity Insights \(spglobal.com\)](https://www.spglobal.com)

⁶ [2023 Annual Evaluation of Fuel Cell Electric Vehicle Deployment \(ca.gov\)](https://www.ca.gov)

hurt FCEV adoption in the state and artificially penalizes hydrogen technology when BEV electricity generation is not held to the same renewable volume percent standards. CARB should focus on a technology-neutral approach focused on carbon intensity to keep costs down for consumers and drive adoption. Baseline CI requirements are already sufficient to drive the right outcomes. With the added cost for renewable content and a lack of willingness to pay from consumers, hydrogen retailers will forgo participation in the program due to these economic pressures.

Biomethane Pathway Life and Deliverability Restrictions

042.7a Chevron disagrees with the sunseting of avoided methane crediting for biogas pathways under the LCFS. This is a demonstrated, significant reduction in greenhouse gas emissions that would otherwise be released to the atmosphere. Additionally, limiting incentives for biogas and renewable natural gas producers to reduce methane emissions is inconsistent with the Subnational Methane Action Coalition's statement of purpose, the 2021 Global Methane Pledge, and threatens the additional 2.4 MMTCO₂e reductions needed per SB 1383 and California's Greenhouse Gas and Short-Lived Climate Pollutant Policy framework.⁷

042.7b Chevron does not support deliverability requirements. The current approach to book-and-claim accounting is practical, aligns with other U.S. policies, and provides the most effective means of reducing GHG emissions, which are global in nature. This language is not an improvement in reporting that would somehow provide greater accuracy, or certainty that imported RNG molecules can be traced to California Natural Gas Vehicle (NGV) fuel tanks. The development of a system map utilizing 2020-2023 data to impose deliverability requirements in 2037 is arbitrary relative to the 2041 date previously established. It is simply an arbitrary requirement—with no additional environmental benefit or grounding in the physical gas system. This has the potential to deter growth and cause backsliding.

042.7a
cont. Restricting established pathway renewals from 30 years to 20 years is an arbitrary change that devalues biomethane and biomethane production assets. Projects that came online before 2030 assumed full crediting in the project evaluation. If new programs do not arise to direct biogas and renewable natural gas to stationary sectors, we urge CARB to revisit this proposal in a future rulemaking to avoid backsliding.

Fuel Pathway Applications

042.11 **Biomass-based diesel pathways:** In § 95488(d), CARB proposes to allow the denial of new biomass-based diesel pathways beginning in 2031 if Class 3-8 ZEV registration exceeds 132,000. This is an inappropriate change as it is contrary to the technology-neutral design of the LCFS. Fuel types and vehicle technologies should be allowed to compete freely in the California market without artificial and arbitrary barriers like this. It is also possible that emerging low-CI feedstocks will become commercially viable after 2031 and arbitrarily cutting off new pathways will deny the opportunity to further reduce the carbon intensity of the diesel fuel consumed in the state. There is also no language around future BBD pathway registrations under subsequent versions of CA-GREET which raises concerns about what will happen to BBD participation in the future.

Furthermore, this change was not part of the original proposal under this rulemaking and is an inappropriate inclusion in a 15-day package.

042.12 **Credit True Ups:** We appreciate the clarification that credit true ups after annual verification

⁷ [Dairy Sector Workshop Presentation \(ca.gov\)](#)

will include the period during which a temporary pathway was in place. This is critical to addressing the extended time period that can take place while operating data is collected and CARB staff reviews submitted pathway applications prior to establishing a provisional pathway.

Regarding the added language requiring complete operational data to be eligible for a true up, it is critical that CARB clarify that this includes quarters during which an approved alternative method is used to represent any missing or invalid data. This can occur over very short periods and for perfectly valid operational reasons (e.g. the replacement of a meter for calibration). It would be wrong to deny a true up for a full quarter in such circumstances.

We also request that CARB clarify in the regulatory language that these true ups would apply for the full period during which a temporary or provisional pathway was used, even if the associated compliance periods have passed. That appears to be the intent, but it should be stated in the regulatory language to avoid confusion.

042.13

Intrastate Jet Fuel

Chevron supports CARB decision to withdraw the proposal to add deficits to the LCFS for fossil jet fuel for intrastate flights. As we noted in our past comments, this would not have added any incentive for alternative jet fuel adoption.⁸ Instead, it would have added cost to air travel and shipping in California, introduced unnecessary complexities in the jet fuel supply chain, and impacted the cost of interstate and international transportation as well.

042.8 cont

Exceedance of Verified CI Penalty

Chevron remains concerned that no changes were made to the verified CI exceedance language between the ISOR Proposed Rule and the 15-day proposal. As defined in §95486.1(g)(1), pathway holders would incur a deficit of **four times** the amount of the annual excess CI generated – and have excess credits invalidated – which effectively creates a penalty of **five times** the amount of the annual excess CI generated. We believe this penalty is excessively punitive to the severity of the violation and will likely have an outsized impact on pathway holders, particularly since any true up benefit in a CI goes to the importer of the fuel. It also seems to conflict with the eight statutory factors that CARB must consider when assessing civil penalties.⁹ We recommend that, if the verified CI is higher than the certified CI, the project should simply repay CARB for any excess credits claimed, and not be subject to any further enforcement liability (unless there is malfeasance or other such cause).

Late Filings and Reporting Corrections

CARB's policy of denying credits for report corrections or late reports is an egregious penalty for the correction of errors or delays in reporting, which can both occur for a number of reasons, many of which can be outside the reporting party's control. The proposal to only withhold valid credits at a rate of 25% per day for late reports is an inadequate correction to this policy. CARB should remove the restriction on crediting for late or amended reports and rely on existing enforcement powers to address any egregious or intentional misrepresentations that may occur.

Fixed Guideway Crediting

Chevron opposes the proposal to increase crediting for pre-2011 fixed guideway transit systems. Much of the equipment that generates credits has been in existence for decades. As

⁸ <https://www.arb.ca.gov/lists/com-attach/6150-lcfs2024-B2RQPgZiBCELf1U6.pdf>

⁹ California Health and Safety Code § 43024

such, only the incremental increase in electricity usage relative to the 2010 baseline should be allowed for credit generation. The regulation partly acknowledges this inconsistency by not allowing the use of an Energy Economy Ratio (EER) when calculating the amount of fuel energy displaced. Removing that limitation now is arbitrary and has no rationale in policy or science.

Furthermore, this change was not part of the original proposal under this rulemaking and is an inappropriate inclusion in a 15-day package.

Low-CI Electricity Balancing Period

Chevron requests that CARB modify the balancing period for low-CI electricity projects that supply renewable electricity to renewable fuel production facilities as described in § 95488.8.(h)(1) from a monthly balancing period to a quarterly balancing period. This would provide more flexibility to account for seasonal variations in renewable electricity production to reflect CI reductions taking place. This is a more modest window than the three quarters provided to low-CI electricity supplied as transportation fuel seen in § 95488.8.(i)(1) and would provide a greater incentive for additional low-CI electricity projects.

Lifecycle Analysis Modeling

We appreciate the opportunity to provide feedback on the updated LCA models and calculators. We are submitting comments separately through the LCA public comment portal.

Rulemaking Timing

Finally, it must be noted that CARB has released this notice and set the comment period during a time when regulated parties are focused on completing verification audits for the LCFS and the Clean Fuel Program in Oregon, all of which are due August 31st. These are complex, resource-intensive audits and the personnel with the expertise to comment on this package are very much engaged with that work. Compliance must take precedence. We hope that CARB will recognize this and consider any supplemental comments they may receive following the August 27th deadline.

Thank you for the opportunity to comment on these matters. If you have any questions regarding our comments, please contact me at (925) 842-8903 or DGilstrap@chevron.com.

Sincerely,

A handwritten signature in dark ink, appearing to read "DGilstrap", with a stylized, flowing script.

Comment Log Display

Here is the comment you selected to display.

Comment 43 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Shane
Last Name	Snow
Email Address	advocacy-noreply@mg.gospringboard.io
Affiliation	
Subject	Stop Dirty Factory Farm Gas in the LCFS
Comment	Please see attached
Attachment	www.arb.ca.gov/lists/com-attach/7361-lcfs2024-ViUBc1A+VXYKUwBk.pdf
Original File Name	Stop Dirty Factory Farm Gas in the LCFS.pdf
Date and Time Comment Was Submitted	2024-08-26 18:11:44

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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From: advocacy-noreply@mg.gospringboard.io on behalf of [On-behalf of Shane Snow](#)
To: [ARB Clerk of the Board](#)
Subject: Stop Dirty Factory Farm Gas in the LCFS
Date: Saturday, August 24, 2024 7:26:12 PM

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear California Air Resources Board,

I'm writing to express deep concern about the current state of California's Low Carbon Fuel Standard (LCFS) and to implore you to take immediate action to address the environmental injustices embedded in the program.

Originally intended as a tool to combat climate pollution in the transportation sector, the LCFS has been manipulated by powerful industries, particularly Big Ag and Big Oil. It has become the nation's largest and most lucrative pollution trading scheme for factory farm biogas, perpetuating harmful practices rather than serving its environmental objectives.

The current flaws in the LCFS, such as "avoided methane crediting" and inaccurate life cycle assessments, not only enable pollution but disproportionately harm low-income communities and communities of color. Factory farms, predominantly situated in these marginalized areas, inflict severe damage on air, water, public health, rural economies, and overall quality of life.

I urge you to consider and prioritize the following reforms to the LCFS:

1. Eliminate "avoided methane crediting" in 2024.
2. Address inaccuracies in the Life Cycle Assessment that ignore associated up- and downstream greenhouse gas emissions from factory farm gas production.
3. Remove the 10-year "grace period" for factory farm gas producers.

CARB has a pivotal opportunity this year to adopt new rules that align the LCFS with California's environmental justice commitments. Environmental justice, zero emission, and climate advocates have presented a clear alternative to the current policies that heap lavish rewards on the biggest polluters through the Comprehensive EJ Scenario. CARB should adopt those recommendations to stop moving California climate policy in the wrong direction.

Please lead the charge in demanding a future free from the clutches of Big Oil and Big Ag. By prioritizing the well-being of Californians over corporate profits, we can reform the LCFS to protect communities most affected by its current flaws. Your decisive action in this critical matter would demonstrate a commitment to bold climate action rooted in justice. Californians deserve no less.

Sincerely,

Shane Snow
1965 E Linda Vista Ave
Ventura CA, 93001-2315

Comment Log Display

Here is the comment you selected to display.

Comment 44 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Peter
Last Name	De Gregorio
Email Address	friendman1@prodigy.net
Affiliation	Climate Reality, Monterey Chapter
Subject	Carbon Tax

Comment

044.1

Large Carbon emitters should be buying non-carbon energy credits rather Biofuel which carbon polluting fuel. It should help low income people to electrify the homes, add solar on their homes and purchase EVs.

Attachment

Original File Name

**Date and Time Comment Was
Submitted**

2024-08-26 20:31:18

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Comment 45 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Andy
Last Name	Foster
Email Address	andy.foster@aemetis.com
Affiliation	Aemetis, Inc.
Subject	Aemetis, Inc. Comments on Proposed 15-day Rule (LCFS)
Comment	<div>Please find attached comments from Aemetis, Inc. in response to the August 12, 2024, Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information for the Proposed Low Carbon Fuel Standard (LCFS) Amendments (15-Day Package).</div>
Attachment	www.arb.ca.gov/lists/com-attach/7363-lcfs2024-AGMFYgR3BTQLUgBw.pdf

Original File Name	CARB_Proposed 15-day Rule_Aemetis Comments_F08262024.pdf
Date and Time Comment Was Submitted	2024-08-26 20:55:23

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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VIA ELECTRONIC FILING

August 27, 2024

Matthew Botill
California Air Resources Board
1001 I Street
Sacramento, California 95814

Re: Aemetis, Inc. Comments on Low Carbon Fuel Standard 15-Day Amendments

Dear Mr. Botill,

Aemetis, Inc. submits these comments to the California Air Resources Board (CARB) in response to the August 12, 2024, Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information for the Proposed Low Carbon Fuel Standard (LCFS) Amendments (15-Day Package).

Aemetis, Inc. is a California based Renewable Natural Gas (RNG) and renewable fuels company focused on the production of low and negative carbon intensity products that replace fossil fuels. Aemetis is the state's largest renewable ethanol producer and is operating and constructing an extensive network of dairy digesters and interconnecting pipelines delivering negative carbon intensity (CI) RNG for truck and bus fleets throughout California. Additionally, Aemetis has been permitted to build a 78 million gallon per year Sustainable Aviation Fuel (SAF) production facility and Carbon Capture and Underground Storage (CCUS) well near Modesto, California.

We applaud CARB's leadership in creating groundbreaking policies that have become a model for other states and countries in the battle to reverse climate change. From the beginning of this century to present time, CARB has shown how the collaboration of stakeholders, both public and private, can bring about change that was once unimaginable.

Aemetis has been a significant contributor and supporter of the LCFS for almost 14 years and has committed to spending nearly one billion dollars to build new or expanded biofuel production facilities in California over the next few years. Because of CARB's innovative programs and policy leadership, we have embarked upon a very ambitious expansion plan that will allow us to contribute to both existing and future low carbon fuel markets. In short, we are "all in" on the future of the LCFS and intend to play a meaningful role in its success.

Key to this ambitious future is the ability for our company, our customers, and our investors to rely upon consistent policies from CARB. As sure as the LCFS cannot survive without robust

investment from the private sector, private investment cannot be sustained if programs and policies do not allow for markets to mature, investments to be recouped, and policy objectives to be met. This unique compact requires shared objectives, and a steady, reliable path to outcomes.

It is in this spirit that we offer our comments and suggestions as you consider the next chapter of the LCFS. Much is at stake in the coming months, and we strongly encourage CARB to keep all perspectives in full view and weighted fairly as you embark upon this critical task.

045.1

- We support CARB's approach to expanding the programmatic targets in the 15-day package. The proposed expansion recognizes that without immediate action, the carbon market will continue to languish with low targets and an oversupply of credits. This is critical as most investments already made or contemplated for the future require a higher LCFS price to merely break even, much less become profitable. The current paradigm has resulted in investors holding back, stalling projects, reconsidering future investments, or looking to other states or countries for alternative strategies. Without aggressive action, this will be catastrophic to the LCFS and similar programs that require large capital investment to move forward. **While the proposed 9% near-term-stepdown for 2025 is a clear improvement over the prior proposal, we believe that adjusting the stepdown to 10.5% - 11.5% will prove more effective. The lack of market response to CARB's proposed 15-day rule on this topic clearly demonstrates that the increase does not go far enough, nor is the suggested >\$130 credit price credible.** We encourage CARB to adopt a higher stepdown.

045.2

- The 15-Day Package continues the proposed timeline for implementing the Auto Acceleration Mechanism (AAM), such that 2028 remains the first year for which the AAM can amend CI reduction targets. This is unreasonable given the current credit oversupply and corresponding market price. Without near-term action, we fear that the current low LCFS price will simply extend for three or more years, creating even more doubt about the program's long-term viability. **We recommend that 2025's performance should be able to trigger the AAM. A 2025 data-year triggering would be able to impact CI targets in 2027.** The AAM should trigger as early as possible as a backstop if the step down is not sufficient to address the current credit oversupply.

045.3

- Similarly, **a greater than 30% reduction in CI by 2030 is not only warranted, but also achievable** and in keeping with the overall past performance of the LCFS. Biofuels have far exceeded GHG reduction targets set by CARB, and with the influx of additional fuels into the portfolio, it is not mere speculation that the market will respond once again. For true progress to be made, **CARB should not allow the program to be hampered by obligated parties who are rewarded with longer time periods and slower progress. We strongly support a CI reduction of 40% by 2030.**

045.4

- **We strongly support the 15-day package proposal of a full credit true-up after Annual Verification for RNG.** Using a full true up to verified actual CI performance for all pathways (temporary, provisional, and fully certified) makes good sense given the changing nature of bioreactors, which are sensitive to changes in weather and operating conditions. For this reason, **however, we are opposed to the arbitrary proposal in the 15-Day Package retains a "4-to-1" penalty for the case where a verified CI is higher than the certified CI.** This is unnecessarily punitive and does not follow science. It is not

only conceivable but likely that CI changes will occur year-to-year due to conditions beyond the producer's control (i.e., weather). **If the verified CI is higher than the certified CI, the project should simply repay CARB for any excess credits claimed, and not be subject to further enforcement liability** (unless there is misreporting etc.).

- 045.5
- **The 15-Day Package proposal reducing the total number of crediting periods for avoided methane emissions for some projects breaking ground before January 1, 2030, from three to two is bad policy, and could likely result in existing projects breaking covenants with debt holders.** As previously mentioned, developers and investors/lenders based significant financial decisions on CARB's stated policy – a policy that was reaffirmed and encouraged by CARB leadership for years. Changing the rules in the middle of the game will not only discourage future investment in RNG and other fuels, but it could also likely lead to loan defaults and financial distress for investors, developers, and dairy owners. Avoided methane crediting is a critical part of the economic formula that allows developers to seek – and repay – investors and lenders. **No serious alternative to avoided methane crediting has been put forward, and until a reasonable replacement or alternative strategy is established and discussed, no change should be made.** Shortening and eventually eliminating this credit will likely result in backsliding, leakage within California and to neighboring states, and millions of dollars of stranded assets. Moreover, progress made in methane remediation will be lost – without an alternative. **We urge CARB to eliminate this provision from the 15-day package.**

- 045.6
- **We strongly encourage CARB to immediately adopt a process to implement a 15% blend allowance for bioethanol.** California is the only state in the nation to restrict ethanol blending to 10%¹, effectively imposing a 90% mandate for petroleum-based gasoline. This is illogical as ethanol is a cleaner burning fuel than gasoline. An earlier study commissioned by CARB² found that adopting E15 in California could also provide significant environmental benefits, cutting emissions of tailpipe pollutants—like particulate matter and carbon monoxide—that cause air quality and human health problems. According to the Renewable Fuels Association³, if all gasoline in California in 2022 had been E15 instead of E10, the state would have seen a 450-million-gallon reduction in petroleum consumption and additional GHG savings of 2.2 billion metric tons, based on CARB's own data.

Furthermore, a recent UC Berkely/US Naval Academy study indicates that moving to E-15 will save California motorists approximately \$0.20 per gallon, or about \$2.7 billion per year⁴. All required testing for E-15 in California has been completed, and there is no reason to further delay its implementation. Until California vehicles have been converted to hybrids, EVs, or other technologies, it is antithetical to the LCFS for California to continue a 90% fossil fuel mandate, which only benefits petroleum producers.

- 045.7
- Finally, in section 95482(a), staff proposes to remove "Fossil Jet Fuel" from the list of transportation fuels that the LCFS applies to. **Aemetis does not support this change**

¹ [Montana becomes 49th state to approve the sale of E15 | Ethanol Producer Magazine](#)

² [E15 Final Report 7-14-22 0.pdf \(ca.gov\)](#)

³ [RFA Letter to CARB re E15 10-3-23.pdf \(d35t1syewk4d42.cloudfront.net\)](#)

⁴ [E15 in California Initial Report \(d35t1syewk4d42.cloudfront.net\)](#)

and believes that it will delay the adoption of SAF by air carriers in California. Rather than stipulating that the rule is faulty because it does not obligate air carriers to transition to SAF (but rather purchase credits), we recommend that staff revisit the proposal to make such a requirement and set a timeframe – as has been done with other obligated parties. Air transportation is a significant source of CO2 emissions, and it escapes logic that this sector would be excluded from the LCFS due to a faulty proposal or insufficient clarity on the transition. **We strongly CARB to reassess this change and include Fossil Jet Fuel in the LCFS.** By deferring this change, it is less likely that air carriers will move to SAF in a reasonable timeframe. Additionally, the need for in-state production of SAF will diminish, thus reducing or eliminating investor interest in supporting California based SAF production. Production facilities take years to permit and construct. **California will be woefully behind other states⁵ and the European Union⁶ in adopting incentives or requirements for air carriers to adopt SAF.**

Aemetis sincerely appreciates the opportunity to comment on the proposed 15-day rule. Our goal is to be constructive, and as one of the leading biofuel companies in California, we hope that our comments are taken in the spirit of collaboration with CARB. We understand that this process is challenging, with many different stakeholders advocating for positions that are often at odds. We trust that the CARB staff and Board will carefully consider the inputs and implications of these viewpoints upon the ultimate policy that is adopted.

Thank you for your dedication to this task, and please do not hesitate to contact us if you have any questions or require additional information.

Sincerely,



Andy Foster
President
Aemetis Advanced Fuels
20400 Stevens Creek Blvd., Suite 700
Cupertino, CA 95014

⁵ [From Legislation to Lift-Off: State Support Powers Sustainable Aviation Fuel Growth \(twelve.co\)](https://www.twelve.co)

⁶ [European Union Aerospace and Defense Sustainable Aviation Fuel Regulation \(trade.gov\)](https://www.trade.gov)

Comment Log Display

Here is the comment you selected to display.

Comment 46 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Shannon
Last Name	Broome
Email Address	sbroome@huntonak.com
Affiliation	on behalf of HIF USA
Subject	Comments of Highly Innovative Fuels USA
Comment	<div><p>Please find attached comments of HIF USA. Please contact me if you have any difficulty opening the file or if you have any questions regarding these comments.</p><p>Shannon S. Broome</p></div>
Attachment	www.arb.ca.gov/lists/com-attach/7364-lcfs2024-WmgHmVxvUjUDKAU1.pdf

Original File Name	2024-08-26 - HIF USA Comments on CARB LCFS August 2024 15-Day Notice.pdf
Date and Time Comment Was Submitted	2024-08-26 22:44:45

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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**COMMENTS OF HIF USA
ON
CALIFORNIA AIR RESOURCES BOARD
NOTICE OF PUBLIC AVAILABILITY OF MODIFIED TEXT
PROPOSED LOW CARBON FUEL STANDARD AMENDMENTS**

AUGUST 26, 2024

Highly Innovative Fuels USA (HIF USA) appreciates the opportunity to offer comments in response to the California Air Resources Board's (CARB or the Board) 15-day Notice of Public Availability (the 15-day Notice) of modified text for the proposed Low Carbon Fuel Standard (LCFS) amendments.

As previously commented, HIF USA is a global e-Fuels company focused on harnessing renewable energy sources to achieve fuel sector decarbonization. HIF USA is currently developing a large-scale commercially viable facility for generating low-carbon e-Fuels that can be used in a number of transportation applications and has submitted an LCFS pathway for its process that is currently awaiting CARB approval. HIF USA has been an active participant in support of CARB's LCFS update process, submitting comments on the regulatory amendment package that CARB released on December 19, 2023, participating in the September 28, 2023 hearing and April 10, 2024 workshop, and submitting comments in response to the April workshop.

HIF USA has reviewed the 15-day Notice and observes that CARB does not in any way address the two key points made in our previous submittals. Because these two issues are important for diversifying California's transportation fuel supply and for encouraging the proliferation of low-carbon e-Fuels for a variety of transportation modes, we reiterate them here and incorporate our previous comments by reference.¹

CARB has an obligation to consider objections and recommendations raised during its rulemaking proceedings and to address timely comments that are relevant to its decision-making process. HIF USA thus respectfully requests that CARB carefully consider and respond to the following two points before finalizing the LCFS amendments:

I. The LCFS Regulations Should Be Amended to Include Low-CI Methanol as an Opt-In Fuel.

CARB should incentivize the proliferation of carbon-neutral transportation fuels by amending 17 C.C.R. § 95482 of the LCFS regulations to include low carbon intensity (CI) methanol (also referred to as "green methanol") as eligible for crediting as an opt-in fuel when sold for use in marine and other specialty transportation applications such as direct methanol fuel cells. As HIF USA has

¹ See Comment 17 for Public Meeting to Hear an Update on the Low Carbon Fuel Standard (Sept. 28, 2023), available [here](#) (HIF USA pre-proposal comments to CARB Board requesting inclusion of low-CI methanol as an opt-in fuel in the LCFS regulations); Comment 389 for Proposed Low Carbon Fuel Standard Amendments (Feb. 20, 2024) at 2, available [here](#) (HIF USA comments in response to CARB 45-day proposal regarding CARB's proposed regulatory text for 17 C.C.R. § 95488.8(i)(1)(A)) (hereinafter, "HIF USA 45-Day Comments"); Comments of HIF USA on Low Carbon Fuel Standard Public Workshop - April 10, 2024 (May 9, 2024), available [here](#).



commented in its previous submittals, amending the LCFS regulations to include green methanol as an opt-in fuel would create another opportunity for CARB to incentivize low-CI fuels in hard-to-decarbonize sectors.

In a July 2022 LCFS workshop presentation, CARB staff indicated that it was considering the inclusion of methanol as an opt-in fuel for “novel applications,” including “commercial harbor craft” under Tier 2 EER-adjusted pathways.² Yet, its proposed regulatory amendments released in December 2023 did not include this proposed change, nor did CARB include this change in the 15-Day Notice, despite recommendations from multiple entities that it do so.³

In comments submitted after the April 2024 workshop, HIF USA offered to support CARB’s efforts to obtain whatever data is needed to support inclusion of green methanol as an opt-in fuel. We reiterate our readiness to assist CARB in obtaining this data, as we believe it is critical to move forward with including low-CI methanol as an LCFS opt-in fuel.

II. Book and Claim Accounting Should Be Preserved for Low-CI Electricity Used to Produce Hydrogen as an Input to E-Fuels.

The 15-day Notice does not address HIF USA’s concern that the proposed changes to the regulatory text in 17 C.C.R. § 95488.8(i)(1)(A) appear to eliminate book-and-claim accounting for low-CI electricity used to produce electrolytic hydrogen as an input for eFuels. As commenters noted during the April 10, 2024 workshop,⁴ and as HIF USA has explained in its previous submittals, CARB’s proposed changes to this provision, if finalized, would negatively impact the commercial availability of low-CI e-Fuels in the California transportation fuel market.

CARB has not explained in this rulemaking process the rationale for the proposed change, other than brief comments at the April 10 workshop, in which a CARB representative indicated that the change may reflect CARB’s interest in prioritizing the production of hydrogen as a primary transportation fuel rather than as a process input. HIF USA does not believe that elimination of the current book-and-claim allowance for hydrogen produced by electrolysis for transportation purposes is necessary to incentivize the production and use of hydrogen as a transportation fuel—as these two uses of hydrogen are complimentary and not mutually exclusive. In any event, because CARB proposes a significant change to the current regulations, it is obligated to provide a rationale and address the comments provided on this issue.

In sum, we urge CARB to refrain from finalizing any changes to 17 C.C.R. § 95488.8(i)(1)(A) that would preclude the continued use of book-and-claim accounting for low-CI electricity used for hydrogen production through electrolysis as a process step for e-Fuels. We request that CARB review and consider our submittal on this topic in response to the 45-day proposed rule.⁵

² See CARB, “Public Workshop to Discuss Potential Changes to the Low Carbon Fuel Standard,” “CARB Presentation” at Slide 31 (July 7, 2022), available [here](#).

³ See, e.g., Comments of the Methanol Institute on Low Carbon Fuel Standard Public Workshop - April 10, 2024 (April 11, 2024), available [here](#).

⁴ CARB, Workshop Recording, Low Carbon Fuel Standard Public Workshop - April 10, 2024, available [here](#) at 3:40 (comments of Infinium and Rocky Mountain Institute advocating for use of book-and-claim accounting for low-CI electricity used to produce hydrogen as feedstock for e-Fuels).

⁵ See HIF USA 45-Day Comments at 2-4.



#

If you have any questions or would like to discuss this submittal, please contact Shannon S. Broome, Hunton Andrews Kurth LLP (sbroome@huntonak.com or (415) 818-2275).

Comment Log Display

Here is the comment you selected to display.

Comment 47 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Mark
Last Name	Mobley
Email Address	markmobley722@gmail.com
Affiliation	2016 Mirai owner
Subject	Proposed Low Carbon Fuel Standard Amendments

Comment

047.1

Thank you for the opportunity to comment. The car loan for my 2016 Mirai is paid off, and I am the first owner. As a retiree on a fixed income and a Californian who cares about my carbon footprint, I'm asking CARB to preserve the HRI provisions unchanged. FCEV drivers have borne the cost for the reduced value of carbon credits. Many have gone back to gasoline fueled options because of the cost. It is much more expensive buying H2 now than it was when the credits were valued at \$100 - \$150/MTCO2. Elimination of the HRI program jeopardizes the fragile business model needed to maintain and expand the LIGHT DUTY H2 infrastructure that I absolutely depend on, unless I dip into my savings to purchase or lease another car. I love my zero emissions Mirai and the redundant infrastructure I enjoy in Orange County. It's more expensive than gasoline, but as a retiree, its one way I can reduce my carbon footprint. I need the Board to allow me to continue doing just that. Thank you, Mark Mobley

Attachment**Original File Name**

**Date and Time Comment Was
Submitted**

2024-08-27 03:33:02

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Comment 48 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Chelsey
Last Name	Robinson
Email Address	Chelsey.Robinson@bayer.com
Affiliation	
Subject	CARB 15-Day Package Comments 2024
Comment	<div><p>Thank you to CARB staff for their continued work on this issue and for considering our comments. Please find the attached comments and reach out to me if you have any questions.</p><p>Sincerely, Chelsey Robinson Bayer Crop Science</p></div>

Attachment	www.arb.ca.gov/lists/com-attach/7366-lcfs2024-BWZVMIAjBTQAZwJ3.pdf
Original File Name	CARBAugust2024.docx.pdf
Date and Time Comment Was Submitted	2024-08-27 04:46:38

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 21, 2024
The Honorable Liane M. Randolph, Chair
California Air Resources Board

Comment Submitted Electronically

RE: Bayer Crop Science's Comments Relating to 15-Day Changes

Dear Chair Randolph:

Bayer Crop Science (Bayer) appreciates the current and historic efforts by the California Air Resources Board (CARB) to reduce the greenhouse gas (GHG) emissions from transportation through the implementation of the State's Low Carbon Fuels Standard (LCFS). Bayer supports the continued evolution of the LCFS through the CARB rulemaking process. Of particular interest to Bayer is the production of biofuels in the most sustainable manner including increasing GHG reductions through the use of lower carbon intensity (CI) crop varieties, climate smart agriculture (CSA), and the utilization of cover crops and crop rotations.

048.1

The recent modifications proposed by CARB to the LCFS regulations (the "15-Day Changes") add stringency and oversight to the LCFS program and have the potential to facilitate more precise and accurate CI analysis. Unfortunately, certain aspects of the 15-Day Changes leverage this precision only to the detriment of biofuel CI scores rather than authorizing the adjustment of CI scores favorably or unfavorably depending on real-world performance. We encourage CARB to continue to embrace the fundamental LCFS principles of technology-neutrality and science-based performance measurement rather than introducing CI bias into the LCFS program structure.

In this final stage of the LCFS rulemaking, CARB has the opportunity to refine the proposed language of the 15-Day Changes so that the LCFS program will disincentivize less-sustainable biofuels **and incentivize more-sustainable biofuels**. Such an approach has the potential to expand and enhance the global sustainable fuels market and minimize the risk of unintended consequences at a time when the rapid phase down of petroleum-based fuels is an environmental imperative that has been codified into California law. The mandatory petroleum-based fuels phase-down triggers the imperative of rapidly scaling sustainable biofuels particularly in the hard-to-abate aviation sector.

To capture these benefits, we recommend the following refinements to the language of the proposed 15-Day Changes.

048.1 cont

Recommended Modifications

The specific changes necessary to establish a non-biased LCFS land use change provision are modest revisions to proposed §95488.3(d)(2). Bayer recommends that the provision as proposed in the 15-Day Changes be modified as follows: "(2) The Executive Officer may determine that no value in Table 6 is ~~conservatively~~ representative of a particular region/feedstock/fuel combination and assign a ~~more~~ conservative LUC value that is representative. Such determination must be based on the best available empirical data, including but not limited to satellite-based remote sensing data for land cover



monitoring, crop variety yields, and emission factors from the AEZ-EF model or carbon stock datasets. For feedstocks not listed in Table 6, the Executive Officer may determine and assign an appropriate LUC value based on empirical land cover data, crop yields, and emission factors.”

One noteworthy example that illustrates the type of GHG reductions that can be incentivized by the above modification is the distinction between Spring Canola and Winter Canola. Spring Canola is planted in early spring (May) and harvested around September and accounts for the majority of U.S. canola production in northern states.¹ Winter Canola, on the other hand, is planted in the fall (September), overwinters, and is harvested in June. In general, Winter Canola has a 20 to 30 percent greater yield potential than Spring Canola due to a longer grain filling period and less competition from summer annual weeds and insect pests.²

Bayer is making investments in Winter Canola and Domesticated Pennycress because these crops can serve as valuable biomass feedstocks, fulfilling demand for lower carbon intensity (“CI”) feedstocks for Renewable Diesel and Sustainable Aviation Fuel (“SAF”). These crops also deliver ecosystem benefits such as carbon sequestration, improved soil health and socio-economic benefits for farmer communities.

Sustainability Certifications:

Bayer commends California Air Resource Board’s efforts to ensure sustainability practices and reduce land use change. Bayer recommends that to most effectively achieve California’s goals, it will be critical for CARB to work with stakeholders as CARB interprets, implements, provides further guidance, and phases in the sustainability and certification requirements.

We recommend that CARB align LCFS requirements to the greatest extent possible with voluntary programs like U.S. Department of Agriculture’s (“USDA”) Conservation Stewardship Program (“CSP”) and Environmental Quality Incentives Program (“EQIP”) administered by the Natural Resources Conservation Service (“NRCS”). It should be noted that while programs such as International Sustainability and Carbon Certification (“ISCC”) offer credible verification standards and approval processes, these programs are highly burdensome for farmers, and the audits impose significant administrative cost on farmers.

American growers have a broad range of climate-smart opportunities that reflect regional variation, crop selection and physical landscape characteristics. A 2024 literature review in “Mitigation and Adaptation Strategies for Global Change” recommends, “Policymakers should prioritize flexibility in policy frameworks, allowing for adaptation to the distinct characteristics of various agricultural landscapes. This flexibility will enable the effective customization of CSA practices, ensuring their alignment with the specific challenges and opportunities faced by farmers in diverse regions.”³

¹ U.S. Canola Production, U.S. Canola Association, <https://www.uscanola.com/crop-production/spring-and-winter-canola/>.

² Kan. St. Univ. Agric. Experiment Station and Coop. Extension Serv., *Great Plains Canola Production Handbook* 1, June 2018, https://bookstore.ksre.ksu.edu/download/great-plains-canola-production-handbook_MF2734.

³ *Id* at 22.



Soy & Canola 20% Cap

048.3 While Bayer recognizes the intent behind the 20% cap on soy and canola proposed by CARB in the 15-day package, and the importance of ensuring other state markets have feedstock availability, we urge a reevaluation of the unintended consequences of such a cap. Limiting the use of renewable, plant-based biofuels made from crops grown on existing cropland in North America will result in greater reliance on foreign feedstocks of less certain origin and inhibit the ability to reach emission reduction goals. Further, because crop-based biofuels are already subject to ILUC and indirect emissions analysis, this cap would be redundant. We urge reconsideration of this approach, especially given CARB's own analysis presented at the April 2024 workshop, which acknowledged that the diesel pool in California cannot be entirely replaced by electrification and such a cap would result in *more* fossil fuel usage, undermining California's emission progress.

About Bayer Crop Science

Bayer is a global enterprise with core competencies in the life science fields of health care and crop science. Bayer's products and services are designed to help people and the planet thrive by supporting efforts to master the major challenges presented by a growing and aging global population. We are deeply committed to reducing emissions aggressively across our own enterprise and enabling our customers to reduce emissions throughout the agriculture sector. Bayer is pioneering farming solutions that accelerate the decarbonization of the food, fuel and agricultural supply chain and is supportive of policy development that recognizes the potential of climate-smart agriculture as an effective lever for achieving these goals.

Conclusion

CARB is a respected international leader in developing and implementing programs to reduce GHG emissions across the California economy. The inclusion of CSA practices in the LCFS will expand the State's leadership throughout the country, especially in the Midwest where a large portion of the corn and soy are grown that provide feedstocks for LCFS fuels and also yield important fuel and feed products.

Bayer appreciates the opportunity to share its perspective and expertise to raise awareness of the science and innovation enabling our customers to grow crops that contribute significantly to clean transportation fuel programs and advance the climate change goals of both California, and the United States. We thank CARB for this opportunity to offer these comments and look forward to continued collaboration to implement policies and strategies that further reduce emissions from the transportation sector.

Sincerely,

Signed by:

Handwritten signature of Jennifer Ozimkiewicz in black ink.

Jennifer Ozimkiewicz

Senior Vice President, Global Soybean and Biofuels Strategy Head
Bayer AG - Crop Science Division

Comment Log Display

Here is the comment you selected to display.

Comment 49 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Kari
Last Name	Buttenhoff
Email Address	kbuttenhoff@christiansoncpa.com
Affiliation	Christianson PLLP
Subject	Christianson PLLP comments - 15-day changes
Comment	<div></div>
Attachment	www.arb.ca.gov/lists/com-attach/7367-lcfs2024-VzQAbIYIV20BdFUh.pdf
Original File Name	Christianson PLLP comments, LCFS 15-day notice 8.27.24.pdf
Date and Time Comment Was Submitted	2024-08-27 06:26:20

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

August 27, 2024

California Air Resources Board
1001 I Street
Sacramento, CA 95814
Via electronic submission

RE: 15-Day Changes to CARB's LCFS Proposed Amendment

Dear California Air Resources Board,

Christianson PLLP, a full-service public accounting firm based in Willmar, Minnesota, has proudly served the renewable fuels industry for over 30 years. We specialize in providing technical assistance and professional services that ensure industry compliance and promote sustainable practices.

As a trusted and chosen third-party verification body for several biofuel producers participating in California's Low Carbon Fuel Standard (LCFS) program, we are writing to provide our insights on two areas related to the recent 15-Day Changes to the LCFS proposed amendment: Sustainability Certification and the inclusion of auditing Social Practices.

049.1

Sustainability Certification

The concept of sustainability requirements for biofuels has recently emerged as a potential safeguard against land conversion for agricultural use. This mirrors the sustainability initiatives implemented into Canada's Clean Fuel Regulations (CFR), which imposes stringent criteria on land-use changes. However, it is essential to recognize that U.S. feedstock is exempted from Canada's Crops-Excluded Land criteria due to the U.S. Environmental Protection Agency's (EPA) aggregate compliance approach, citing that "the U.S. Code of Federal Regulations provides a sufficient level of environmental protection with respect to the land on which the feedstock is harvested."

Furthermore, the USDA's 2022 Census of Agriculture, released in February, highlights a significant decrease of 14 million-acres (4%) in U.S. cropland since 2017, continuing a longstanding trend of declining cropland area. This data underscores the limited need for additional safeguards for U.S. cropland, as the decline in agricultural land suggests that existing regulations sufficiently protect against unwarranted land conversion.

Given the limited availability of accredited third-party verification bodies and the stringent qualifications already required by the U.S. EPA's Renewable Fuel Standard aggregate compliance, we believe imposing additional sustainability guardrails on U.S.-

produced renewable fuels is unnecessary.

049.2

Social Practices Audit

The proposed sustainability audit introduces social audit requirements that apply exclusively to crop-based biofuels. According to Staff's April 10th presentation, this audit process would mandate the verification of social practices.

While the aim of promoting social responsibility is commendable, it is important to recognize that social criteria do not directly contribute to greenhouse gas (GHG) reductions—the primary focus of the LCFS. Implementing this requirement would place the onus on verification bodies, like ours, to enforce these standards solely on crop-based biofuels, thereby imposing an uneven regulatory burden across the industry.

At Christianson PLLP, we are committed to supporting the goals of the LCFS while ensuring that regulatory requirements remain focused on their core objectives. We respectfully request that the California Air Resources Board consider the shortage of verification bodies and the current state of U.S. agriculture when evaluating the necessity of these additional sustainability and social practices requirements.

We appreciate your time and consideration of our perspective. Should you have any questions or need further clarification, please reach out.

Sincerely,



Kari Battenhoff, CPA
Partner, Christianson PLLP

Christianson PLLP
302 5th St. SW
Willmar, MN 56201

Comment Log Display

Here is the comment you selected to display.

Comment 50 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Helen
Last Name	Kemp
Email Address	hkemp@3degreesinc.com
Affiliation	3Degrees Group Inc.
Subject	3Degrees Comments on LCFS 15-Day
Comment	Thank you for your consideration of our attached comments.
Attachment	www.arb.ca.gov/lists/com-attach/7368-lcfs2024-UWIAYlw4BTEEcAVg.pdf
Original File Name	3Degrees Comments on LCFS Formal Rulemaking - 15 Day (August 2024).pdf
Date and Time Comment Was Submitted	2024-08-27 06:54:05

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 27, 2024

The Honorable Liane M. Randolph, Chair
California Air Resources Board
1001 I St.
Sacramento, CA 95814

RE: 3Degrees Comments in Response to Proposed Amendments to the Low Carbon Fuel Standard Regulation (15-Day Changes)

Dear Chair Randolph and California Air Resources Board (CARB) Staff,

Thank you for the opportunity to provide comments in response to the Proposed Amendments to the Low Carbon Fuel Standard (LCFS) Regulation published August 12, 2024. 3Degrees Group Inc. (“3Degrees”) is a global climate and clean energy solutions provider and is a strong supporter of the LCFS program. We participate in the program as a designated reporting entity on behalf of a variety of opt-in parties with light-duty electric vehicle (EV) chargers, electric forklifts, hydrogen forklifts, and heavy-duty EV fleets. We are also an active fuel pathway developer.

3Degrees appreciates the time and effort that Staff has put into engaging the public and crafting these updates to the program over the last few years and for considering our comments that were submitted in response to the 45-Day draft rule package published earlier this year. Our recommendations for the updated LCFS proposed rule are outlined below. Under each heading, we have organized our comments in order of what we view as the key priorities for this formal rulemaking process.

—

050.1

CARB should still consider imposing a more stringent 2030 carbon intensity target to ensure long-term credit price stability.

3Degrees applauds Staff’s proposal to go with a 9% CI step-down goal for 2025. However, even with this step-down, our market analysis continues to show that the proposed 30% CI target (§ 95484) is too low to provide the near-term price indicators that are necessary to spur the substantial industry investment in lower-CI projects, fuels, and vehicles required to reach the program’s long-term goals. 3Degrees previously advocated for at least a 35% CI reduction by 2030 and 90% by 2045 in order to align with the ambition of the 2022 Scoping Plan and other decarbonization objectives in California and we still believe this is an appropriate action.

We understand that this stringent step-down coupled with the potential that the auto-adjustment mechanism (AAM) would be triggered one or multiple times could result in an increase to the 2030 CI target by the time we enter the latter half of the decade. However, while we support the AAM, it cannot be triggered until 2028 at the earliest and takes a reactive, rather

than proactive, approach to balancing the credit market. To reiterate a point from our 45-Day comments: while lower near-term prices may achieve the objective of reducing total program costs, the post-2030 targets will only be achievable through significant investments in the low carbon fuel sector this decade. Low credit prices will not send the reliable demand signal necessary to drive the required level of investment. This can only be accomplished through increasing the CI schedule through 2030 to ensure the credit bank is drawn upon sooner than later.

050.2

We strongly urge CARB to provide clarification within the regulation that, for electricity transaction types, third-party site visits of every facility where FSE are located are not required for annual verification.

As stated in our 45-Day comments, with the introduction of new third-party verification requirements for certain electricity crediting types, it is imperative that CARB does not take a one-size-fits-all approach to the site visit obligation. As several verification providers, aggregators, and other parties have noted, it would not just be logistically and financially infeasible, but outright *impossible*, for verifiers to send their employees to visit the thousands of disparate sites containing FSE. We do not believe this was CARB's intent when including electricity transaction types as subject to third-party verification requirements under the revisions in §95500.

The proposed text in the 15-Day draft rule still states that verifiers must "annually visit each facility; and, if different from the fuel production facility, the central records location for which the records supporting an application or report subject to verification are submitted" (§ 95501(b)(3)). We request that CARB make a revision to this section and propose the following changes to the text (in **bold**):

*(3) Site Visits. At least one lead LCFS verifier accredited by the Executive Officer on the verification team must, in addition to one visit to validate an application, annually visit each facility **except as provided in 95501(b)(3)(B)**; and, if different from the fuel production facility, the central records location for which the records supporting an application or report subject to verification are submitted. Site visits, included voluntarily as part of a quarterly review, may not substitute for the required site visit for annual verification services, which must occur after all LCFS data for the prior calendar year has been submitted to the Executive Officer and attested to.*
[...]

(B) For the transaction types identified in §95500(c)(1)(E), the verification body may use a risk-based approach informed by a sampling plan to identify a subset of facilities that reasonably represents the reporting entity's FSE, and perform site visits only to these facilities, to satisfy annual site visit requirements.

As part of their rulemaking process to update the clean fuels program, Oregon has proposed clear rules that provide the necessary flexibility for third-party verifiers to ensure with adequate

certainty that participants are not misreporting data. As proposed in the current draft rules, for entities using credit aggregators (i.e., designated entities), site visits to facility locations (beyond where the aggregator's records are kept) may be performed at the verifier's discretion.¹ This represents a typical set of requirements for verification bodies to come to a *reasonable* level of assurance - the standard for a positive verification statement - as opposed to seeking an *absolute* level of assurance by visiting every parking lot in the state with a registered FSE. While we understand that CARB desires to apply verification requirements equally to all reporting entities throughout the LCFS program, the nature of EV charging equipment is such that the verification process could require multiple months of continuous travel to achieve 100% visitation of all sites with registered FSE. This impractical requirement would pose serious issues for verification bodies and designated entities alike, while adding exorbitant costs to participate in the program. Failing to make these changes would discourage EV participation in the program, especially for entities with a large number of distributed FSE.

In addition, we ask CARB staff to exempt all residential charging from verification requirements. We recommend that § 95500(c)(1)(E)(1) be revised to state, "EV Charging except as specified under 95491(d)(3)(A) **and 95491(d)(3)(B)**" (new text in **bold**). This captures both the metered and non-metered residential charging provisions under the exemption. Without this change, private individuals that own EVs and have no connection to the LCFS program could have their property become subject to a site visit, which poses serious privacy concerns.

050.3

The regulation should specify that Original Equipment Manufacturers (OEMs) may act through a designated entity.

We strongly support the opportunity for OEMs to generate a portion of base residential credits. The LCFS plays a key role in California's position as a leader in EV adoption and it makes sense to incentivize and reward OEMs for supplying those EVs. The revenue requirements outlined in § 95483(c)(1) are reasonable and provide sufficient flexibility for OEMs to use profits from credit sales for new and exciting electrification projects.

For consistency with the other electricity credit generation types, CARB should include language where applicable (e.g., throughout § 95483(c)(1)) that the OEM **or their designee** may act. Allowing OEMs the option to have a third-party manage their participation in the program would maximize efficiency for both the OEM and CARB and streamline registration and reporting activities.

We encourage CARB to add electric ground support equipment (eGSE) as an eligible credit-generating technology.

3Degrees recommends that CARB use this rulemaking opportunity to explicitly include eGSE as an eligible credit-generating technology type under the LCFS. eGSE are eligible for crediting under the programs in both Oregon and Washington, and incorporating eGSE into the LCFS would serve to incentivize an industry that is in the early stages of electrification. This would

¹ <https://ormswd2.synergydcs.com/HPRMWebDrawer/Record/6798709/File/document>

help ensure that the California LCFS remains a driving force for new technologies to transition away from fossil fuels. Since CARB is now proposing that fossil jet fuel continue to be exempt from generating deficits, adding eGSE to the program would be a way that the agency could promote emissions reductions at airports - an issue that numerous stakeholders testified was of key importance during several hearings and workshops. An EER for eGSE can be easily developed using a similar methodology to that of electric cargo handling equipment (eCHE). This category of electric off road equipment charging should, in line with other clean fuels programs, assign the owner of the FSE as the fuel reporting entity and the credit generator.

3Degrees also wishes to express our support for the following proposals.

- Missing Data Provisions in 95491.2(b)(2): The addition of specified methods for data substitution that can avoid alternative methods requests subject to approval is a straightforward and sensible approach.
- Biomass-Based Diesel Potential Phase-out 95488(d): The triggers identified in this section balance the state's electrification ambitions with the need to maintain incentives for biofuels through at least the next several years.

3Degrees appreciates this opportunity to provide feedback and we look forward to continuing to work with CARB on the success of the LCFS program. Please reach out with any questions or for further discussion.

Sincerely,

/s/ Helen Kemp

Helen Kemp
Policy Manager, Regulatory Affairs
hkemp@3degrees.com

Comment Log Display

Here is the comment you selected to display.

Comment 51 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Amanda
Last Name	Myers Wisser
Email Address	amanda.myers.wisser@weavegrid.com
Affiliation	Weave Grid, Inc.
Subject	WeaveGrid Comments on LCFS Proposed 15-Day Changes
Comment	<div></div>
Attachment	www.arb.ca.gov/lists/com-attach/7369-lcfs2024-BXICYVQ0U3YGZQhv.pdf
Original File Name	WeaveGrid_Proposed LCFS Amendments V2_final.pdf
Date and Time Comment Was Submitted	2024-08-27 07:16:30

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375 Alabama Street
Suite 325
San Francisco, CA 94110

Amanda Myers Wisser
Director, Policy and Regulatory Affairs
amanda.myers.wisser@weavegrid.com

August 27, 2024

California Air Resources Board
1000 I Street
Sacramento, CA 95814
Submitted Electronically

**Re: Weave Grid, Inc. Supportive Comments in Response to Proposed 15-Day
Changes: Proposed Low Carbon Fuel Standard Amendments**

Dear Chair Randolph, Honorable Board Members, and California Air Resources Board Staff,

Weave Grid, Inc. (WeaveGrid) respectfully submits these comments in response to the California Air Resources Board (CARB) Proposed 15-Day Changes to the Proposed Low Carbon Fuel Standard (LCFS) Amendments posted on August 12, 2024.

I. Introduction

WeaveGrid is a California-based software company that helps load-serving entities support increased adoption of electric vehicles (EVs) through greater understanding of EV driver charging behaviors and vehicle-grid integration. WeaveGrid's technology leverages utility and charging data, including the embedded vehicle telematics—data, controls, and communication systems—and the charging equipment to transform unpredictable and disaggregated EV charging loads into a cohesive network of controllable grid resources. We also support load-serving entities in engaging their EV customers with personalized messages, insights, and notifications via the web, email, and text. Our approach enables broad participation in EV load management programs, while helping reduce the costs to serve EV loads. WeaveGrid is a market leader in providing these solutions.

II. Comments

WeaveGrid appreciates Staff's thoughtfulness with the further proposed amendments to the LCFS regulation. LCFS plays an essential role in supporting California's ambitious transportation electrification and climate goals. WeaveGrid largely supports the regulation and the proposed amendments outlined in December 2023 and August 2024.

051.1

A. WeaveGrid commends CARB for retained language on vehicle-grid integration (VGI).

WeaveGrid is strongly supportive of the retained proposed amendments from the December 19, 2023 proposed amendment update within Section 95483(c)(1)(A)5.b.¹ As EV adoption in California increases, California needs to adapt the grid accordingly. WeaveGrid appreciates that the focus of these proposed additional allowable holdback projects supports greater grid investment to accommodate a growing number of EVs on California's roads. We support the additions in this section, including investments in distribution infrastructure for EV charging, support for vehicle-grid integration (VGI) projects, and technology, such as EV load management software, that can avoid or reduce grid upgrades. Distribution grid investments ensure that charging infrastructure needs are met, especially in underserved communities and for medium- and heavy-duty electric vehicles. VGI projects help EV drivers charge when and where it is most beneficial for the grid and customers.² VGI enables cleaner charging by increasing renewables integration and providing a signal for drivers when it is cleanest to charge.³ Technology helps enable VGI and makes it more driver-friendly by being more automated. VGI projects that use automated technology can benefit from greater participation and, therefore, better outcomes.

Increasing the use of VGI in California is critical to meet clean electricity, clean transportation, and affordability goals. Electrical distribution utilities (EDUs) are the key player to enable effective VGI. More sophisticated VGI includes managing EV charging based on ever-changing grid conditions. To enable cheaper and cleaner charging, grid-aware inputs are required for VGI. For example, renewable energy curtailments can be reduced by charging more vehicles when renewable energy generation is abundant. Another example is avoiding charging when there is higher grid congestion at a local distribution or bulk system level. Among the many approaches to VGI, EDUs are best positioned to incorporate relevant grid signals into their VGI projects. It is for this reason that we emphatically support the VGI-related pre-approved uses for EDU holdback credits.

051.2

B. WeaveGrid strongly recommends clarifying and streamlining the EDU holdback credit requirements and pre-approved uses.

WeaveGrid is a leading technology provider of VGI. Our VGI deployments through public utility commission-approved utility programs and government-selected grant opportunities within and outside of California often require or encourage a strong focus on equity. We

¹ Appendix A-1 Proposed Regulation Order, Section 95483(c)(1)(A)5.b., p. 46, https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_atta-1.pdf.

² LBNL, Quantifying the Financial Impacts of Electric Vehicles on Utility Ratepayers and Shareholders, February 2023, <https://emp.lbl.gov/publications/quantifying-financial-impacts>.

³ CPUC Decision 20-12-029.

have launched and are launching programs in partnership with community-based organizations (CBOs), with important disadvantaged community (DAC) and low-income community enrollment targets, and with tracking of meaningful community benefit metrics. As such, we do not see VGI efforts at odds with equity efforts. In fact, we think that these two categories of focus should be seen as complementary: Equity communities can benefit from greater access to VGI technology.

As currently written in Sections 95483(c)(1)(A)5.a.⁴ and 95483(c)(1)(A)5.b.⁵ under “Restrictions of Use of Holdback Credits,” equity holdback projects can be interpreted as separate and distinct from VGI holdback projects – this can inadvertently disallow equity-focused VGI projects. WeaveGrid encourages CARB Staff to clarify and streamline this language. We recommend combining the list of required and pre-approved uses of holdback credits. As explained above, meeting the 75 percent required equity spend does not need to be at odds with VGI deployment.⁶ In effect, this would also mean expanding what is included as a qualified Holdback Credit Equity Project. Currently, the LCFS regulation has a relatively narrow set of projects that qualify as equity projects, limiting the scope of what EDUs can do with this funding. In our view, any transportation electrification efforts that meaningfully benefit disadvantaged, vulnerable, and underserved communities should be eligible for LCFS funding. This is a best practice in line with what we see from other commissions, utilities, and federal and state agencies.

Moreover, as CARB finalizes amendments to the LCFS program, there is a handoff to the California Public Utilities Commission (CPUC), who also regulates the use of the holdback revenue that EDUs receive. Clearer language around the use of holdback credits upfront in the CARB regulation allows the CPUC to review and approve utility programs that best fit local communities and do not include needlessly limiting restrictions. Given the extensive regulatory guidance and approval process for EDU holdback credits, we recommend streamlining the language in the Restrictions of Use of Holdback Credits section by consolidating the required and pre-approved uses, as outlined above, so that there is greater clarity and more flexible use of credits to benefit communities across California.

051.3

C. WeaveGrid offers strong support to increase the stringency of the program.

WeaveGrid applauds CARB’s proposed amendments to the carbon intensity benchmarks to increase the stringency of the program by bringing LCFS credits and deficits in balance.⁷ To maintain the long-term effectiveness of LCFS, we believe at least a 9 percent step-down is required in 2025. As stated previously, LCFS is a critical funding source in the state for

⁴ Appendix A-1 Proposed Regulation Order, p. 44.

⁵ Appendix A-1 Proposed Regulation Order, p. 46.

⁶ Appendix A-1 Proposed Regulation Order, p. 44.

⁷ Appendix A-1 Proposed Regulation Order, p. 66.

transportation electrification efforts, so maintaining reliable credit prices is necessary. Given the prominent role that LCFS plays, we are highly supportive of CARB's efforts to strengthen compliance measures, which can ultimately increase the program's success in reducing transportation emissions and promoting cleaner fuels.

III. Conclusion

WeaveGrid appreciates the opportunity to submit these comments. We thank CARB for consideration of these comments and look forward to continued engagement.

Respectfully submitted,

/s/ Amanda Myers Wisser

Amanda Myers Wisser

Director, Policy and Regulatory Affairs

WeaveGrid

Phone: 650-590-9021

Email: amanda.myers.wisser@weavegrid.com

Comment Log Display

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Comment 52 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Mark
Last Name	Stoermann
Email Address	mstoerm@newtrient.com
Affiliation	Newtrient LLC
Subject	Newtrient LLC Comments on the Proposed Amendments to the Low Carbon Fuel Standard

Comment

Newtrient appreciates the opportunity to comment on the proposed amendments to the Low Carbon Fuel Standard (LCFS). With our support of CARB and the LCFS in mind, Newtrient would like to offer the attached comments on the proposed amendments to the Low Carbon Fuel Standard which were made publicly available on August 12, 2024.

Attachment	www.arb.ca.gov/lists/com-attach/7370-lcfs2024-VWdWZFRIUjISZgk+.pdf
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Original File Name	240827 -Newtrient-LCFS-15-Day-Comments.pdf
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Date and Time Comment Was Submitted	2024-08-27 07:25:19
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August 27, 2024

Chair Liane Randolph and Members of the Board California Air Resources Board
1001 I St.
Sacramento, CA 95814

RE: Newtrient LLC Comments on the Proposed Amendments to the Low Carbon Fuel Standard

Dear Chair Randolph and Members of the Board,

Newtrient appreciates the opportunity to comment on the proposed amendments to the Low Carbon Fuel Standard (LCFS). Newtrient was founded by leading milk cooperatives and organizations, representing 20,000 dairy farmers producing approximately half of the nation's milk supply. Newtrient delivers solutions to environmental and economic challenges, including advancing manure management technologies and products. Through a team of credible technical experts in manure management systems, nutrient recovery, renewable energy, and environmental asset markets, Newtrient helps dairy farms, and the dairy industry reduce its environmental footprint.

Newtrient would also like applaud the success that has been achieved by the LCFS program as was announced in August 2023, when the California Air Resources Board (CARB) announced that in Q1 2023 clean fuels replaced more than 50% of the diesel used in the state for transportation purposes, equating to nearly two billion gallons of avoided fossil diesel use in 2022.¹ This further underscores the success of the program and continued need for the LCFS to deliver GHG reductions from the transportation sector.

As we have stated in previous comments, two programs directed by the California Department of Food and Agriculture (CDFA) have been particularly vital to the progress California has made. According to the 2023 CARB Mid-Year Data Update report on the cumulative progress of the

¹ California Air Resources Board. *For the first time 50% of California Diesel Fuel is replaced by clean fuels.* August 23, 2023. <https://ww2.arb.ca.gov/news/first-time-50-california-diesel-fuel-replaced-clean-fuels>

California Climate Investments Program (CCIP), the Dairy Digester Research and Development Program (DDRDP) and the Alternative Manure Management Program (AMMP) have received a total of \$309.1 million in funding and have reduced 23.2 million MTCO₂e. The funding for these programs represents 1.86% of the California Climate Investments program as of May 31, 2023, but the GHG reductions from these two programs represent 23.69% of the total for all California Climate Investments programs².

Of the 78 subprograms listed in the 2023 CARB Mid-Year Data Update report on the cumulative progress of the California Climate Investments Program as of May 31, 2023, only the DDRDP, has produced a GHG reduction at a cost of less than \$10 per MTCO₂e. The DDRDP program has the largest GHG reductions of any single subprogram (22.1 million MTCO₂e) and represents the single most effective program in the overall strategy to achieve the ambitious climate goals set by the State of California.

In December of 2022, researchers at UC Davis published the study, *Meeting the Call: How California is Pioneering a Pathway to Significant Dairy Sector Methane Reduction* in which they stated “...analysis shows that continued implementation and commitment to the incentive-based climate smart solutions that are currently driving voluntary dairy methane reduction in California should, by 2030, achieve the full 40 percent reduction in dairy methane sought by state regulators without the need for direct regulation.”³

With our support of CARB and the LCFS in mind, Newtrient would like to offer the following comments on the proposed amendments to the Low Carbon Fuel Standard:

Strengthening Carbon Intensity (CI) Targets

052.1

Newtrient applauds CARB and is encouraged to see that the proposed amendments aim to set more ambitious carbon intensity targets. A strong CI reduction target is a critical component for driving down (GHG) emissions in the transportation sector, reducing reliance on petroleum fuels, and transitioning to electric vehicles where feasible. We are pleased to see that staff have proposed a more aggressive step-down of 9% in the 15-day changes. This is a much-needed

² California Climate Investments Program: 2023 CARB Mid-Year Data Update (May 31, 2023), (https://ww2.arb.ca.gov/sites/default/files/auction-proceeds/ci_2023mydu_cumulative_statistics.pdf)

³ Kebreab, Ermias, Ph.D., Mitloehner, Frank, Ph.D., and Sumner, Daniel A., Ph.D., Meeting the Call: California is Pioneering a Pathway to Significant Dairy Methane Reduction (December 2022), available at: <https://clear.ucdavis.edu/news/new-report-california-pioneering-pathway-significant-dairy-methane-reduction>

market correction, to align targets with available supply, which has been delivered to the LCFS program in excess in recent years, creating a credit bank. While this alone will not fully address the oversupply of credits in the cumulative credit bank, this single adjustment will translate into millions of additional tons of GHG emission reductions that would've otherwise gone unabated.

052.2

While we believe that the proposed 9% step-down in stringency is a good start at course correcting the market, we also believe that an Auto-Acceleration Mechanism (AAM) is still needed to respond to clear overperformance of the program and to send an unambiguous market signal to investors that the program is nimble and will respond to opportunities to deliver additional GHG reductions rather than “add to” an excessively large credit bank that is at odds with the objectives of the program. The AAM is a necessary complement to the CI target adjustment and as designed, will send a clear, supportive, and unambiguous market signal to continue investments in clean fuels by tightening the program in the event overperformance occurs. Adoption and implementation of this mechanism will ensure that potential emission reductions are not left on the table and will help California reach its climate goals faster if triggered.

Avoided Emission Crediting

052.3

The proposed amendments in the 45-day package sought to phase out avoided emission pathways for projects that break ground after December 31, 2029, for biomethane used as a transportation fuel through 2040 and for biomethane used to produce hydrogen through 2045. The 15-day changes aim to expand this phase out to projects breaking ground before January 1, 2030, restricting the total number of crediting periods for avoided methane emissions from three consecutive 10-year periods to two. Newtrient believes that this is inconsistent with the incentive-based approach outlined in SB 1383 and currently being implemented in California.

052.4

Moreover, eliminating or phasing out the avoided methane crediting in the dairy sector would lead to an inability to meet the state's targeted methane reduction goals and result in significant dairy methane emissions leakage. Avoided methane crediting is a key component of dairy methane reduction incentives that has achieved significant reductions to date and as stated previously, is one of the most effective tools to meet California's GHG goals.

According to a UC Davis analysis:

... misguided efforts to change course by forced coercion to pasture-based operations, direct regulation of dairy farms, or limitation on dairy digesters incentives will not only fail to achieve the desired greenhouse gas emissions reductions but will exacerbate the

problem by causing significant emissions leakage. Revenue streams that incentivize investment in biogas capture and beneficial use are critical. Phasing out of avoided methane crediting in the dairy sector would jeopardize existing projects, making them uneconomic in the long-term, and dry up investment capital for the additional digester projects sought by CARB to achieve the state's ambitious and aggressive targets.⁴

The ultra-low carbon indices within the dairy Anaerobic Digestion (AD)/Biogas sector are real and well-vetted within the national laboratory-developed Greenhouse Gases, Regulated Emissions, and Energy Use in Technologies (GREET) model. As such, anyone who values science must appreciate their role in meeting GHG and climate goals, and not selectively replace them with non-scientific reasoning.

The low carbon intensity of these projects arises from a combination of well-to-wheels carbon gains plus the methane offsets from baseline methane emissions from manure management, storage, and application. Methane offsets from baseline emissions are a legitimate accounting practice as baseline, pre-AD/biogas systems emissions exist, and are largely removed through the installation of the AD/biogas system.

CARB has carefully and correctly set the boundaries of animal agriculture and clearly defines the baseline scenario of California dairies by providing a diagram of the LCFS boundaries and indicating the project related components in the Compliance Offset Protocol for Livestock Projects Capturing and Destroying Methane from Manure Management Systems Adopted: November 14, 2014.

Some groups misrepresent the dairy industry and, as in the case of the comments submitted and made during public input sessions, misrepresent the benefits of the use of anaerobic digestion and renewable energy production on dairy farms. Anaerobic digestion systems have scientifically supported GHG reductions. By calling the scientifically supported GHG reductions achieved by AD systems “artificially inflated,” they show that they are not willing to discuss the science and the significant impact of AD on reducing GHG emissions from farms, but instead label and denigrate these projects with their own unscientific opinions.

⁴ Kebreab, Ermias, Ph.D., Mitloehner, Frank, Ph.D., and Sumner, Daniel A., Ph.D., Meeting the Call: California is Pioneering a Pathway to Significant Dairy Methane Reduction (December 2022), available at: <https://clear.ucdavis.edu/news/new-report-california-pioneering-pathway-significant-dairy-methane-reduction>

Revenue streams that incentivize investment in biogas capture and beneficial use are critical. Phasing out of avoided methane crediting in the dairy sector would jeopardize existing projects, making them uneconomic in the long-term, and dry up investment capital for the additional digester projects sought by CARB to achieve the state's ambitious and aggressive targets.

Avoided methane emissions are a critical part of science-based, life cycle assessments, and their inclusion in carbon intensity scores are consistent with internationally recognized standards of carbon accounting. The scientific evidence for this is robust and recognizes that the baseline includes methane emissions that would otherwise be released into the atmosphere. Recognizing methane and its role as a short-lived climate pollutant, while incentivizing its removal from the atmosphere, has proven highly successful in supporting the reduction of millions of metric tons of carbon dioxide equivalents. We strongly encourage CARB to continue its longstanding commitment to a science-driven framework that utilizes proven science including Argonne National Laboratory's GREET model.

In the event CARB maintains its plans to phase out eligibility for avoided methane in vehicle fuels, we encourage CARB to be clear that it is a policy decision associated with CARB's efforts to transition biomethane into non-vehicle sectors (e.g., residential, commercial, and industrial uses). CARB should be explicit that the policy decision to discontinue recognition and eligibility of avoided methane emissions in vehicle pathways should not be interpreted as a departure from the established rigorous science of accounting for the benefits of avoiding methane emissions which continues to be appropriate for non-vehicle sectors.

Deliverability Requirements

052.5

The 15-day changes added a provision to section 95488.8(i)(2) that would allow the Executive Officer to approve a gas system map that identifies transcontinental and connected pipelines for which gas flows to California at least 50% of the time. Should the Executive Officer approve this map before July 1, 2026, then entities reporting under bio-CNG, bio-LNG, and bio-L-CNG must demonstrate physical flow to the state 50% of the time after December 31, 2037, not January 1, 2041. It appears that the deadline for biomethane used as an input to hydrogen production remains January 1, 2046.

While it appears that the addition of a gas flow map, for which the Executive Officer isn't technically required to approve, may address some implementation questions, this modification does not address the overall lack of detail with the proposal or the reality that

an implementation date of 2037 or 2041 will be difficult to achieve. As mentioned in our February 16, 2024, comments, the ABC believes that CARB should require further guidance on the proposed deliverability requirements as they lack detail. The proposed amendments aim to adopt the California Renewable Portfolio Standard (RPS) requirement of ensuring biomethane injected into a common carrier pipeline physically flows towards California 50% of the time. Yet, the references RPS framework does not provide any clarity on how these biomethane molecules can be traced to California, how a 50% average flow toward California may be modeled, nor expected geographical indications of regions anticipated to remain eligible for book-and-claim accounting. While the proposed map may aid geographical clarity for some projects, those projects that remain outside geographic boundaries, but may otherwise be able to demonstrate deliverability, are left without clear guidance on how they may meet the requirements. We look forward to discussing these provisions with CARB staff in the coming year and highly encourage CARB to conduct a full and transparent public process to inform any gas maps the Executive Officer may consider.

Hydrogen

052.6

Newtrient disagrees with the modification in the 15-day changes to exclude hydrogen produced with blended renewable and fossil gas from receiving LCFS credit by January 1, 2030. Specifically, this language constrains entities that are currently blending biomethane and fossil natural gas to produce a lower-CI hydrogen via steam methane reforming (SMR). This change, which was not discussed in the 45-day package or previous public workshops, has the potential to limit the availability of low-CI hydrogen during a time when hydrogen produced via electrolysis and renewable electricity is still struggling to scale up and reach cost parity.

True-Up Provision

052.6

Newtrient is pleased to see the proposed amendments to expand the credit true-up to include periods using temporary pathway CIs after annual verification following stakeholder input highlighting the benefits of the credit true-up. Based on our understanding of the language, reporting that is submitted March 31, 2025, will cover the years 2023-2024 and include a credit true-up back to 2023. We do however take issue with the proposal including true-up provisions that adjust credits based on verified operational CIs relative to certified CIs, applying a penalty of four times the spread for shortfalls. The

052.7

justification for this 4X multiplier is unclear, as a smaller multiplier, such as 2X, would still effectively discourage overconfidence in CI analysis. Finally, we urge CARB to establish a temporary CI pathway for biogas-to-electricity projects, as the absence of such a pathway currently puts biogas-to-electricity at a disadvantage compared to biomethane projects, which already have access to temporary CI pathway.

Conclusion

Over the past year and a half, CARB staff have held numerous public workshops to gather feedback on potential changes to the program, where has Newtrient participated, and we are pleased to see that the rulemaking is nearing completion.

Thank you for the opportunity to comment on the proposed amendments, and we look forward to engaging with CARB staff on these topics.

Sincerely,

A handwritten signature in black ink, reading "Mark Stoermann".

Mark Stoermann
Chief Operating Officer
Newtrient LLC

Comment Log Display

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Comment 53 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	William
Last Name	Barksdale
Email Address	william_barksdale@cargill.com
Affiliation	Cargill, Inc.
Subject	Comments on 15-day changes
Comment	<div><p>Cargill thanks CARB staff for the opportunity to comment, and for consideration of the attached.</p><p>Sincerely,</p><p>William Barksdale Managing Director</p></div>

Attachment

Original File Name Cargill LCFS Comments 15-day .pdf

Date and Time Comment Was Submitted 2024-08-27 08:23:36

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 27, 2024

Chair Liane Randolph and Members of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Dear Chair Randolph and Members of the Board,

Cargill appreciates the opportunity to provide comments on the California Air Resources Board's (CARB) proposed 15-Day Changes to the Proposed Amendments to the Low Carbon Fuel Standard (LCFS) Regulation (15-day package), and we thank staff for consideration of our points below.

Cargill is a Minnesota-based global agribusiness company that has worked closely with small- and large-scale growers since our founding 159 years ago. We partner with farmers, food companies, retailers, and fuel producers to make, process, and move food and fuel feedstocks around the world. Cargill businesses originate, process, and convert these feedstocks into renewable fuels including biodiesel and ethanol, while working closely with our farmer partners. Our work starts at the farm level, where we are undertaking comprehensive, large-scale efforts to [reduce emissions](#) across our global supply chains – working hand in hand with farmers to scale regenerative farming practices, protect and restore vital landscapes and empower producer communities.

Cargill is taking climate action – the global food system depends on it.

Climate change has a direct and growing impact on the food and agriculture industries. With a global footprint and presence in major supply chains worldwide, Cargill has a responsibility to make the food system even more sustainable and resilient. Cargill appreciates CARB's commitment to decarbonize the State's transportation sectors. A more sustainable food system must consider how food and other vital goods move around the world from origin to destination. Incentivized markets, such as California's LCFS program, are instrumental in creating demand for these lower-carbon transportation solutions.

Near-Term Stringency Increase

053.1 Cargill welcomes CARB's proposal of a near-term increase in stringency to a 9% CI reduction in 2025 as a way to stabilize LCFS prices, but we believe there is room for a more impactful step-down given the build in the LCFS credit bank as the industry responds to the demand of lower carbon liquid transportation fuels in California. The over-performance of the program is a testament to its success, and we believe the proposed adjustment will be supportive to higher credit prices and continued investment in the state's transition to cleaner energy.

20% Cap on Soybean Oil and Canola Oil Feedstocks

053.2 **Cargill's priority will always be nourishing the world.** We believe North American agriculture still has an important role to play in the transition to cleaner energy and more sustainable food systems, and that the industry is uniquely positioned to feed the world and meet the growing global demand for low carbon biofuels. North American farmers are integral to the decarbonization of our food and energy sectors and continue to use innovative technologies and cropping systems to support carbon sequestration, sustainability, and emissions reductions throughout the supply chain.

As such, Cargill does not support the proposed cap on soybean and canola oils. Any deviation from the current policy must be nimble, non-arbitrary, and designed to effectively respond to near-term acute needs without driving longer-term unintended consequences. While we believe that innovation in agronomics and technology will lead to greater opportunities for emissions reductions for traditional feedstocks like soybeans and canola, we also acknowledge CARB's desire to send a clear market signal so that participants can make decisions that affect the long-term performance of their businesses.

Agriculture has been serving food and fuel markets for decades and will continue to support both markets with an unwavering commitment to sustainability as the energy transition evolves. As we invest and modernize assets to support near-term demand, we see a shared benefit for long-term food production supported by more advanced infrastructure.

053.3 A key driver for the long-term success of the industry will be the continued reduction in the carbon intensity of crop-based feedstocks. The growing adoption of sustainable farming practices results in the production and availability of lower carbon-intensity feedstocks for bioenergy. Farmers are increasingly adopting these practices to further reduce and sequester carbon, in addition to seeing clear economic and productivity gains. Recognizing the opportunity and imperative of regenerative agriculture, Cargill is supporting and incentivizing these sustainable practices among growers in our supply chain. We encourage CARB to promote the adoption of these reduction mechanisms by making available pathways which incorporate regenerative agriculture practices.

053.2 cont CARB's proposed cap on soybean and canola oil feedstocks disadvantages the North American grower who is integral to the decarbonization of our global food systems. In the years ahead, the global food system will be subjected to the indirect consequence of reducing the available production of soybean and canola oil – which is to reduce contingency supplies available to the food system. In essence, CARB's proposed policy guidance calls for greater decarbonization without its most flexible and scalable feedstock supply. We believe this undermines the critical imperative to provide food and to decarbonize the global transportation supply chain.

The proposed cap on soybean and canola oils for biomass-based diesel represents a material policy change to the program. CARB's 15-day package presents the first opportunity for a broad stakeholder group to review these impactful changes. Given the potential implications of this policy change, Cargill asks CARB to provide stakeholders with additional time to properly vet the intent, impact, and implications of the proposed requirements. While we expect additional question to be raised over time, we request that CARB respond to the following as soon as possible:

- Current participation % of soybean and canola oils as biomass-based diesel feedstocks – Cargill requests that CARB provide stakeholders with the composition of the "Other" feedstock type category used for data modeling in Table 6 of the LCFS Data Dashboard.

- Assessment of the 20% cap – Is the cap assessed on the volume of biomass-based diesel imported into California’s LCFS program, or is the cap assessed on the total volume of production by producer? Cargill requests that staff make available a formula or illustrative example of how staff intends to assess this cap at the producer level.
- Definition of the term “company” – Cargill requests that staff provide a clear definition of this term so stakeholders can better analyze how the cap might affect current business operations.
- Reporting and verification – Cargill requests that staff provide more details for stakeholders related to reporting and verification processes relative to the proposed cap and its implementation.

Sustainability Certification for Biomass

053.4 Cargill supports and promotes sustainable approaches to agriculture that are demonstrated through traceability back to our growers. We recognize the importance of traceability throughout the supply chain, not just for renewable biomass from crops, but for waste-based feedstocks as well. Adequate mechanisms must be in place to ensure that all feedstocks are correctly identified and that their environmental benefits match the material being used for credit-generating fuel.

Growth in waste-based feedstocks to feed our domestic market increasingly comes from foreign locations. Feedstocks sourced from outside North America are oftentimes challenging to trace back to origin. This challenge is compounded by the smaller volumes of waste that must be aggregated from hundreds of sourcing locations, and sometimes across multiple regions. Cargill believes that all feedstocks require effective compliance processes. We encourage CARB to engage with industry and relevant authorities to develop and adopt such processes and procedures.

To this end, Cargill is actively exploring the application of lipid profile analytical testing methods which would serve as support to the identification and verification of feedstocks such as used cooking oil (UCO). Developing and incorporating such testing methods would be a strong step towards ensuring rigorous compliance requirements for all feedstocks within the program.

We request that CARB align the sustainability certification requirements between biomass and waste feedstocks to ensure that all eligible feedstock for the program is subject to the same requirements, and that advantages for waste-based feedstocks are not derived from less rigorous compliance requirements.

Conclusion

Cargill respectfully requests that CARB remove the proposed cap from the rulemaking package. We recognize that crop-based feedstocks must be allocated for fuel use in a thoughtful and balanced manner. Cargill’s participation in global agriculture supply chains gives us confidence in the market’s ability to serve both food and fuel.

North American farmers continue to grow their use of climate-smart agricultural practices in support of soil health, resource conservation, and soil carbon sequestration. We know that continued reductions within the industry are essential to meeting our decarbonization goals and that farmers are leading the way to a more sustainable future for our agricultural supply chains and global food systems.

We also believe that the strong demand signal for foreign-sourced waste-based feedstocks without appropriate traceability requirements presents opportunities for ineligible material to make its way into the LCFS.

We look forward to continued collaboration with CARB as we support the role of agriculture in the decarbonization of our transportation sectors and food systems. Thank you for this opportunity to submit comments.

Sincerely,

A handwritten signature in dark ink, reading "William A. Barksdale", followed by a horizontal line extending to the right.

William Barksdale
Managing Director
Cargill, Inc.

cc: Rajinder Sahota

Comment Log Display

Here is the comment you selected to display.

Comment 54 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Gal
Last Name	Sitty
Email Address	galsitty@kiausa.com
Affiliation	Kia Corporation
Subject	Kia comments on the proposed 15-Day Changes to LCFS Regulation

Comment

Please find the Kia Corporation's comments on the Proposed 15-Day Changes to the LCFS Regulation.

Thank you,

Gal Sitty

Senior Regulatory Compliance Manager
Kia NA

Attachment

www.arb.ca.gov/lists/com-attach/7373-lcfs2024-B2wGaVw8U18BZARr.pdf

Original File Name

Kia Comments 15 Day Modification to LCFS Ammendments_FINAL.pdf

Date and Time Comment Was Submitted 2024-08-27 08:33:23

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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Comments of Kia Corporation
to the
California Air Resources Board

**RE: 15-Day Notice of Modifications to
Proposed Low Carbon Fuel Standard Amendments**

August 27, 2024

The Kia Corporation (Kia) submits these comments to the California Air Resources Board (CARB) on the modifications of proposed Low Carbon Fuel Standard (LCFS) amendments issued on August 12, 2024. Kia appreciates this opportunity to provide feedback on these modifications which have potential to significantly contribute to California's LCFS goals. Kia supports the changes proposed by CARB, but we recommend a few revisions to provide more certainty for automakers.

054.1

Kia supports comments submitted by the Alliance for Automotive Innovation (AAI). Kia supports AAI's request for CARB to provide additional clarity on the definition of an "eligible OEM." Kia also supports more clarity on how this rule will impact the Clean Fuels Rewards program and the metrics that determine the allocation of "up to 45 percent" of base credits for residential EV charging.

Kia, part of the Hyundai Motor Group (HMG), is a dynamic part of the world's third largest automaker. Kia is committed to electric vehicles (EVs) and is investing \$28 billion by 2027 into EVs and other advanced technologies. Kia is focused on popularizing EVs at all levels of the market and becoming a global leader in EVs and electrification.

As more states adopt similar clean fuel programs,¹ CARB's leadership in designing and implementing a market-based program that decreases transportation fuel carbon intensity (CI) can have a lasting impact on reducing greenhouse gas emissions nation-wide.

Kia appreciates the opportunity to collaborate with CARB in developing changes to the LCFS. Kia supports the proposal to allow the Executive Officer to allocate up to 45 percent of the base credits for residential EV charging to qualified Original Equipment Manufacturers (OEMs). Further, Kia supports CARB's proposal for a 9 percent increase in stringency of the CI target for 2025. This proposal will help ensure that California residents who purchase electric vehicles (EVs) realize the benefits of this program.

Residential Charging Base Credits

¹ Washington, Oregon, and New Mexico have adopted their own Clean Fuel Standards. New York and Minnesota are among states that have had Clean Fuel Standards introduced in the legislature.

054.2

Due to the recent and ongoing low prices for credits in the LCFS program, Californians who purchased EVs were unable to receive a rebate under the Clean Fuels Rewards program. Additionally, without the rebate, the higher purchase price could have turned consumers away from purchasing an EV. If OEMs are directly able to capture revenue from the base credits generated by their own vehicles, rebates for EVs would reach consumers under all LCFS credit market conditions and potentially in higher amounts.

Under current rules where electric distribution utilities (EDU) are allotted the entirety of base credits, the Clean Fuels Rewards program has been insufficiently funded. This represents a lost opportunity in advancing LCFS goals as well as other CARB priorities such as Advanced Clean Cars II's (ACCI's) Zero Emission Vehicle (ZEV) requirement. Incremental credit proceeds, while helpful, are insufficient to provide enough revenue for OEMs to meaningfully increase EV rebates or provide for any of the other proceed usage requirements detailed in the proposed section 95483(c)(1)(B).

Conversely, Kia routinely and extensively provides rebates on their vehicles for various reasons. Kia has the ability, the know-how, and the incentive to support customers with direct rebates. New proceeds from base credits will position Kia and other OEMs to increase their ability to provide rebates on EVs. This will reduce EV transaction prices; increasing EV adoption and the use of low-CI electricity as a transportation fuel. This is a double benefit to consumers as low-CI electricity is generally more affordable than gasoline and other liquid transportation fuels.

As part of our commitment to EVs, Kia is also working to expand EV charging infrastructure through our investment in IONNA² and other efforts. The National Renewable Energy Laboratory (NREL)³ estimates that California will require 262,000 public level-2 charging ports and 29,100 public DC-fast charging ports by 2030. This is significantly higher than the current 32,667 level-2 ports and 10,677 DC-fast charging ports available in California.⁴ Ongoing issues with charger reliability, siting and permitting, and grid connectivity and capability, present hurdles in growing the public charging network. This necessitates the use of all available tools to meet the challenge. The additional revenues achievable from base credits could help Kia overcome these challenges and continue to build out the infrastructure that is critical for wider adoption of EVs.

Kia strongly supports granting OEMs up to 45 percent of residential EV charging base credits. This increases the efficiency and efficacy of the LCFS by providing a more direct conduit for LCFS credit proceeds to support California consumers in making their low-CI fuels purchasing decisions. Kia encourages CARB to finalize language that ensures OEMs are better positioned to contribute to the continued success of the LCFS.

Carbon Intensity Targets

054.3

Kia supports CARB's proposal for a "near-term increase in stringency of 9 percent CI reduction in 2025" and the addition of the "Automatic Acceleration Mechanism" to help ensure the continued success of the LCFS. Appropriate CI targets that maintain adequate LCFS credit

054.4

² IONNA, "Automakers United to Revolutionize EV Charging", July 2023, <https://ionna.com/news/seven-automakers-unite>.

³ NREL, "The 2030 National Charging Network: Estimating U.S. Light-Duty Vehicle Demand for Electric Vehicle Charging Infrastructure", June 2023.

⁴ California Energy Commission, "Electric Vehicle Chargers in California", accessed August 2024.

pricing will support the continued growth of low-carbon fuels. We appreciate CARB recognizing the need to add these measures to advance adoption of low carbon fuels. Kia encourages CARB to continue to ensure a healthy credit trading market by monitoring program metrics.

Conclusion

Kia looks forward to participating in CARB's efforts to bring Californians more low-carbon fueling options. We appreciate the opportunity to provide comments on the proposed modifications and look forward to continued engagement with CARB on the LCFS.

Comment Log Display

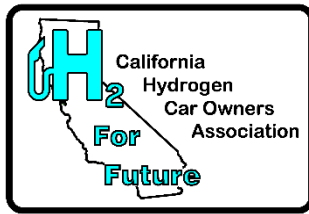
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Comment 55 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Gregory
Last Name	Cane
Email Address	greg@h2tonps.org
Affiliation	California Hydrogen Car Owners Associati
Subject	Low Carbon Fuel Standard (LCFS) Comments
Comment	Please see attached
Attachment	www.arb.ca.gov/lists/com-attach/7378-lcfs2024-BWkBc1UmBQkLYVQ3.pdf
Original File Name	Ltr LCFS Comment AU2724_0842P.pdf
Date and Time Comment Was Submitted	2024-08-27 08:59:28

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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14995 N. Country Rd
Grass Valley, CA 95949

(360) 929-0524
www.h2tonps.org

August 27, 2024

Ms. Liane Randolph
Chairman, California Air Resources Board
1001 I Street
Sacramento, CA 95814

Subject: Low Carbon Fuel Standard (LCFS) Comments

Dear Chair Randolph:

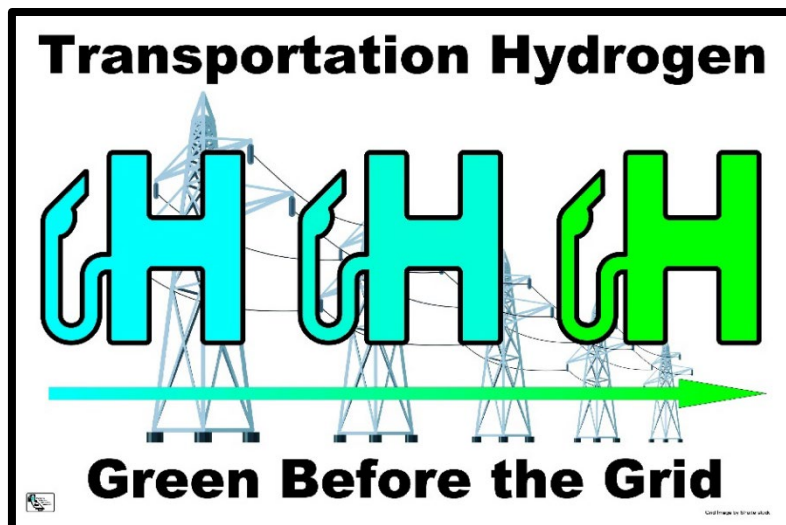
The [California Hydrogen Car Owners Association](http://www.h2tonps.org) (CHCOA) is a group of hydrogen car drivers who believe in the positive role that these cars can play in California's green energy future. Our Association, which started a year and a half ago, has grown to 197 members and includes current and former lawmakers, hydrogen industry and agency representatives, research scientists and many folks who have driven these cars for as long as they have been around.

In our charter documents, CHCOA stated that the lack of reliable hydrogen refueling infrastructure is single-handedly thwarting the success of these cars in the United States. We now believe that the unabated high prices of hydrogen at the dispenser is having an equally chilling effect on the success of light-duty FCEVs. It is incumbent on the California Air Resources Board to take such actions, within their purview, to reduce this cost. At a minimum, we believe that CARB should retain the Light-Duty HRI program and do what it can to increase LCFS credit prices.

CHCOA believes that hydrogen produced for use in transportation should have a carbon intensity of zero as soon as reasonably possible, taking into consideration the need for increasing volumes of hydrogen to supply a growing industry. Our *Green Before the Grid* campaign reflects our commitment to this essential goal.

Sincerely,

Gregory R. Cane
President



Comment Log Display

Here is the comment you selected to display.

Comment 56 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	John
Last Name	Rauber
Email Address	rauberjohn@johndeere.com
Affiliation	Deere & Company
Subject	Proposed Modifications to Proposed LCFS Amendments (15-Day Changes) 8.12.24

Comment

Please find attached comments submitted by Deere & Company ("John Deere") to CARB's 8/12 Proposed Modifications to Proposed LCFS Amendments ("15-Day Changes").

Attachment	www.arb.ca.gov/lists/com-attach/7379-lcfs2024-UTtdNANqUm9SCwBk.pdf
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Original File Name	John Deere comments CARB LCFS 8.27.24 proposals.pdf
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Date and Time Comment Was Submitted	2024-08-27 08:58:37
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If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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Deere & Company
801 17th St., NW Washington, DC 20006
Phone: 202-423-2273; Fax: 202-296-0100
E-mail: RauberJohn@JohnDeere.com

John W. Rauber, Jr.
Director & Counsel
U.S., Mexico & Canada Government Affairs

August 27, 2024

Clerks' Office
California Air Resources Board
1001 I Street
Sacramento, California 95814

RE: CARB Notice of Public Availability of Proposed Modifications ("15-Day Changes") to the Proposed Low Carbon Fuels Standard Amendments, released on August 12, 2024.

Deere & Company ("John Deere") appreciates this opportunity to submit comments following the California Air Resources Board's ("CARB") August 12, 2024 release of Proposed Modifications to its Proposed Low Carbon Fuel Standard Amendments, and specifically the proposed changes to credits for biomass-based diesel (new subsection 95482(i)).

John Deere supports policies that promote an expanding, sustainable supply of U.S.-grown renewable fuels and feedstocks. For decades, U.S. renewable fuels, including biomass-based biofuels, have provided cleaner-burning transportation fuels to U.S. consumers. It is John Deere's hope that, backed by strong fuels policies, U.S.-grown biofuels will continue to play a key role in decarbonizing the U.S. transportation sector.

056.1 Deere believes that the proposed limitation on credits for biomass-based diesel produced from virgin soy and canola oils is both unnecessary and counterproductive to the state's decarbonization goals. By limiting LCFS credits for biomass-based diesel, proposed subsection 95482(i) would effectively cap the volume of biomass-based diesel allowed into California's transportation fuel supply. Once the proposed 20 percent cap is met, additional low-carbon fuels made from soy and canola oils would be assigned a pre-determined carbon intensity score that does not reflect the sustainable, well-documented carbon reduction benefits they provide¹.

056.2 The exponential growth in adoption of climate-smart ag practices, precision technologies and data-enabled farming have brought about significant sustainability gains and production efficiencies². According to USDA data, most recent increases in U.S. production of soybeans, for example, can be attributed to increases in yields per acre. Over the past three decades, average U.S. soybean yields have risen from 32.6 to 49.5 bushels per acre, a nearly 52 percent increase.³ As productivity has increased, so has farmers' ability to generate and analyze field-level data that allows for measuring, documenting and calibrating the carbon-reducing impacts of climate-smart practices. The use of precision equipment and technologies has created a virtuous cycle of generating the data to track performance, and then the insights to improve that performance over time.

056. cont The proposed addition of subsection 95482(i) includes the rationale that California seeks to "avoid sending a long-term signal for virgin soy or canola oil to serve California demand." Yet even as California's progress towards zero-emissions continues, the demand for reliable supplies of liquid, low-carbon biofuels will continue for years to come. These fuels are and will remain the most viable, affordable option for many segments of California's economy, including heavy duty and offroad users. By limiting the availability of LCFS credits for biomass-based diesel, the state would leave rural and off-road fuel users with fewer alternatives, not more, along with higher fueling costs. This would be especially problematic for many California farmers who have a need for higher-powered equipment that cannot be met through battery electric alternatives. By ignoring this reality, proposed



JOHN DEERE

subsection 95482(i) will stifle decarbonization efforts and raise fueling costs for important segments of California's economy.

056.3 Deere reiterates comments it submitted to CARB on March 15, 2023, encouraging the Board, rather than placing caps on virgin oil feedstocks, to consider convening an Expert Working Group ("EWG") to provide a third-party evaluation of this matter and report back to CARB on its findings and any recommendations. Given that caps on virgin oil feedstocks would disproportionately impact those in the oilseed and agricultural industries, we recommend that those sectors be adequately represented among the those who comprise the EWG. In addition, we recommend the EWG conduct a review of the LCFS' indirect land use change ("ILUC") modeling data to ensure the most current scientific data is being utilized.

John Deere appreciates the opportunity to comment as CARB continues implementation of the LCFS and considers program changes. We urge CARB to set aside the proposed addition of a cap on biomass-based fuels and instead initiate a stakeholder process to thoroughly evaluate the necessity and impacts of such a restriction.

Sincerely,

John W. Rauber, Jr.

¹ H. Xu, et al. (2022) [Life Cycle Greenhouse Gas Emissions of Biodiesel and Renewable Diesel Production in the United States | Environmental Science & Technology \(acs.org\)](#)

² Association of Equipment Manufacturers (2021) [Environmental Benefits of Precision Agriculture \(aem.org\)](#)

³ U.S. Department of Agriculture (2024) [National Agricultural Statistics Service - Charts and Maps - Soybeans: Yield by Year, US.](#)

Comment Log Display

Here is the comment you selected to display.

Comment 57 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Christiana
Last Name	Darlington
Email Address	christiana@clereinc.net
Affiliation	Placer Co Air Pollution control District
Subject	Biomass references
Comment	See attached
Attachment	www.arb.ca.gov/lists/com-attach/7380-lcfs2024-BWZVMgBzVGUEXVck.pdf
Original File Name	carb submittal 2024.pdf
Date and Time Comment Was Submitted	2024-08-27 09:05:35

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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Jordan Ramalingam, Manager, Alternative Fuels Section
California Air Resources Board
1001 I Street, Sacramento, California 95814

August 27, 2024

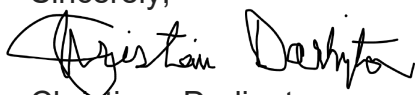
Dear Mr. Ramalingam,

Thank you for the opportunity to respond to the proposed changes to the Low Carbon Fuel Standard Regulations relating to the utilization of biomass. The District has proposed changes to the provisions that relate to forest biomass, directly or indirectly, in order for the regulations to achieve the environmental safeguards and optimize biomass utilization for biofuels. As ARB is fully aware of the benefits of such utilization over open burning or wildfire, the District chooses not to belabor the point in this letter.

- 057.1 Instead, please see the language additions that offers a few important clarifications. First, we recommend the use of the term “dimensional lumber” instead of “wood product” because it is the higher grade materials that should be prevented from being used for biofuels. The term “wood products” include things like mulch, pet bedding, and landscaping chips, which would be appropriate for use as biofuel, as well. Therefore, the phrase dimensional lumber makes more sense.
- 057.2 Second, biomass from fire salvage operations is explicitly listed as this is an important source. Next, the District proposed language that clarifies that the use of plantation style tree farm biomass that is less than fifteen years old (as proposed by CARB) must go
- 057.3 through the additional environmental safeguards for use in the program. Also, the word “compaction” is removed because that term is too broad to be used in this context, and finally, clarifies that national and state level environmental documentation could prove to satisfy environmental requirements. There are other small changes that just help clarify the regulation.

The District has consulted with several different forestry professionals to help support ARB with these changes, and is more than happy to facilitate any further discussion. Please note that attachment has the redline version of the regulation with notes.

Sincerely,



Christiana Darlington
General Counsel
Placer APCD

057.1 cont

“Forest Biomass Waste” means small-diameter residues, limited to forest understory vegetation, ladder fuels, limbs, branches, and logs that do not meet regional minimum marketable standards for processing into dimensional lumber.

057.2 cont

§ 95488.8. Fuel Pathway Application Requirements Applying to All Classifications.

g) 1_a_3) Forest biomass waste removed for the purpose of forest fire wildfire reduction, to reduce the risk to public safety, or forest stand improvement infrastructure, post-fire salvage, to create defensible space, or for forest restoration; and from a treatment wherein which no clear-cutting occurred; and that was performed in compliance with all local, State, and federal rules and permits.

§ 95488.9. Special Circumstances for Fuel Pathway Applications.

057.3

(g)(1)(A) when biomass is used in fuel pathways that is sourced from private commercially owned tree plantation lands, it must have been cleared or cultivated prior to January 1, 2008 and actively managed or fallow, , since January 1, 2008. Biomass may not be sourced from land that is covered under international or national law or by the relevant competent authority for nature protection purposes.

(g)(1) (B) Biomass must be produced according to best environmental management practices that reduce GHG emissions or increase GHG sequestration, including but not limited to: 1. Maintain or enhance biodiversity habitat on agricultural or forested lands; 2. Enhance soil fertility and avoid erosion; 3. Apply fertilizers in a manner that minimizes runoff, and soil and water contamination; 4. Reduce unsustainable water use, and minimize diffuse and localized pollution from chemical residues, fertilizers, soil erosion, or other sources of ground and surface water contamination. These requirements may be demonstrated through documentation prepared under FPA, NEPA or CEQA.

Comment Log Display

Here is the comment you selected to display.

Comment 58 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Robert
Last Name	Parkhurst
Email Address	rparkhurst@sierravIEWSolutions.com
Affiliation	Indigo Agriculture
Subject	IndigoAg comments on Proposed 15-day LCFS Changes
Comment	Please see the attached letter providing feedback on the Proposed 15-Day Changes to the Proposed LCFS Regulation Order.
Attachment	www.arb.ca.gov/lists/com-attach/7383-lcfs2024-Bm8BaV04Bz1WNwhn.pdf
Original File Name	IndigoAg 15-day comment Letter on CARB LCFS.pdf
Date and Time Comment Was Submitted	2024-08-27 09:35:30

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

August 27, 2024

The Honorable Liane M. Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: 2024 Low Carbon Fuel Standard Amendments

Dear Chair Randolph:

Indigo Ag, Inc. (Indigo Ag) appreciates the current and historic efforts by the California Air Resources Board (CARB) to reduce the greenhouse gas (GHG) emissions from transportation through the implementation of the State's Low Carbon Fuel Standard (LCFS). Since 2011, California's LCFS program has been tremendously successful and is a model for the nation and the world. Indigo Ag supports the continued evolution of the LCFS through the CARB rulemaking process. Of particular interest to Indigo Ag is the production of biofuels in the most sustainable manner. The use of sustainably grown biofuels directly supports the State's goal to reduce anthropogenic emissions by 85 percent by 2045.

About Indigo Ag

Indigo Agriculture, Inc. ("Indigo") was founded in 2013 and is headquartered in Boston, Massachusetts, with its commercial office based in Memphis, Tennessee. Carbon by Indigo is the first private program to quantify agricultural soil carbon benefits with registry-approved rigor at a global scale, and Indigo Source is the first program to produce low carbon intensity (CI) ag feedstocks at scale. Our ecosystem partner-based approach supports the scaling of our technology to realize the large, pooled projects needed to move beyond carbon abatement and realize mass drawdown across agricultural acres.

Thousands of US farmers across seven million acres of active cropland have enrolled in our programs, which generate carbon offsets, low CI crops, and/or other ecosystem services. Our prior work has primarily focused on the voluntary market, following Climate Action Reserve's (CAR) Soil Enrichment Protocol (SEP) and The Greenhouse Gas Protocol's (GHGP) Land Sector & Removals Guidance (LSRG). We have now taken this project through three successful rounds of independent verification by an ISO-accredited verification body. Across those three verifications we have issued nearly 300,000 credits, each representing one metric ton of CO₂e emissions either reduced, avoided, or removed from the atmosphere. We also work with our supply chain partners to deliver ~20M bushels of low CI ag commodities to voluntary buyers each year.

Over the last 6 years, Indigo has made substantive (and almost certainly unique levels) of investment in our science and technology and methods for driving carbon action and quantification farms with growers and our partners. It is through this investment that we have proven that these programs are not only robust but can be scaled in a credible way and are

excited for the opportunity to bring these capabilities to alternative fuels markets, such as the LCFS.

Leverage Existing Certification Programs to Meet Sustainability Requirements

058.1

At the April 10, 2020⁴ workshop, CARB stated that in implementing a continuous third-party sustainability certification program, it plans to “leverage existing certification programs”¹ and listed four programs approved under the European Union’s (EU) Renewable Energy Directive (RED): ISCC, RSB, REDcert, and Bonsucro. We recommend that CARB allows a fuel pathway to select the sustainability certification program that best fits their feedstock, agricultural practices, and operation. Specifically, we encourage the use of a sustainability certification programs that include the quantification of direct and indirect nitrous oxide emissions and soil carbon sequestration changes, such as the ISCC. The ISCC GHG Guidance requires the measurement of a soil carbon baseline and impacts “after at least 10 years of application” of practices. After initial soil carbon sampling, the GHG Guidance allows the use of the DAYCENT model, which has been extensively calibrated and validated in the US.²

058.2

An alternative approach that would leverage existing certification programs would be for CARB to use CAR’s SEP to meet the sustainability certification requirements. CAR has been supporting GHG reduction programs in the State for more than two decades. In 2002, the state passed SB 812 entitled “Air pollution: California Climate Action Registry.” This law mandated CAR’s predecessor, the California Climate Action Registry, to develop the first offset protocol for the sequestration of carbon in forests.³ This protocol became the U.S. Forest Projects Compliance Offset Protocol, which is currently used in the State’s Cap-and-Trade Program.

In addition, CAR is an approved Offset Project Registry (OPR) under the State’s Program. The Cap-and-Trade regulations have detailed requirements for OPRs including a conflict of interest policy, maintenance of professionally liability insurance, and personnel trained on CARB’s programs and processes.⁴ These requirements would need to be developed and implemented for organizations supporting the sustainability certification programs that CARB does not have as extensive experience with.

Finally, five projects have been successfully listed under CAR’s SEP since it was adopted in September of 2020. The protocol already includes many of the requirements proposed in §95488, such as the requirement to apply fertilizer in a manner than minimizes runoff, enhance soil fertility, and monitor land use change. For the requirements that are not quantified in the protocol, such as maintaining or enhancing biodiversity, minimizing runoff, and reducing

¹ CARB (2024) California Low Carbon Fuel Standard Workshop. <https://ww2.arb.ca.gov/sites/default/files/2024-04/LCFS%20April%20Workshop%20Slides.pdf>

² ISCC (2024) ISCC EU 205 – Greenhouse Gas Emissions. https://www.iscc-system.org/wp-content/uploads/2024/01/ISCC_EU_205_Greenhouse-Gas-Emissions_v4.1_January2024.pdf

³ California Senate. SB 812 (2002) SB 812, Sher. Air pollution: California Climate Action Registry. https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=200120020SB812

⁴ CARB (2018) Regulation for the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms. Title 17. CCR § 95986. https://ww2.arb.ca.gov/sites/default/files/2021-02/ct_reg_unofficial.pdf

unsustainable water use, CAR requires all projects to publicly track and disclose how each project meets the United Nations (UN) Sustainable Development Goals (SDGs), which include “provisions for monitoring, reporting and verification.”⁵ The use of the UN SDGs is part of the requirements of being an Eligible Emissions Unit Programme under the International Civil Aviation Organization’s (ICAO) Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).⁶ CAR is an approved Eligible Emissions Unit Programme. The UN SDGs required to be tracked and reported by Programmes cover the following best environmental management practices:

- Maintain or enhance biodiversity habitat on agricultural or forested lands
 - SDG 15 “Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss”
- Enhance soil fertility and avoid erosion or compaction
 - SDG 2 “End hunger, achieve food security and improved nutrition and promote sustainable agriculture”
- Apply fertilizers in a manner that minimizes runoff, and soil and water contamination
 - SDG 2 “End hunger, achieve food security and improved nutrition and promote sustainable agriculture”
 - SDG 6 “Ensure availability and sustainable management of water and sanitation for all”
- Reduce unsustainable water use, and minimize diffuse and localized pollution from chemical residues, fertilizers, soil erosion, or other sources of ground and surface water contamination
 - SDG 2 “End hunger, achieve food security and improved nutrition and promote sustainable agriculture”
 - SDG 6 “Ensure availability and sustainable management of water and sanitation for all”

Between the quantification requirements in the protocol and the UN SDG reporting required by CORSIA, the CAR SEP more than meets the requirements in § 95488.

058.3

Remote Sensing Should be Allowed to Monitor and Report Land Use Changes

Remote sensing has become a powerful tool for agronomic data collection and validation. It also shows great promise for soil carbon quantification. Indigo currently uses publicly available remote sensing data, together with our significant volume of ground-truthing data, to develop advanced algorithms for these purposes. Today our algorithms are able to identify field boundaries (with greater accuracy than the Common Land Units) and generate data on

⁵ ICAO (2019) CORSIA Emissions Unit Eligibility Criteria. https://www.icao.int/environmental-protection/CORSIA/Documents/ICAO_Document_09.pdf

⁶ ICAO (2024) CORSIA Eligible Emissions Units. https://www.icao.int/environmental-protection/CORSIA/Documents/CORSIA%20Eligible%20Emissions%20Units/CORSIA%20Eligible%20Emissions%20Units_March%202024.pdf

management events such as tillage, irrigation, planting, cover crops, and harvesting. The Cropland Data Layer is also a very useful tool for determining crop type and crop rotations over time. These outputs can be used to reduce the data collection burden on individual farmers, as well as for providing a validation check on land use change around the world. They can also be used to generate estimates of carbon intensity of specific fields.

058.4

Challenges Implementing the Sustainability Requirements

IndigoAg is encouraged about the inclusion of sustainability criteria in the 15-Day Changes to the LCFS regulations. We support the leveraging of existing certification programs and encourage CARB to seek additional feedback about the design and implementation of the requirements from organizations with expertise in the quantification of environmental impacts from agriculture. If implemented thoughtfully and carefully, there are opportunities not only to implement the certification requirements by using existing programs, but also in a manner to encourage agricultural producers to implement multiple practices that increase the sustainability of the fuel. Not seeking additional feedback on the design and implementation could result in “overly simplistic metrics” that “fail to conserve the key ecological values they seek to protect”⁷ as was found by a 2020 paper that evaluated 255 peer-reviewed publications on biodiversity programs and found 24 different categories that included metrics for habitat area and condition, ecological diversity, and biological population density.

IndigoAg has Valuable Experience Designing and Implementing Sustainability Certifications for Agriculture

For more than five years, Indigo has been strongly supportive of including climate-smart agricultural practices in the LCFS. We feel that these practices need to be accurately measured, monitored, and verified. Agriculture is an inherently variable system that depends on a myriad of variables including crop rotation, geography, soil type, and weather. The ability to implement a certification program that certifies the “best environmental management practices” related to agricultural practices such as enhancing biodiversity, avoiding erosion, minimizing runoff, and optimizing water use should be done carefully and leveraging programs that have demonstrated experience with agricultural systems, such as the ISCC and CAR programs.

Since 2013, we have pursued innovative ways for science and technology to drive sustainability and profitability in agriculture. Our core mission is “Harnessing nature to help farmers sustainably feed the planet.” Our four key principles are:

- Helping farmers enhance their profitability and soil health
- Improving the quantity, quality, and traceability of the food available to consumers
- Protecting the environment by reducing and removing harmful greenhouse gases from the atmosphere, while incentivizing sustainable land stewardship practices
- Creating long-term value for our shareholders

⁷ Marshall, E., Wintle, B.A., Southwell, D., Kuhala, H. (2020) What are we measuring? A review of metrics used to describe biodiversity in offsets exchanges. *Biological Conservation*. (241) 108250 <https://doi.org/10.1016/j.biocon.2019.108250>

We are prepared to work with staff and stakeholders to identify and leverage the tools, processes, and procedures to determine the “best environmental management practices.”

058.5

Reducing Land-Based Emissions is Key to Meeting California Targets

In 2018, the Intergovernmental Panel on Climate Change (IPCC) published a Special Report on the impacts of a 1.5°C global warming above pre-industrial levels. This report found that achieving global carbon neutrality by mid-century is critical to avoiding the most catastrophic impacts of climate change.⁸ Moreover, the IPCC Sixth Assessment identified land-based emissions mitigation as “the only [sector] in which large-scale carbon dioxide removal may currently and short term be possible” and that it is “crucial to limit climate change and its impacts.”⁹ The latest science finds that it is increasingly likely that the 1.5°C target will be exceeded¹⁰ and that large-scale GHG reductions are critical to meeting any state or global target, including the goals of the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC).¹¹

In 2016, the California legislature adopted Senate Bill 32, codifying a statewide GHG reduction target of at least 40 percent below 1990 levels by 2030. In 2022, the California legislature adopted Assembly Bill 1279, requires the state to achieve net zero GHG emissions as soon as possible, but no later than 2045.¹²

The agriculture sector will need to play a significant role in helping California meet the goal of reducing statewide GHG emissions by 40 percent by 2030 and net zero no later than 2045. Not only can the agriculture sector help the State meet its GHG goals, but it can also do so while implementing “best environmental management practices.” However, those practices need to be clearly defined and quantified. Practices including optimizing fertilizer application, reducing tillage, using enhanced-efficiency fertilizers, double-cropping, and planting cover crops have the

⁸ IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 3-24, <https://doi.org/10.1017/9781009157940.001>.

⁹ Nabuurs, G.-J., R. Mrabet, A. Abu Hatab, M. Bustamante, H. Clark, P. Havlík, J. House, C. Mbow, K.N. Ninan, A. Popp, S. Roe, B. Sohngen, S. Towprayoon, 2022: Agriculture, Forestry and Other Land Uses (AFOLU). In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. <https://doi.org/10.1017/9781009157926.009>.

¹⁰ Mathews, D.H., Wynes, S. (2022) Current global efforts are insufficient to limit warming to 1.5°C. *Science* 376 (6600) 1404-1409. <https://www.science.org/doi/10.1126/science.abo3378>

¹¹ Mace, M.J., Fyson, C.L., Schaeffer, M., Hare, W.L. (2021) Large-Scale Carbon Dioxide Removal to Meet the 1.5°C Limit: Key Governance Gaps, Challenges and Priority Responses. *Global Policy* 12 (51) 67-81. <https://doi.org/10.1111/1758-5899.12921>

¹² CARB (2022) 2022 Scoping Plan for Achieving Carbon Neutrality. <https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>

potential to reduce the CI of fuels by more than 40 g CO₂e/MJ^{13,14} or up to 74 percent.¹⁵ And these practices are not limited to their GHG benefits; they provide “additional ecosystem service benefits, including watershed protection, increased biodiversity, and improved soil health and fertility,”¹⁶ which will help the State meet the proposed requirements in §95488.

For the foreseeable future, liquid fuels will be required to power a significant portion of transportation in the state. To create the supply for the fuels with the “best environmental management practices,” CARB needs to account for and incentivize field-based practices. We are prepared to help the State meet this challenge.

CARB has been an international leader in developing and implementing programs to reduce GHG emissions across the California economy. The inclusion of a “continuous third-party sustainability certification” for biomass used in fuel pathways will continue the State’s environmental leadership. We look forward to continued collaboration with CARB to design and implement policies and strategies that further reduce emissions from the transportation sector.

Sincerely,



Christopher M. Malone
Vice President, Market Development
Indigo Ag

¹³ Liu, X. et. al. (2020) Shifting agricultural practices to produce sustainable, low carbon intensity feedstocks for biofuel production. *Environ. Res. Lett.* <https://doi.org/10.1088/1748-9326/ab794e>

¹⁴ Yoo, E., Lee, U., Wang, M. (2022) Life-Cycle Greenhouse Gas Emissions of Sustainable Aviation Fuel through a Net-Zero Carbon Biofuel Plant Design. *ACS Sustainable Chem. & Eng.* 10 (27), 8725-8732. <https://doi.org/10.1021/acssuschemeng.2c00977>

¹⁵ Scully, M.J., Norris, G.A., Alarcon Falconi, T.M., MacIntosh, D.L. (2021) Carbon intensity of corn ethanol in the United States: state of the science. *Environ. Res. Lett.* 16, 043001. <https://doi.org/10.1088/1748-9326/abde08>

¹⁶ Liu, *op. cit.*

Comment Log Display

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Comment 59 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Lisa
Last Name	Hanke
Email Address	lhanke@ecoengineers.us
Affiliation	EcoEngineers
Subject	Proposed Low Carbon Fuel Standard Amendments issued August 12, 2024
Comment	Please see attached.
Attachment	www.arb.ca.gov/lists/com-attach/7384-lcfs2024-VmdWZVZ6BTJVMgR9.pdf
Original File Name	15-Day LCFS Amendments Comments EcoEngineers.pdf
Date and Time Comment Was Submitted	2024-08-27 09:50:37

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

August 27, 2024

Chairperson Liane Randolph
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Proposed Low Carbon Fuel Standard Amendments issued August 12, 2024

Dear Chairperson Randolph,

EcoEngineers appreciates the opportunity to submit comments regarding the Proposed Low Carbon Fuel Standard Amendments issued on August 12, 2024.

EcoEngineers is one of the nation's leading auditing, verification, and consulting firms for renewable fuel and clean energy technologies. We are accredited under the California Low Carbon Fuel Standard (LCFS), USEPA Renewable Fuel Standard (RFS), the Washington and Oregon Clean Fuel Standards, and the Canadian Government Clean Fuel Standard. We are also accredited by the American National Standards Institute (ANSI) National Accreditation Board (ANAB), in accordance with the International Organization for Standardization (ISO) standards ISO/IEC 17029:2019. EcoEngineers has performed over one thousand registrations and audits under the LCFS program and is proud to be a strong partner and advocate for the program. We appreciate the opportunity to share some of our thoughts and comments on the proposed amendments.

EcoEngineers strongly supports the advancement of policies, regulations, and programs that address the global reduction of greenhouse gas (GHG) emissions across all sectors. The LCFS program continues to be a vital tool that can assist California and the U.S. meet their climate reduction goals. This program serves as an example to jurisdictions around the world looking to decarbonize their transportation fuel sector and, as such, should continue to strive towards ambitious targets while closely considering market dynamics. EcoEngineers applauds the steadfast ambition that CARB has demonstrated to reduce GHG emissions in the transportation sector. This leadership has made the LCFS and related climate policies a model for other states and countries pursuing decarbonization strategies.

EcoEngineers presents the following comments on the Proposed Amendments.

1. Program Benchmarks

059.1 As stated in Eco's comments on the Proposed Amendments issued on December 19, 2023, including a step-down mechanism is a crucial element of the proposed rules and, if implemented correctly, could help stabilize the credit market. EcoEngineers supports the increase in the step-down mechanism from the originally proposed 5% to 9% in 2025. Our modeling has shown that this will be valuable for program performance in the short and medium term, and we thank CARB for re-examining this key element for program success.

2. Modification to Treatment of Fossil Jet Fuel

059.2 The LCFS compliance mechanism has proven that the proper policy structure can reduce emissions. As of September 2023, over 25 billion gallons of petroleum fuel have been displaced from transportation since the program began in 2010. This happened because the LCFS set a strict carbon intensity reduction requirement for on-road fuels. Fuels in use today, such as renewable diesel and renewable natural gas, did not exist in significant volumes when the program was launched. However, the right combination of policy and credit pricing created a marketplace for those fuels. Regulated entities have consistently over-complied with the standard, generating a bank of credits, and at the end of Q1 2024, the bank stood at nearly 26.07 million credits. The lessons learned from decarbonizing on-road transportation should now be applied to the aviation sector.

EcoEngineers recommends that CARB stays firm in setting a carbon intensity reduction goal for the aviation fuel sector. As such, EcoEngineers strongly recommends the intrastate flight obligation be added to the list of transportation fuels included in the LCFS as proposed on December 19, 2023. This inclusion would result in a positive ripple effect across the industry while providing positive market signals to both obligated parties and low-carbon aviation fuel producers. The inclusion of fossil jet fuel would be consistent with European initiatives as well as support the International Civil Aviation Organization's (ICAO) Carbon Offsetting and Reduction Scheme for Aviation (CORSIA). EcoEngineers continues to support the inclusion of aviation fuel under the obligation. We encourage CARB to reevaluate its decision continuously to ensure the LCFS remains successful at meeting its overarching objectives and those of the State of California.

3. Hydrogen

059.3 EcoEngineers applauds CARB's efforts to support the development of a low-carbon intensity hydrogen economy. However, the LCFS regulation has always been science-based and technology-neutral, and the removal of LCFS crediting eligibility for hydrogen from fossil natural gas after January 1, 2031, defies these long-standing CARB principles within the LCFS. This proposed amendment discounts the potential for carbon capture and sequestration and assumes the carbon intensity of the natural gas grid will remain the same until 2030. The rule effectively eliminates natural gas production pathways with carbon capture, regardless of carbon intensity, including hydrogen produced via steam methane reforming (SMR), autothermal reforming (ATR), or methane pyrolysis, from supporting California's hydrogen economy. Doing so narrows the field of low-carbon producers (and supply), reduces competition among low-carbon hydrogen suppliers, and enables green

hydrogen producers to charge a premium for their product absent competition. EcoEngineers strongly recommends that CARB reconsider this amendment.

059.4 Regarding heavy-duty hydrogen refueling infrastructure (HD-HRI), the proposed amendments include restrictive location requirements per section (a)(1)(B)(1):

"The proposed HD-HRI station must be located in California, and if a shared HD-HRI station be: Located within five miles of any ready or pending Federal Highway Administration Alternative Fuel Corridor."

Linking HD-HRI funding to a designated clean corridor ignores the fact that some high-density freight corridors, particularly along the California-Mexico border, would not qualify. EcoEngineers recommends that CARB reconsider the restrictive location requirements so that the industry can grow across the state.

059.3 cont Finally, changes to substantially narrow process energy to renewable co-located electrolytic hydrogen only devalue and undermine progress on energy policy. Current energy policy allows grid-connected hydrogen to provide "good load," thus reducing curtailment and distribution needs by being located closer to demand. Narrowing this policy will be contrary to program goals.

4. RNG Compliance Requirements

059.5 We thank CARB for including RNG projects that have broken ground by January 1, 2030, to be eligible for the two consecutive 10-year renewal periods. Additionally, an essential element to achieving sustainability is ensuring that the industry can meet effective requirements economically and without undue administrative burden. EcoEngineers is concerned about the proposed regulations regarding RNG directionality requirements.

059.6 Book-and-claim is an essential element of RNG project implementation and success. The requirement to prove directionality for RNG will add complexity to project implementation and cause inconsistencies in LCFS policy. For example, phasing out book-and-claim for RNG while promoting book-and-claim for hydrogen is an inconsistency that will weaken the confidence producers and investors need in policy stability to make project financing decisions. Requiring proof of directionality will also increase the administrative burden while providing no additional benefits for the LCFS program's success. EcoEngineers encourages CARB to revise this amendment.

5. Land Use Change, Biodiversity, and Other Sustainability Requirements for Purposely Grown Feedstock

EcoEngineers strongly supports the advancement of measures to ensure renewable fuel is produced in a sustainable and ecologically sound manner. Land use change and biodiversity loss are important issues to consider while reviewing the environmental impact of low-carbon fuel policy. However, we have concerns regarding CARB's proposed approach to regulating these issues: the 20% limit for soy and canola renewable diesel/biodiesel-based fuels, the proposed sustainability requirements for biomass, and the approach to determining land use change risks.

059.7

EcoEngineers is concerned with the ability of pathway holders to meet the proposed sustainability requirements without additional details on what is needed to demonstrate compliance. Though sustainability requirements were further clarified and given a phase-in period from the 45-day amendments, there are outstanding questions on quantification and demonstrating how producers can satisfy these requirements. There could be an immense administrative and economic burden due to certification requirements that many producers may be unable to satisfy. As an accredited LCFS auditor, we have first-hand experience that clarity in compliance requirements is of utmost importance as we attempt to retrieve and review all necessary documentation during a verification.

To address the potential negative impact of land use change from incentives for purposely grown feedstock, CARB indicates Global Trade Analysis Project - Biofuels Model and Database (GTAP-BIO) and Agro-Ecological Zone Emission Factor Model (AEZ-EF) models should be used for estimating Indirect/Induced Land Use Change (ILUC). EcoEngineers requests clarification on the definition of regions with "higher LUC risk." Since GTAP geographical levels are based on 18 agro-ecological zones (AEZs), EcoEngineers requests clarification on which AEZs and counties are considered higher LUC risk. This will ensure consistency across ILUC estimates.

059.8

Finally, that biomass-based feedstocks are the most feasible solution to decarbonizing transportation (on-road, aerial, and marine) in the short and medium term, EcoEngineers objects to the 20% cap on soy and canola renewable diesel/biodiesel-based fuels.

Instead of setting a cap on two of the most successful feedstocks and creating additional administrative burdens for producers, EcoEngineers recommends CARB convene a committee dedicated to addressing how the energy in purposely grown feedstock can be harnessed ecologically. Emissions from land-use change, impact on food and feed markets, and a commitment to biodiversity and sustainability should be studied to understand how to cultivate low-carbon feedstock for fuel. This committee can provide recommendations for how these necessary fuels can be produced in the most sustainable, ecologically sound manner.

Thank you once again for the opportunity to comment on the proposed amendments. Please do not hesitate to contact me for more details. We look forward to continuing to work with CARB on implementing a successful LCFS program.

Sincerely,

Lisa Hanke

Director, Regulatory Engagement

EcoEngineers

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Comment 60 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Kent
Last Name	Leacock
Email Address	kent.leacock@mainspringenergy.com
Affiliation	
Subject	Mainspring Energy Comments on Proposed LCFS Amendments
Comment	See attached letter.
Attachment	www.arb.ca.gov/lists/com-attach/7385-lcfs2024-UzBdOgFyUWAAWQNv.pdf
Original File Name	CARB LCFS Letter_Mainspring_15 day amends_FINAL.pdf
Date and Time Comment Was Submitted	2024-08-27 10:02:08

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

Mainspring Energy
3601 Haven Avenue
Menlo Park, CA 94025
mainspringenergy.com



August 27, 2024

Clerks' Office
California Air Resources Board
1001 I Street
Sacramento, California 95814

Re: Proposed Amendments to the Low Carbon Fuel Standard (15-Day Changes)

Mainspring Energy, Inc. ("Mainspring") appreciates the opportunity to submit comments to the California Air Resources Board ("CARB") on the Proposed Amendments to the Low Carbon Fuel Standard (15-Day changes) released August 12, 2024. Specifically, we appreciate the development of the amendments, including the 9% proposed stepdown, and support adoption of the proposal.

Driven by its vision of the affordable, reliable, net-zero carbon grid of the future, Mainspring has developed and commercialized a new power generation technology —the linear generator— delivering local power that is dispatchable and fuel-flexible. Mainspring's linear generator offers a unique non-combustion capacity and energy solution that simultaneously addresses the critical need of reducing greenhouse gas and criteria pollutant emissions, while also enhancing grid reliability and resilience. Linear generators use a low-temperature, uniform non-combustion reaction that maintains peak temperatures below the levels at which NO_x forms (1500°C), resulting in near-zero NO_x emissions at all loads – including during start-up. This contrasts with the combustion of a fuel with a non-homogenous flame-front, a process that results in higher temperatures and high NO_x emissions.

Modular and scalable, Mainspring's linear generators can be deployed near load, either customer- or grid-sited, with the ability to immediately generate electricity from a range of renewable fuels – including both 100% hydrogen and ammonia (a hydrogen carrier). Mainspring's inverter-based technology offers a full range of valuable grid benefits including fast (and unlimited daily) starts/stops, a wide dispatch range from minimum to maximum load, quick ramping, and in many cases on-site fuel storage which allows linear generators to firm renewables for short or extended

periods of time, thereby facilitating the continued rapid adoption of a reliable renewable energy grid.

The LCFS has been a highly successful program as part of a broad package of regulations and incentives to address climate change. Currently the LCFS is overperforming as the carbon intensities are too easy for the market to meet, leading to low credit prices that are undermining investment in electric cars, trucks, buses, and charging infrastructure, as well as infrastructure for other low-carbon fuels. For the LCFS program to continue to be successful, it is essential that the stringency be increased expeditiously and be implemented as soon as possible to ensure the LCFS continues to contribute substantially to the state's clean air, climate change, and zero-emission transportation requirements and goals. Within the proposed amendments, we strongly support CARB's proposal for a 9% step-down in 2025, which will help relieve the surplus in credits and help support the market and credit pricing so that it can efficiently incentivize low carbon fuels and reduce emissions.

As a California based manufacturer, Mainspring appreciates the development of the 15-Day Proposed Amendments to the LCFS. We strongly support the LCFS program, the development of the amendments, and encourage staff to move forward with the proposal at the November Board Hearing and encourage approval by the Board. This provides industry and stakeholders with the certainty needed for LCFS to be successful to planners, implementers, and investors.

Sincerely,

Kent Leacock
Senior Director, Public Affairs
Mainspring Energy

Comment Log Display

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Comment 61 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Tim
Last Name	Hellem
Email Address	tim.hellem@bbraunusa.com
Affiliation	
Subject	Proposed LCFS Changes
Comment	Please see attached. Thanks
Attachment	www.arb.ca.gov/lists/com-attach/7386-lcfs2024-VjoHYgFmBCQFXFVn.docx
Original File Name	LCFS 2024 DRAFT Amendment Comments 8-22-24.docx
Date and Time Comment Was Submitted	2024-08-27 10:15:30

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

August 22, 2024

Subject: Comments on the Proposed Low Carbon Fuel Standard Amendments Related to Changes for Electric Forklift Operators

My company is a small owner of electric forklifts that currently generates about 1,000 LCFS Credits a year. The following changes will significantly impact my and other small electric forklift credit generators' ability to remain in the LCFS program and may force us to opt-out based on the following proposed changes:

- 061.1 • Requiring 3rd party verification of all electricity-based credits, which would increase compliance cost;
- 061.2 • Requiring direct metering of electricity supplied to forklifts by the start of 2026 which will significantly increase operating cost and potentially decreasing the number of credits generated;
- 061.3 • Decreasing the Energy Economy Ratio for electric forklifts from 3.8 to 2.4 for most of our electric forklift fleet, significantly decreasing the number of credits generated from most grid electric-powered forklifts by a factor of 2 or more;
- 061.4 • Decreasing the carbon intensity benchmarks for diesel, which would further decrease future LCFS credits generated from electric forklifts; and
- 061.5 • Not allowing any LCFS credit proceeds to offset the cost of verification and meter installation.

All these factors could decrease annual LCFS generated to the level that most of our proceeds would be used to pay for verification services. Many entities would have annual metering errors impacting more LCFS credits than an entity like ours could generate over a five-year period. We therefore suggest the following:

- 061.1 cont • Exempt verification for all entities that generate less than 1,500 LCFS credits a year;
- Require a less-intense verification requiring a simple statement without a report for all entities that generate between 3,000 LCFS credits to 3,000 LCFS deficits a year;
- 061.5 cont • Modify the requirements of the LCFS credit proceeds for credits from electricity-fueled equipment to allow costs for LCFS program operation to be excluded from proceeds required to promote electric vehicle use; and
- Ensure the requirements for direct metering of electricity used by forklifts is not cost-prohibitive.

If some of these proposed changes are not made to the regulation, it will drive my company as well as many other small owners of electric forklifts and associated fuel supply equipment to opt-out of the LCFS program, especially since it places an unnecessary regulatory burden on the small operators with respect to the impact on the total deficits and credits generated under the LCFS program.

Sincerely,

Tim Hellem

Head of EHS&S

Comment Log Display

Here is the comment you selected to display.

Comment 62 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Jordan
Last Name	Garfinkle
Email Address	jordan.garfinkle@bloomenergy.com
Affiliation	Bloom Energy
Subject	Comments of Bloom Energy - Proposed 15-Day Changes, Low Carbon Fuel Standard
Comment	
Attachment	www.arb.ca.gov/lists/com-attach/7387-lcfs2024-U2JRYId7UWYHYFcu.pdf
Original File Name	15-day Comments of Bloom Energy _8.20.24_combined.pdf
Date and Time Comment Was Submitted	2024-08-27 10:25:53

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

August 27, 2024

Chair Liane Randolph and Members of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Comments of Bloom Energy - Proposed 15-Day Changes to the Low Carbon Fuel Standard

Dear Chair Randolph,

Bloom Energy appreciates the opportunity to submit comments in response to the proposed 15-day changes to the proposed amendments to the Low Carbon Fuel Standard (LCFS). We thank the Air Resources Board for steady and thoughtful management of the program while balancing a broad range of interests and stakeholders. Bloom Energy previously submitted comments on the December 19, 2023 proposed amendments, filed on February 20, 2024.

Bloom Energy is a manufacturer of solid oxide fuel cell (SOFC) technology that utilizes an electro-chemical process to power non-combustion microgrids as well as high efficiency electrolyzer systems designed to convert renewable electricity into renewable “green hydrogen.” Bloom Energy’s solid oxide fuel cells and electrolyzers are designed in a modular fault-tolerant format that provides mission critical reliability with no downtime for maintenance. The company has installed over 1000 of its non-combustion solid oxide fuel cell systems for customers in thirteen U.S. states as well as in Japan, South Korea, India, Italy and Taiwan. Bloom Energy’s emission reducing systems have proven resilient through outages caused by hurricanes, winter storms, earthquakes, forest fires, and other extreme weather and natural disasters.

Bloom Energy’s modular design, high efficiency, and ability to utilize biogas without the significant upgrading required for pipeline injection, allow for smaller and remotely located biogas projects to make the most efficient use of this valuable form of renewable energy, producing more electricity for equivalent volumes of biogas than other available technologies. Its electrochemical process produces far fewer criteria pollutants than competing technologies that rely on combustion. Our SOFCs also require virtually no water during operation, mitigating water supply concerns in many areas across the country.

062.1

We applaud Staff’s proposal of a more aggressive Carbon Intensity (“CI”) step-down of 9% from the previous 5% in the 15-day changes. This is a much-needed market correction in order to align targets with available supply, which has been delivered to the LCFS program in excess in recent years, creating a credit bank. While this alone will not fully address the oversupply of credits in the cumulative credit bank, this single adjustment will translate into millions of additional tons of GHG emission reductions that would’ve otherwise gone unabated.

Based on our experience developing projects that consume or generate renewable fuels, Bloom submitted detailed comments on the December 19th proposal that offered suggestions to further enhance the environmental benefits of the program while fostering a robust market. Those comments are attached to this letter as Appendix A. In addition, below we provide brief comments relevant to the 15-day rulemaking.



Bloom Energy Corporation
4353 North First Street, San Jose, CA 95134
408 543 1500
www.bloomenergy.com

062.2 **Avoided Methane Crediting**

Bloom Energy reiterates that we do not support a phaseout of avoided methane emission credits for biogas to electricity projects. These projects promote beneficial use of biogas while meeting numerous state objectives, such as providing renewable energy generation to support air quality goals via Zero Emission Vehicle (ZEV) deployments.

062.3 **Book-and-Claim**

Currently, book-and-claim under LCFS does not provide a level playing field across pathways. Biogas-to-electricity projects under the LCFS must physically wheel the power into California, while RNG projects may be located anywhere in North America and utilize book-and-claim accounting to demonstrate use for LCFS compliance. We believe that pathways that rely on the same feedstock should adhere to the same book-and-claim requirements. A major step in this direction would be to allow such projects to utilize book-and-claim accounting anywhere in the Western Electricity Coordinating Council (WECC), as is already the case in Oregon under their Clean Fuels Program. Additionally, we recommend allowing biogas-to-electricity projects to qualify when electricity generation and biogas production are not co-located.

Consideration of Total Environmental Impact

062.4 Furthermore, Bloom Energy encourages CARB to allow LCFS to value environmental results beyond carbon reductions. Environmental benefits such as reduced criteria air pollutant emissions in particular warrant consideration as part of the calculation methodology. An increasing body of research has found the economic and health benefits associated with reducing NOx and PM emissions often exceed the economic and health benefits of reducing GHG emissions on a per ton basis. Currently, while biogas combustion narrowly serves LCFS program objectives, the associated air pollution runs counter to CARB's broader new and long-standing air quality goals. Alternatively, non-combustion biogas-to-electricity projects meet LCFS objectives while also reducing local air pollution and furthering air quality objectives.

Bloom Energy appreciates the opportunity to provide comment on this important proceeding. Please do not hesitate to contact the undersigned if we can provide additional information. We look forward to further engagement as stakeholders collaborate to strengthen the LCFS program.

Sincerely,

/s/Jordan Garfinkle

Jordan Garfinkle
Director, Government Affairs & Policy
Bloom Energy Corporation

jordan.garfinkle@bloomenergy.com

www.bloomenergy.com

February 20, 2024

Chair Liane Randolph and Members of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Comments of Bloom Energy - Proposed Amendments to the Low Carbon Fuel Standard

Dear Chair Randolph,

Bloom Energy appreciates the opportunity to submit comments in response to the December 19, 2023 Staff Report regarding proposed amendments to the Low Carbon Fuel Standard (LCFS). Acknowledging the complexity and far-reaching nature of the program, we thank the Air Resources Board for steady management over the years while balancing a broad range of interests and stakeholders.

Bloom Energy is a manufacturer of solid oxide fuel cell (SOFC) technology that utilizes an electro-chemical process to power non-combustion microgrids as well as high efficiency electrolyzer systems designed to convert renewable electricity into renewable “green hydrogen.” Bloom Energy’s solid oxide fuel cells and electrolyzers are designed in a modular fault-tolerant format that provides mission critical reliability with no downtime for maintenance. The company has installed over 1000 of its non-combustion solid oxide fuel cell systems for customers in thirteen U.S. states as well as in Japan, South Korea, India and Italy. Bloom Energy’s emission reducing systems have proven resilient through outages caused by hurricanes, winter storms, earthquakes, forest fires, and other extreme weather and natural disasters.

Bloom Energy’s modular design, high efficiency, and ability to utilize biogas without the significant upgrading required for pipeline injection, allows for smaller and remotely located biogas projects to make the most efficient use of this valuable form of renewable energy, producing more electricity for equivalent volumes of biogas than other available technologies. Its electrochemical process produces far fewer criteria pollutants than competing technologies that rely on combustion. Our SOFCs also require virtually no water during operation, mitigating water supply concerns in many areas across the country.

Based on our experience developing projects that consume or generate renewable fuels, we offer the following comments on a few key aspects of the proposal and Staff Report.

Avoided Methane Crediting

Bloom Energy does not support a phaseout of avoided emission credits for biogas to electricity projects, and commends CARB for recognizing the value of these projects by proposing to retain this aspect of the program.

Converting biogas into electricity through scalable, efficient, non-combustion technologies provides outsize environmental benefits by eliminating methane emissions and generating reliable clean, firm, renewable electricity. As a short-lived climate pollutant and potent greenhouse gas, methane is a core contributor to climate change and often a difficult pollutant to mitigate. Phasing out avoided methane credits would have the unintended consequence of leaving small or remote methane sources



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062.2 cont

undeveloped, creating stranded resources that emit methane with no mitigation options. Because small or remote farms or digesters are not biomethane project candidates due to their size and distance from pipelines for injection, in many cases biogas-to-electricity is the only viable option for emissions reductions. In addition, non-combustion biogas-to-electricity projects that supply EV chargers directly serve CARB's goal of improving air quality by reducing vehicle tailpipe emissions through increasing market penetration of Zero Emission Vehicles (ZEVs). As noted in the Staff Report, "[r]educing criteria pollutants and toxic emissions from fuel combustion in line with California's air quality goals requires deploying ZEVs and ensuring the availability of fueling infrastructure to support ZEV deployment."¹ Supporting extremely low carbon intensity (CI) renewable energy to power ZEVs serves both climate and local air quality objectives.

062.3 cont As highly efficient, non-combustion and modular electricity generation systems, fuel cells meet the needs of these small/remote sources. Developing biogas to electricity projects in these locations would deliver critical methane reductions and valuable clean, firm electricity that can be delivered to meet transportation energy demand around the clock. Avoided methane credits are critical to leveraging these resources and developing such projects. And the carbon benefits are not just theoretical; as of this writing, Bloom has three operational non-combustion solid oxide fuel cell biogas-to-electricity projects operational at dairy farms in California. The first project, located in Kerman, CA, received a CARB-certified CI score of -790, the lowest CI score in the history of the LCFS program.²

Book-and-Claim

Currently, biogas-to-electricity projects under the LCFS must physically wheel the power into California, while RNG projects may be located anywhere in North America and utilize book-and-claim accounting to demonstrate use for LCFS compliance. We acknowledge CARB's proposal to limit book-and-claim accounting for RNG starting in 2040 but that is a long time away. We believe that the most efficient, cost-effective way to ensure that the LCFS program enables the most beneficial projects is to maintain a level playing field for pathways that rely on the same feedstock. A major step towards aligning requirements for projects with the same feedstock, and unlocking the untapped emissions reductions of biogas-to-electricity, would be to allow such projects to utilize book-and-claim accounting anywhere in the Western Electricity Coordinating Council (WECC), as is already the case in Oregon under their Clean Fuels Program. This, coupled with the proposed sunset for national book and claim available for RNG projects, would eventually result in regulatory consistency for projects with the same feedstock.

Additionally, Bloom recommends changes that allow biogas-to-electricity projects to qualify when electricity generation and biogas production are not co-located. This is in-line with the California RPS's treatment of "directed biogas" and allows greater project penetration by supporting optimal siting of both the RNG source and the electricity generator rather than requiring co-location. Specifically, where electricity generation is used for on-site EV charging, the project should be permitted to utilize directed biomethane as a power generation fuel provided that the biogas source and the electricity generator are located within the WECC. This additional flexibility would allow many more biogas to electricity projects to participate and would provide for greater deployment of biomethane-fueled microgrids at EV charging stations, which, as noted above, would further CARB's efforts to promote vehicles with zero tailpipe emissions. Of course, this would also bolster California's efforts to address the significant grid capacity

¹ California Air Resources Board. *Public Hearing to Consider the Proposed Amendments to the Low Carbon Fuel Standard, Staff Report: Initial Statement of Reasons*. December 19, 2023.

² Application No. B0490, available at:

https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/comments/tier2/b0490_cover.pdf

issues associated with large scale deployment of charging infrastructure across the State by enabling renewable generation to be deployed where it is most needed, rather than where the fuel is generated.

Consideration of Total Environmental Impact

Furthermore, Bloom Energy encourages CARB to reward market participants in the LCFS Program for achieving environmental results beyond carbon reductions. Environmental benefits such as reduced criteria air pollutant emissions in particular warrant consideration as part of the calculation methodology. An increasing body of research has found the economic and health benefits associated with reducing NOx and PM emissions often exceed the economic and health benefits of reducing GHG emissions on a per ton basis.³ Currently, while biogas combustion narrowly serves LCFS program objectives, the associated air pollution runs counter to CARB's broader new and long-standing air quality goals. Alternatively, non-combustion biogas-to-electricity projects meet LCFS objectives while also reducing local air pollution and furthering air quality objectives.

Over the past several years, research has shown that local combustion-related air pollutants are far more harmful to human health and the environment than previously understood. Some key findings that demonstrate the need for clean energy programs to value these impacts include:

- Combustion related air pollution may be as harmful to human lungs as smoking cigarettes;⁴
- Combustion related air pollution increases preterm birth risk;⁵
- Particulate matter (PM) is the largest environmental health risk factor in the nation, and the resulting health impacts are borne disproportionately by disadvantaged communities.⁶

This information is not new to CARB. In fact, the benefits of reduced criteria pollutant emissions are well documented in the Staff Report. To the extent that the proposed amendments do already reduce these emissions, the report states, "[t]he total statewide health benefits derived from criteria emissions reductions is estimated to be approximately \$5 billion, with \$4.9 billion resulting from reduced premature cardiopulmonary mortality and \$85 million resulting the reductions in other adverse health impacts."⁷

The following table shows the different environmental impacts of non-combustion via a solid oxide fuel cell versus combustion uses of biogas.

³ Institute for Policy Integrity, New York University School of Law, "How States Can Value Pollution Reductions from Distributed Energy Resources" July 2018 available at <https://policyintegrity.org/publications/detail/how-states-can-value-pollution-reductions-from-distributed-energy-resources>

⁴ Wang M, Aaron CP, Madrigano J, et al. "Association Between Long-term Exposure to Ambient Air Pollution and Change in Quantitatively Assessed Emphysema and Lung Function." *JAMA*. 2019;322(6):546–556. doi:10.1001/jama.2019.10255 Aubrey, Allison. Air Pollution May Be As Harmful To Your Lungs As Smoking Cigarettes, Study Finds. NPR. 13 August 2019. <https://www.npr.org/sections/health-shots/2019/08/13/750581235/air-pollution-may-be-as-harmful-to-your-lungs-as-smoking-cigarettes-study-finds>

⁵ Mendola, P. et al. "Air pollution and preterm birth: Do air pollution changes over time influence risk in consecutive pregnancies among low-risk women?" *International Journal of Environmental Research and Public Health*, 2019. <https://pubmed.ncbi.nlm.nih.gov/31547235/>

⁶ Tessum et al. "Inequity in consumption of goods and services adds to racial-ethnic disparities in air pollution exposure." *PNAS* March 26, 2019 116 (13) 6001-6006; first published March 11, 2019 <https://doi.org/10.1073/pnas.1818859116>

⁷ California Air Resources Board. *Public Hearing to Consider the Proposed Amendments to the Low Carbon Fuel Standard, Staff Report: Initial Statement of Reasons*. December 19, 2023.

Table 1: Comparison of NO_x and SO₂ Emissions

g/MMBtu			
	Non-combustion SOFC ¹	Engine ²	% reduction
NO _x	0.402	385.55	99.9%
SO ₂	0.00039	0.27	99.8%

1. From source testing
2. AP-42 Chapter 3 Section 2 for 2SLB engines

58,000 MMBtu/year of biogas equates to roughly a 1 MW Bloom solid oxide fuel cell system, or 7,900 MWh/year. Using the emissions factors above for an illustrative biogas-to-electricity project and utilizing the corresponding emissions for EPA's Co-Benefits Risk Assessment Health Impacts Screening and Mapping Tool (COBRA),⁸ results in \$1.3 to \$3M of air quality driven health benefits for non-combustion fuel cell over combustion-based generation or flaring. The illustrative 1 MW Bloom project in the above example emits roughly 3,000 MT CO₂e/yr. At the midpoint of the COBRA health benefits calculation (\$2.4M), the additional air quality-driven health benefits of the project equate to roughly \$800/MT. While the LCFS credit market generally values carbon abatement at anywhere from ~\$50 to ~\$200/MT, it does not value air quality benefits at all.

In order to value these significant benefits, Bloom strongly encourages CARB to include a mechanism that appropriately considers criteria air pollutant emission reductions when evaluating electrical generation from biogas and natural gas, across all pathways. One possibility is to include an LCFS credit multiplier such that, when utilizing the same fuel, a project that does not exacerbate air quality issues generates more credits than one that does. Under this model, we recommend setting an emissions threshold of <0.1g/MWh NO_x and <0.01g/MWh SO₂, below which projects receive a credit multiplier of 1.5.⁹ At current and expected LCFS credit prices, this results in far less additional value than the \$800/MT shown above and would be a modest but direct acknowledgement of the societal benefits of improved air quality.

062.5

Tier 1 Calculator for Biogas-to-Electricity

For certain fuel pathways the LCFS currently provides Tier 1 CI calculators that help to streamline the application review and validation process. As part of the proposed amendments, Staff proposes to update the calculators to increase usability and further reduce administrative burden on applicants and agency staff. Additionally, the proposed amendments would create a new Tier 1 CI calculator for hydrogen. While the Staff Report justifies the existing Tier I option due to extensive experience reviewing certain pathways, no such claim can be made of hydrogen, which is relatively new and still emerging. This acknowledges the benefits of streamlining without risking the integrity of an existing and robust process.

Bloom supports both of these proposals and the Tier 1 calculators in general. Additionally, we respectfully request that a Tier 1 calculator or other streamlining option be made available for biogas-to-electricity projects. Given the fact that this option is already available for RNG, this would help to provide equal treatment for pathways dependent on the same feedstock.

⁸ <https://www.epa.gov/cobra>

⁹ Note that the emission rates shown in Table 1 are represented in terms of grams per MMBtu.

062.6

GREET Model Treatment of CO₂ Storage

With the emergence of various forms of above ground permanent CO₂ storage, such as manufacturing products (including concrete, plastics, etc.) from captured CO₂, we encourage CARB to broaden the definition of permanent CO₂ storage beyond the limited “underground” storage definition currently used. This will incentivize more projects to capture and sequester CO₂, thus achieving even lower carbon intensities and furthering CARB’s goals of aggressive decarbonization of the transportation sector.

062.7

A Broader Clean Fuels Standard Will Support Industrial and Commercial Sector Decarbonization

Notwithstanding all of the above, Bloom Energy also wishes to point out that a broader Clean Fuels Standard is necessary to support industrial and commercial sector decarbonization. These sectors have proven hard-to-decarbonize and remain a significant source of GHG emissions that must be addressed to achieve the State’s carbon neutrality goals. As the adopted 2022 Scoping Plan recognizes, changes in fuel use are also critical to reducing GHG emissions from these sectors and biomethane use in these sectors is critical to meeting both 2030 and 2045 Scoping Plan goals.

CARB could and should expand the LCFS program outside of transportation or use the LCFS program as an example to develop and adopt a broader Clean Fuels Standard that would complement the LCFS. Such a standard could impose a decreasing, rate-based target on regulated entities, allowing these sectors to achieve emission reductions in a technology neutral manner by choosing between electrification, procuring low- and zero-carbon and carbon-negative fuels, and/or improving energy efficiency. Such a standard would achieve significant reductions at least cost by enabling compliance flexibilities and harnessing technological innovation. The current LCFS program is providing critical support to the RNG market. Because a significant amount of RNG usage today is occurring in the transportation sector, the LCFS program holds continued importance as the State explores opportunities to incentivize RNG use in other sectors. Competitive pricing and availability of supply will be critical when looking to expand RNG usage to other hard-to-abate sectors. For these reasons, Bloom Energy continues to recommend that discussions about the potential expansion of LCFS or the potential development of a broader standard should happen in parallel with ongoing support provided to the RNG market through the current LCFS.

Bloom Energy appreciates the opportunity to provide comment on this important proceeding. Please do not hesitate to contact the undersigned if we can provide additional information. We look forward to further engagement as stakeholders collaborate to strengthen the LCFS program.

Sincerely,

/s/Jordan Garfinkle

Jordan Garfinkle
Senior Manager, Policy
Bloom Energy Corporation

jordan.garfinkle@bloomenergy.com
www.bloomenergy.com

Comment Log Display

Here is the comment you selected to display.

Comment 63 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Robert
Last Name	Hambrecht
Email Address	rrh@allotropepartners.com
Affiliation	Allotrope Partners LLC
Subject	CARB LCFS Rulemaking Comment Letter
Comment	<div>Please see our attached letter. Thank you for the opportunity to participate in this process.</div>
Attachment	www.arb.ca.gov/lists/com-attach/7388-lcfs2024-BmUAZ1QnUGEHXgNv.pdf
Original File Name	CARB LCFS Rulemaking Letter Final August 27, 2024.pdf

Date and Time Comment Was Submitted 2024-08-27 10:33:55

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To: California Air Resources Board

Thank you for the opportunity to once again comment on the Board's LCFS rulemaking process. Allotrope Partners, LLC, has been working over a decade on developing sustainable demand for forest biomass waste streams to create long-term economic and policy drivers for increased forest health management in California. This work closely aligns with the CARB 2022 Scoping Plan for Achieving Carbon Neutrality, specifically its goal to "accelerate the pace and scale of climate smart forest management to at least 2.3 million acres annually."¹

Through our subsidiary, Allotrope Cellulosic Development Company (ACDC), we have been actively developing a cellulosic ethanol plant to be located in Anderson, CA. The plant will utilize 330,000 bone dry-tons of biomass per year and produce 22 million gallons of low-carbon ethanol, which will ultimately be used for production of sustainable aviation fuel, and approximately 500,000 MMBTUs of renewable natural gas per year. The plant will contribute to carbon neutrality while improving forest management by expanding waste biomass processing infrastructure, a strategy specifically cited in the CARB Scoping Plan², and improving air quality by mitigating the risk of wildfires and reducing open pile burning of forest and agricultural biomass.

ACDC presently has key technology, offtake and strategic partners in place, including Axens North America, bp (formerly, British Petroleum PLC), and Sumitomo Corporation of the Americas, respectively. ACDC and its partners have invested significant time and resources into the development of this project, which will be one of the largest economic opportunities benefiting Shasta County in many decades. The project will qualify for federal tax credits through the Inflation Reduction Act and is in the second stage of the USDA's 9003 loan guarantee process.

Definition of Forest Biomass Waste

063.1

ACDC is concerned about the definition of "forest biomass waste" on page 14 of the Appendix A-1. The document proposes to define the forest biomass waste as:

"Forest Biomass Waste" means small-diameter, non-merchantable residues, limited to forest understory vegetation, ladder fuels, limbs, branches, and logs that do not meet regional minimum marketable standards for processing into wood products.

¹ CARB 2022 Scoping Plan Update, December 2022. Page 252.

² IBID. Page 252

We believe that the definition of “forest biomass waste” should be broadened to include material from wildfire mitigation, fuel removal and forest restoration activities, recognizing that in many cases this material, whose removal helps combat wildfire and associated GHG emissions, may include some larger “merchantable” sized material. Please consider that in situations where only a small portion of material is merchantable, it is more efficient to treat all the material as biomass waste rather than separate out the merchantable portion. That cost/benefit is a decision best made on a case-by-case, site-specific basis by those doing the work, rather than by a rule that applies across the board.

As such, we recommend that the definition be amended as follows:

“Forest Biomass Waste” means residues that are 1) removed for wildfire mitigation, forest restoration projects, or the protection of public safety, or 2) small-diameter, non-merchantable residues, limited to forest understory vegetation, ladder fuels, limbs, branches, and logs that do not meet regional minimum marketable standards for processing into wood products.”

063.2 Specified Source Feedstocks and Forest Biomass Waste

In addition, the general definition of “specified source feedstock” in section 95488.8(g), and as it pertains to forest biomass waste in section 95488.8(g)(1)(A)(3) in particular, are not clear. The language appears to imply that the specific source feedstocks listed in 95488.8(g)(1)(A) would qualify for a reduced Carbon Intensity score (CI). Are they to receive a lower CI, beyond the calculated CI from their GREET models? Will the CI of non-specified sources be calculated using factors beyond their GREET models and Life Cycle Analyses?

063.3 More specifically restricting forest biomass waste specified source feedstocks to “non-industrial forestland” would limit the amount of sustainable material available for biofuels projects like ours for a number of reasons:

- Industrial forestland owners are the only large landowners in the state that can offer reliable long-term forest biomass supply agreements that provide the needed certainty necessary for long-term investors and lenders needed to develop low carbon biofuel projects.

- At present, there are no entities that can reliably aggregate supply from smaller nonindustrial landowners into such long-term contracts at adequate scale.
- Federal biofuel regulations restrict us to utilizing material from private landowners only. Thus blanket restrictions on the use of forest biomass from private lands prevents the establishment of needed long-term feedstock contracts.

According to the California's Legislative Analyst Office, 39% of California forests are privately owned, with 35% of that portion considered industrial forestlands.³ Thus, if this requirement is adopted, over one third of private forestlands will not be allowed as a specified source feedstock. In the Redding/Anderson area the situation is even more striking, as 64.4% of private forest lands within 60 miles of Redding are considered industrial.⁴ As a result, this prohibition could significantly restrict the amount of available qualified material in the area.

It is important to consider as well that many forest communities in California were initially founded around timber mills located in the proximity of large private landholdings (i.e. industrial timberlands) to assure access to wood for the mills. As a result, today, many of the most at-risk and under-served rural communities are surrounded by industrial forestlands whose biomass would be much less accessible under the draft definition in Section 95488.8(g)(1)(A)(3). As proposed, all forestlands, both industrial and non-industrial, would remain at a higher risk of destruction from wildfire and natural degradations such as beetle rot and unrestrained undergrowth. This is because while only industrial forestlands are excluded, doing so likely will make projects such as ours unsustainable and thus remove an important incentive/sustainability measure for performing wildfire treatments on non-industrial forestlands.

It's also important to note that the term "non-industrial forestland" is ambiguous. It is not defined in the LCFS Regulation, nor does Section 95488.8(g)(1)(A)(3) reference a definition in any other regulation. The Legislative Analyst Office report cited in Footnote 3 uses the terms "industrial" and "nonindustrial" to generally describe categories of forest *owners*, not forest *lands*. Thus, in addition to being imprecise, the term proposed for inclusion in Section 95488.8(g)(1)(A)(3) is potentially discriminatory. CARB should not be in the business of discriminating between which kinds of private landowners qualify for this LCFS pathway.

³ Taylor, Mac "Improving California's Forest and Watershed Management" California Legislative Analyst Office, April 2018. Page 5.

⁴ Based on GIS work done by an industry partner.

063.4

Furthermore, the phrase “forest stand improvements” should remain in the language, as thinning programs as part of a holistic forest management regime, are exceedingly important treatments that enhance forest health as well as reduce fire risk. Eliminating the phrase suggests that such forest management activity will not qualify. A recent review of scientific literature and related meta-analysis found “overwhelming evidence” for the efficacy of thinning programs when combined with prescribed burning or pile burning.⁵

063.5

As described in detail in our initial submission, we also believe that any material extracted in compliance with California Forest Practice Act should be considered eligible. The exception of “clear cuts” does not recognize that single age forest management is permitted within the California Forest Practice Rules, considered some of the most protective forest management rules in the world. We do support the proposed addition of the phrase “that was performed in compliance with all local, State, and federal rules and permits.” This language makes it very clear that in California the requirements of the California Forest Practice Act and related regulations apply, and that provides sufficient protection. Excluding “clear cuts” – another term that is not defined in the LCFS Regulation and is thus ambiguous – creates potential conflicts between Section 95488.8(g)(1)(A)(3) and the California Forest Practice Act and its implementing regulations.

We respectfully request that, if the regulations are going to define a specified source feedstock for forest biomass waste, the initial definition should be for forest biomass waste from California only, and the language amended as follows:

063.1 cont

3. *Forest biomass waste from ~~non-industrial~~ forestlands removed for the purpose of wildfire fuel reduction or forest stand improvement, to reduce the risk to public safety or infrastructure, to create defensible space, or for forest restoration; and from a treatment ~~in which no clear-cutting occurred~~ and that was performed in compliance with the California Forest Practices Act, as well as any local, and federal rules and permits.*

⁵ See USFS publication: <https://research.fs.usda.gov/treesearch/67659>

Thank you for the opportunity to contribute to this rulemaking process. Our goals are strongly aligned with the State's vision for scaled up forest management as a key solution to California's wildfire crisis as well as combating climate change. We respectfully request the LCFS program rules be amended to support sustainable forest management that helps avoid megafires and associated climate and health impacts.

Sincerely,

Robert Hambrecht

Robert Hambrecht

Partner

Allotrope Partners LLC, and its subsidiary,

Allotrope Cellulosic Development Company LLC

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Here is the comment you selected to display.

Comment 64 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Nancy
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Email Address	nyoung@gevo.com
Affiliation	
Subject	Gevo's Comments on the 15-Day Notice-LCFS
Comment	Please see the attached comments. Thank you.
Attachment	www.arb.ca.gov/lists/com-attach/7389-lcfs2024-B2BRMIAnVWkBWFQ3.pdf
Original File Name	Gevo Comments - LCFS 15-Day Notice-8-27-24.pdf
Date and Time Comment Was Submitted	2024-08-27 10:40:01

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August 27, 2024

VIA ELECTRONIC FILING
Submitted via LCFS Comments Upload Link

The Honorable Liane M. Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Gevo, Inc.'s Comments on 15-Day Notice of Changes to the Proposed Low Carbon Fuel Standard Amendments

Dear Chair Randolph:

Gevo, Inc. (Gevo) appreciates this opportunity to comment on the California Air Resources Board (CARB) 15-Day Notice of Changes to the Proposed Low Carbon Fuel Standard (LCFS) Amendments (hereinafter "15-Day Notice"). Gevo submitted comments on CARB's proposed LCFS amendments on February 20, 2024, and on the content of the CARB Workshop held on April 10, 2024, and we incorporate those comments here by reference.¹ Although we continue to urge CARB's consideration of all of the comments we previously submitted, the comments here relate to areas elaborated in the 15-Day Notice, as specified by CARB in its Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information Proposed Low Carbon Fuel Standard Amendments.²

As a refresher, Gevo's mission is to produce low-carbon, renewable energy-dense liquid hydrocarbons for drop-in transportation fuels such as gasoline, jet fuel, and diesel. Our alcohol-to-hydrocarbons production process uses a combination of decarbonization technologies and sustainably farmed feedstock to produce fuels with substantially

¹ See Gevo, Inc.'s Comments on "Proposed Amendments to the Low Carbon Fuel Standard" (February 20, 2024) (available as Comment #196 in CARB's Public Comments Received portal) and Gevo, Inc.'s "Comments on the Low Carbon Fuel Standard Workshop, April 10, 2024" (May 10, 2024) (available in CARB's LCFS Meetings and Workshops portal).

² CARB, Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information Proposed Low Carbon Fuel Standard Amendments, at 2 (August 12, 2024) (noting that "staff will only address comments received during this 15-day comment period that are responsive to this notice.")

reduced carbon intensity (CI) compared to fossil fuel equivalents. We broke ground on our first alternative jet fuel (AJF)/sustainable aviation fuel (SAF)³ production facility, "Gevo Net-Zero 1" (NZ1), in Lake Preston, South Dakota, in September 2022. This facility will use a three-part strategy to produce low-CI SAF: 1) use locally-sourced corn feedstock from farmers engaged in sustainable agriculture to both reduce on-farm greenhouse gas (GHG) emissions and sequester carbon dioxide (CO₂) in the soil; 2) decarbonize the fuel production process by replacing conventional fossil fuel inputs with wind energy, renewable natural gas, and green hydrogen; and 3) use carbon capture and sequestration (CCS) technology to reduce emissions from the production process further. The Gevo approach is aimed at decarbonizing every step in our SAF's life cycle, which we track all the way from the farm field through to the aircraft using our Verity Tracking platform.

Gevo currently is participating in the LCFS through our production of renewable natural gas (RNG) from three dairies, for which we installed dairy-manure biomethane capture and upgrading equipment, thereby producing pipeline quality RNG rather than allowing the methane from the manure to continue to be released from the dairy lots. In addition, we intend to submit a Tier 2 LCFS Provisional Pathway application for the SAF, renewable diesel, and renewable naphtha fuels that will be produced at the NZ1 facility, utilizing our field corn starch feedstock and alcohol-to-jet (ATJ)/alcohol-to-hydrocarbons production process.

I. Gevo Strongly Supports CARB's Proposal for a Nine Percent Near-Term CI Benchmark Stringency Increase (Section 95484(d)-(f))

- 064.1 In both of our earlier sets of comments, Gevo supported CARB's intent to provide a near-term CI stringency increase (i.e., "stepdown") in tandem with a strengthening of the overall compliance curve and adoption of an Automatic Acceleration Mechanism (AAM), while also urging CARB to go farther in increasing the stringency of these provisions. Accordingly, we welcome and strongly support CARB's 15-Day Notice
- 064.2 proposal for a near-term stepdown of nine percent, rather than the five percent CARB originally proposed.

As noted in our previous comments, the five percent and seven percent stepdown options that CARB analyzed would be insufficient to address the excess credit buildup in

³ Gevo typically uses the term "sustainable aviation fuel" or "SAF" to refer to our fuel. This fuel meets the definition of "alternative jet fuel" (AJF) as set forth in the LCFS regulations. Accordingly, our references to SAF in this comment letter should be deemed synonymous with AJF.

the bank that weakens the effectiveness of the LCFS, even if accompanied with an AAM trigger. While we continue to believe that a stepdown of ten to eleven percent would be supportable based on the ICF analysis presented to CARB,⁴ the nine percent option is the most preferable of the options CARB assessed as it is projected to result in credits closer to the demand to be sparked by the compliance curve. Therefore, we strongly support this proposal and urge CARB to adopt it.

II. Gevo Supports the Tier 2 and Renewable Diesel Definition Proposed Changes Recognizing Alcohol-to-Hydrocarbons Pathways and Urges Further Alignment of the Renewable Naphtha Definition

In various places in the initial LCFS proposal, provisions enumerated certain production processes, seemingly omitting alcohol-to-hydrocarbons fuels pathways. As noted below, Gevo supports the proposal to expressly include the alcohol-to hydrocarbons pathway in the Tier 2 classification provisions. Further, we support CARB's proposal to make the "renewable diesel" definition process- and feedstock- neutral and we urge CARB to do the same with the "renewable naphtha" definition.

- 064.3
- CARB's Inclusion of Alcohol-to-Hydrocarbons in the Tier 2 Classification Provisions (Section 95488.1(d)(4)): While Gevo understood that the Tier 2 pathway classification might not be limited to the production processes listed in this section of the originally proposed regulation, we expressed concern in our earlier comments that the omission of the alcohol-to-hydrocarbon conversion process might be misread as an exclusion. Therefore, we support and appreciate CARB's proposal in the 15-Day Notice to add this pathway to the list of drop-in fuels. We also appreciate CARB's recognition in the Notice of Public Availability document that alcohol-to-hydrocarbon conversion is one of the ways in which SAF can be produced.⁵
- 064.4
- The Proposed Revision of the Definitions of "Renewable Diesel" and "Renewable Naphtha" (Section 95481(a)): CARB's original proposal for the "renewable diesel" and "renewable naphtha" definitions would import specific feedstocks and production pathways (i.e., hydrotreated lipids and biocrudes or from gasified biomass converted using the Fischer-Tropsch process and portions from co-processing) into these definitions. Concerned that the proposed definitions would

⁴ As we laid out in our February 20 comments, ICF's analysis demonstrates that "a stepdown of at least 10.5% in 2025 likely is needed to ensure that the credit bank reverses and is drawn down to the level necessary to continue to incentivize LCFS-driven emissions reductions, i.e., with the credit bank holding approximately two to three quarters' worth of deficits."

⁵ CARB, Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information Proposed Low Carbon Fuel Standard Amendments, at 10.

exclude feedstocks and production pathways such as Gevo's feedstock (corn starch) and production process (the alcohol-to-hydrocarbons conversion process), we urged CARB to make the definitions feedstock and pathway neutral. As we explained in our comments, renewable diesel and renewable naphtha are hydrocarbon fuels that are produced alongside our SAF/AJF in alcohol-to-hydrocarbons production facilities.

We are pleased that CARB provided a new proposal for the "renewable diesel" definition in the 15-Day Notice that would make it process- and feedstock-neutral. However, CARB has not proposed a corresponding change to the "renewable naphtha" definition. As we had noted in our previous comments, there is no rational reason for excluding from CA-LCFS eligibility the renewable naphtha from a process such as Gevo's. Accordingly, we urge CARB to also make the "renewable naphtha" definition neutral as to non-petroleum feedstocks and production processes.

064.5

III. CARB Should Not Limit the Time Period of Eligibility for Avoided Methane Projects as Proposed in the 15-Day Notice (Section 95488.9(f)(3)(A))

In the 15-Day Notice, CARB proposes to reduce the total number of crediting periods for pre-2030 avoided methane emissions projects from dairy and swine manure and landfill-diverted organic waste disposal to two 10-year crediting periods, rather than the three 10-year periods in the original LCFS proposal. Gevo opposes this proposed change. Accordingly, we urge CARB to discard this new proposal and to revert to the original proposal.

As noted, Gevo participates in the LCFS via the RNG captured from three dairies, for which we installed dairy manure biomethane capture and upgrading equipment, thereby producing pipeline quality RNG rather than allowing the methane from the manure to continue to be released to atmosphere. LCFS policies create incentives for dairy farmers to capture methane emissions from their cows to convert into biogas. As CARB has recognized, "capturing methane from dairies is one of the primary measures for achieving the state's 2045 greenhouse gas reduction targets and SB 1383 methane reduction target."⁶ In addition, we note that use of dairy digesters creates synergistic environmental benefits, as farmers can generate soil amendments that provide nutrients and decrease the amount of fertilizer needed.⁷

⁶ California Air Resources Board, "Proposed Amendments to the Low Carbon Fuel Standard Initial Statement of Reasons," Dec. 19, 2023, at page 124.

⁷ See, e.g., University of California, Agriculture and Natural Resources, "California Dairy Farmers Generate Renewable Energy from Waste," (Nov. 3, 2023) available at <https://ucanr.edu/News/?postnum=58234&routeName=newsstory>.

In our February 20 comments on the LCFS proposal, Gevo supported CARB's proposal to continue avoided methane crediting, including for dairy RNG, and we urged CARB to decline to impose time limits (or other restrictions) on such crediting. As we noted, dairy manure methane avoidance projects such as ours require significant capital investment and carry with them significant ongoing operating costs. Accordingly, limits on the crediting period for such projects not only inhibit initial investment but can also threaten the viability of continuing methane avoidance operations over time. Accordingly, CARB's 15-Day Notice proposal to limit the crediting periods for these avoided methane projects would unnecessarily limit the viability of these important projects and the climate benefits they bring.

CARB asserts in the 15-Day Notice of Public Availability document that two 10-year crediting periods "still provid[es] an incentive to develop methane capture projects."⁸ Yet no support is provided for this assertion. CARB further asserts that the "proposed modifications to the proposed credit true-up concept in section 95488.10(b)" will "ensure sufficient return on investment for fuel pathways reporting using temporary fuel pathways."⁹ While, as detailed below, Gevo supports CARB providing an extended opportunity for credit true-ups, as Gevo had explained in its previous comments, such true-ups are warranted even with the previously proposed three 10-year crediting periods. Again, Gevo urges CARB to withdraw the proposal to limit the crediting periods and to revert to the original proposal.

064.6

IV. Gevo Supports CARB's Proposal to Extend the Credit True-Up Periods for Temporary Pathways, with a Two-Year Lookback (Section 95488.10(b))

As we noted in our February 20 comments, Gevo supports a credit true-up in the LCFS program for all pathways – including for dairy RNG. Accordingly, we support CARB's proposal in the 15-Day Notice for a true-up for temporary pathways, with data-based true-ups to be initiated by reports submitted in 2025. As we understand the proposal, CARB would authorize true-ups for data reports submitted in 2025 to cover the 2023 through 2024 time-period (e.g., report submitted March 31, 2025, covering 2023-2024, with the true-up back to 2023).

Gevo strongly supports this proposal with a two-year lookback. With specific respect to our RNG operations, we note that the RNG temporary pathway score of -150 CI for swine and dairy manure biomethane projects is more than 50% greater than the actual

⁸ CARB, Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information Proposed Low Carbon Fuel Standard Amendments, at 12.

⁹ *Id.*

CI of Gevo's operating facility. As CARB recognized in the Notice of Public Availability, the true-up for temporary pathways "enables the eventual recovery of credits based on verified operational data" and such true-ups are expected to "alleviate or mitigate any business impacts associated with a delay in pathway certification" allowing "recognition for the full amount of climate benefit of a fuel."¹⁰ A two-year lookback supported by operational data is duly warranted due to the length of time required for pathways to receive initial CARB review, undergo a completeness evaluation and finally receive a full review. Indeed, by allowing such true-ups from temporary CI's, CARB would allow fuel producers like Gevo to be credited for the actual climate value of these projects, thereby supporting and promoting investment in climate mitigating projects and advancing California's emissions reduction efforts.

064.7

V. Gevo Is Committed to Strong Sustainability and Tracking Requirements, but Urges CARB to further Refine the Proposed Crop-Based Biomass Sustainability Provisions (Section 95488.9(g))

As Gevo explained in our February 20 comments on the original LCFS proposal and in our comments on the content of the April 10 workshop, Gevo is fully committed to providing low-carbon, sustainable SAF and other renewable fuels and to meeting appropriately tailored regulatory requirements for demonstrating sustainability. Against that backdrop, we respectfully submitted that CARB's original sustainability certification proposal for crop- and forestry-based feedstocks was unduly vague and not fit for purpose, urging CARB to convene a stakeholder process to flesh out an appropriately tailored approach to sustainability certifications that would include crediting the emissions reductions from climate-smart agriculture.

While CARB has not convened a stakeholder process to flesh out the proposed sustainability provisions or established crediting for emissions reductions from climate-smart agriculture as Gevo advocated, Gevo notes the progress CARB has made in the 15-Day Notice in terms of providing more detail and more practicable implementation steps for the sustainability certification provisions. We appreciate that CARB has provided some specifics, such as the provision stating that "biomass used in fuel pathways must only be sourced on land that was cleared or cultivated prior to January 1, 2008," and set out a transition to full sustainability certification from 2026 to 2028 to 2031.

Although CARB's 15-Day Notice proposal is an improvement relative to the original proposal, we respectfully submit that it still needs significant work. As detailed below, the proposed sustainability criteria that California is seeking to satisfy remain unduly

¹⁰ CARB, Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information Proposed Low Carbon Fuel Standard Amendments, at 13.

vague and several areas in the proposed regulatory provisions appear to have errors. Further, to the extent that CARB is requiring sustainability certification and tracking of crop-based feedstocks, CARB also should credit the emissions reductions from climate-smart agriculture practices covered by the sustainability and tracking provisions.

A. The Sustainability Criteria Remain Unduly Vague

As noted, Gevo supports and is committed to fully meeting appropriate sustainability criteria. Unfortunately, what CARB has proposed in the 15-Day Notice still misses the mark. CARB has failed to fully define the problem it purportedly is trying to solve and, relatedly, has failed to provide an appropriately defined solution. During the April 10 LCFS Workshop, CARB repeated that its main objective in proposing sustainability certification for fuels that use crop-based (and wood-based) feedstocks is to ensure "biofuel production must not come at the expense of deforestation or food production."¹¹

In terms of defining the problem, virtually all the data CARB presented at the Workshop about the potential for crop-based feedstocks to negatively affect food and forests discussed crop-based oil seeds and virgin oil. Notably, Gevo's process uses only residual starch from low-carbon corn, first ensuring that the protein from the corn goes to food and feed uses. Yet, there was no mention of corn starch feedstock creating impacts of concern in the slides presented by CARB.¹² In fact, U.S. corn production has long had multiple uses in food, feed, and fuel and has not resulted in increased land use, nor has it negatively affected food prices.¹³ Since 1920, U.S. farmers have increased their yield by approximately 140 bushels of corn per acre while reducing agriculture's land footprint by 9% nationwide.¹⁴ Indeed, leveraging existing agricultural land, regenerative agriculture practices, and clean energy to produce both feed and fuel from the same crop while sequestering carbon throughout the production process maximizes land use

¹¹ This intent was restated in the slide deck presented by CARB at the Workshop, "California Low Carbon Fuel Standard Workshop, April 10, 2024," at slide number 51 (hereinafter "CARB Workshop Slide Deck").

¹² CARB Workshop Slide Deck, at slides 52-56.

¹³ See Oladosu, Gbadebo & Kline, Keith & Langeveld, "Structural Break and Causal Analyses of U.S. Corn Use for Ethanol and Other Corn Market Variables," *Agriculture*. 11. 267. 10.3390/agriculture11030267 (2021) ("The casualty analysis finds that U.S. corn use for ethanol is not a driver of corn price and net corn exports.") See also Taheripour, Baumes & Tyner, "Economic Impacts of the U.S. Renewable Fuel Standard: An Ex-Post Evaluation," *Front. Energy Res., Sec. Sustainable Energy Systems* Volume 10 (2022) ("The long-run effects of biofuel production and policy on food prices were negligible... biofuels' contribution to commodity price increases is really no different from fructose corn syrup, increased feed demands, or other market demands.")

¹⁴ See USDA, "Crop Production Historical Track Records."

efficiency and carbon abatement. Making multiple products from one crop is an efficient, sustainable use of cropland and better for our environment.

CARB's 15-Day Notice proposal provides one clear sustainability criterion, stating that "biomass used in fuel pathways must only be sourced on land that was cleared or cultivated prior to January 1, 2008,"¹⁵ a provision clearly related to the stated CARB goal that "biofuel production must not come at the expense of deforestation or food production." However, the other criteria set out in the 15-Day Notice remain unduly vague and untethered from the stated goal that biofuel production not come at the expense of deforestation or food production. CARB proposes at Section 95488.9(g)(1)(B) that "[b]iomass must be produced according to best environmental management practices that reduce GHG emissions or increase GHG sequestration," yet then leaves this requirement open-ended, asserting that this requirement includes, but is not limited to the following general criteria:

- 1. Maintain or enhance biodiversity habitat on agricultural or forested lands;*
- 2. Enhance soil fertility and avoid erosion or compaction;*
- 3. Apply fertilizers in a manner that minimizes runoff, and soil and water contamination;*
- 4. Reduce unsustainable water use, and minimize diffuse and localized pollution from chemical residues, fertilizers, soil erosion, or other sources of ground and surface water contamination.¹⁶*

While providing a bit more detail regarding expectations than the original sustainability certification proposal, CARB still defers the interpretation of how these general criteria might be satisfied to third-party schemes, and specifically those under the European Renewable Energy Directive (EU RED),¹⁷ which was designed by European regulators and presumably based on European conditions and structures. CARB's failure to set out more specific requirements calls into question not only what problem CARB is trying to solve, but also how producers might comply. It also raises the question of whether CARB has the legal and regulatory authority to import into the LCFS undefined substantive provisions from outside schemes.

¹⁵ 15-Day Notice, Attachment A-1, Section 95488.9(g)(1)(A).

¹⁶ 15-Day Notice, Attachment A-1, Section 95488.9(g)(1)(B).

¹⁷ 15-Day Notice, Attachment A-1, Section 95488.9(g)(3)(C).

By way of example, the 15-Day Notice proposal further specifies that, in addition to certain of the general criteria noted in 95488.9(g)(1)(B), the third-party “certification system must consider environmental, social, and economic criteria.” Yet, like the general criteria noted in 95488.9(g)(1)(B), this “environmental, social, and economic criteria” provision could be interpreted in a variety of ways. It is unclear from the proposed language which specific environmental, social, and economic criteria would be deemed essential for the CA-LCFS program and how those criteria might align with program goals. Further, CARB’s failure to establish clear criteria calls into question why the current analytical, science-based methodologies used by CARB are assumed to be insufficient to provide the necessary controls on crop-based (and forestry) feedstocks to ensure environmental integrity. Moreover, given that CARB only detailed potential concerns about oil seed crops during the April 10 Workshop, there does not appear to be a basis for the broad application of the proposed sustainability certification requirements to all low-carbon fuels that use any form of crop-based feedstock.

064.9

In addition, it is unclear why crop and forestry-based fuels are being singled out for meeting social and economic criteria, which have implications for any fuel pathway participating in the program. These additional criteria have the potential to add substantial administrative burden to both farmers and fuel producers, potentially creating barriers to LCFS participation, and, as such, should be carefully considered in the context of what the program hopes to achieve by applying these criteria.

During the April 10 Workshop, CARB staff reiterated that its remit from the Board at the September 28, 2023, informal Board meeting regarding crop-based fuels was to “investigate guardrails.”¹⁸ It does not appear that CARB staff has done so, instead, as noted, CARB simply defers to third-party sustainability certification schemes without determining what “guardrails” might be required to meet the state’s objectives and bypasses the public stakeholder process in the development of standards. Although the proposed LCFS regulatory revisions do not cite specific third-party schemes, during the April 10 Workshop, CARB staff referred to the Roundtable on Sustainable Biomaterials (RSB) and the International Sustainability and Carbon Certification (ISCC) initiative as the types of certification systems it believed would be applicable.

While Gevo is a member of and works with both RSB and ISCC, in our experience, despite being well-intentioned regarding stakeholder input from their members, these entities have not actively included farmers in the development of standards and, as European certification bodies, do not have first-hand experience with U.S. agriculture. Also, both of these entities have multiple certification standards, yet CARB has not provided sufficient detail to suggest which standards might be applied.

¹⁸ CARB Workshop Slide Deck, at slide 51.

In light of the above, we implore CARB to remove the sustainability certification requirement from the current rulemaking and continue to mature the development of specific program requirements with multi-stakeholder input and workshop feedback to align any requirements CARB might impose with specific LCFS goals and make the provisions practicable. Critically, this stakeholder input must include farmers and others who work in agriculture. Farmers are often omitted from the development of program standards, despite being the most critical actors in implementation of those standards.

By focusing in on what the State of California seeks to achieve through additional sustainability criteria, and delineating those criteria with appropriate inputs, CARB can ensure program requirements are fit for purpose, clear, transparent, applied fairly across feedstocks and fuel production processes, properly credit GHG emissions reductions from agricultural feedstocks, and align with LCFS-specific program goals. Such a process need not be open-ended, as CARB could set up a process with a specified time frame (e.g., six months) as it has in other instances in which program requirements needed to be refined.

B. The Proposed Regulatory Provisions Have Apparent Errors and Conflicts

In reviewing the regulatory text proposed in the 15-Day Notice, we identified a number of apparent errors and conflicting provisions, further calling into question whether the sustainability proposal is fit for purpose. We identify the problematic provisions here and, again, urge CARB to revisit and refine its sustainability certification proposal.

- 064.10
 - Section 95488.9(g)(1) asserts that “biomass used in fuel pathways is subject to the sustainability criteria listed in subsections 95488.9(g)(1)(A) through (C).” However, there is no subsection (C) under (g)(1). We note that missing (or otherwise unintended) subsection 95488.9(g)(1)(C) is referenced again under the 2031 Approved Certification Systems.
- 064.11
 - The 2026 provisions in Section 95488.9(g)(2)(C) require field shapefiles/coordinates and attestations that the information is accurate. For existing pathways, the provision states the fuel producer must “maintain” the associated records, whereas for new pathways, the provision states the fuel producer must “maintain” the records and “submit” them to CARB. While that distinction seems reasonable, we note that the proposed regulatory text has instructions not only for fuel producers with new pathways to submit the records to CARB but also has instructions for those producers with existing pathways to submit the records, a seeming contradiction with the requirement that those with existing pathways simply “maintain” the records.

- As noted in the 15-Day Notice of Availability document, CARB intends the 2028 sustainability certification to ensure only that “feedstocks are not sourced on lands converted after 2008,” with certification to any other sustainability criteria being optional.¹⁹ This intent is carried through in the initial regulatory text at Sections 95488.9(g)(3)(A)&(B), which state that “pathways utilizing biomass under section 95488.9(g)(1) must []²⁰ at least meet the sustainability requirements for biomass under section 95488.9(g)(1)(A)” (i.e., the 2008 land conversion provision). However, the subsections numbered (1) under 95488.9(g)(3)(A)&(B) contradict the stated intent to only require certification of the 2008 land conversion provision, by stating that the “chain-of-custody evidence for sustainable biomass must meet requirements of section 95488.8(g)(1)(B)1. through 3.,” which are three of the separate environmental management practices.²¹ We believe the inclusion of the additional sustainability criteria here is an error, as including them would contradict the stated intent and also would make the 2028 requirements the same as the 2031 requirements.

C. Emissions Reductions from Climate-Smart Agriculture Practices Should Be Credited

CARB proposes at Section 95488.9(g) that “[b]iomass must be produced according to best environmental management practices that reduce GHG emissions or increase GHG sequestration,” and yet, while the drive for lower CI fuels already incentivizes use of lower CI feedstocks, CARB does not provide crediting within the LCFS for the climate-smart agriculture processes that are “best.”

Climate-smart agriculture is an important lever for carbon abatement. Accordingly, in establishing specific sustainability criteria for crop-based feedstocks, CARB should also allow for climate-smart agriculture practices to be credited under the LCFS. Implementation of these feedstock production practices requires transition from usual practice and significant additional effort from farmers. Critically, as recognized by the U.S. Department of Agriculture (USDA), the National Academy of Sciences, the IPCC,

¹⁹ CARB, Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information Proposed Low Carbon Fuel Standard Amendments, at 13.

²⁰ The actual regulatory text that has been proposed repeats the word “must,” so it reads “pathways utilizing biomass under section 95488.9(g)(1) must must at least meet the sustainability requirements for biomass under section 95488.9(g)(1)(A).”

²¹ See 15-Day Notice, Attachment A-1, Sections 95488.9(g)(3)(A)(1) and 95488.9(g)(3)(B)(1).

and others, these practices can bring significant GHG emissions reductions.²² Indeed, although CARB has not spelled out in detail what it might expect for the “best practices” it calls for under Section 95488.9(g)(1)(B) with respect to soil and fertilizer, various soil and fertilizer best practices can bring CI reductions, and most sustainability certifications would include a GHG analysis of the feedstock in addition to certification of sustainable practices. Yet, while proposing to require sustainability certifications that would cover such practices, CARB offers no emissions reduction credits to cover the additional cost and effort these requirements would impose on the farmer or the fuel producer.

As noted, CARB should revisit its sustainability certification proposal and include within it crediting for emissions reductions associated with climate-smart feedstock production practices. To expedite such crediting, CARB could leverage recent efforts at the federal level by USDA (and others) to include emissions crediting for agricultural practices under the Section 45Z tax credit. While still in development, the work to develop criteria for crediting emissions reductions from climate-smart agriculture practices under Section 45Z is being informed by a public stakeholder process that includes input from those with expertise in U.S. agriculture.

As noted, Gevo plans to source sustainably grown, low-CI field corn from the Lake Preston, South Dakota area and use Verity Tracking to measure and verify carbon intensity and all farm activities to the field level. The Gevo Growers’ Program is currently enrolling farmers under our \$30 million USDA Climate-Smart Commodities grant, which allows us to pay farmers more for implementing climate-smart agriculture practices such as cover crops, reduced tillage, organic fertilizers, and nutrient management. Simply put, such climate-smart agricultural practices are critical to producing sustainable feedstocks and lowering the CI of fuels. In addition to sequestering carbon in soil, these production practices provide significant additional ecosystem benefits such as soil health, water quality improvement, water use efficiency, more resilient crops, and long-term land fertility. These practices are a significant component of Gevo’s approach to producing sustainable SAF and other low-carbon

²² See J. Rosenfeld, J. Lewandrowski, T. Hendrickson, K. Jaglo, K. Moffroid, and D. Pape, 2018. A Life-Cycle Analysis of the Greenhouse Gas Emissions from Corn-Based Ethanol. Report prepared by ICF under USDA Contract No. AG-3142-D-17-0161. September 5, 2018. See also National Academies of Sciences, Engineering, and Medicine. 2019. Negative Emissions Technologies and Reliable Sequestration: A Research Agenda. Washington, DC: The National Academies Press. doi: <https://doi.org/10.17226/25259>. See also Nabuurs, G-J., R. Mrabet, A. Abu Hatab, M. Bustamante, H. Clark, P. Havlík, J. House, C. Mbow, K.N. Ninan, A. Popp, S. Roe, B. Sohngen, S. Towprayoon, 2022: Agriculture, Forestry and Other Land Uses (AFOLU). In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)). Cambridge University Press, Cambridge, UK and New York, NY, USA. doi: 10.1017/9781009157926.009.

fuels, and we urge CARB to support these practices by crediting the emissions reductions they provide under the LCFS.

VI. CARB's Proposal to Assign Land Use Values Other Than Those Published Is Arbitrary and Capricious (Section 95488.3(d))

In the 15-Day Notice, CARB proposed to authorize the Executive Director to adopt "more conservative" land use change (LUC) values than currently provided in the regulations upon a determination that a published value is not "conservatively representative of a particular region/feedstock/fuel combination."²³ While stating that any such decision would be based on "the best available empirical data, including but not limited to satellite-based remote sensing data for land cover monitoring, crop yields, and emission factors from the AEZ-EF model or carbon stock datasets," the proposed regulatory text does not set out clear criteria for the Executive Director to make a determination that a published value is not "conservatively representative" or what value might be more "conservative" or "representative." Such broad and undefined authorization would create tremendous regulatory uncertainty, while also calling into question CARB's assignment of LUC values in the first place.

We also note this approach confuses the concepts of indirect land use change (iLUC) with direct land use change (dLUC). Economic models such as GTAP-BIO simulate causal relationships between sectors of the economy and cannot be replicated by empirical data such as satellite imagery. Models like GTAP-BIO simulate both land use change estimated to occur directly in cultivation of biofuel feedstock, as well as land use change estimated to occur in non-biofuel sectors in reaction to changes in biofuel production. While satellite data can indicate that land use change has occurred, it cannot provide evidence of why it occurred, and so cannot capture estimated economic ripple effects. Hence, it is not clear how empirical data could be used to arrive at a conceptually comparable value to the already modeled iLUC values and, if implemented, CARB's proposal would inappropriately create two different standards for LUC calculations for different feedstocks.

Accordingly, for the reasons cited above, the proposal as it stands is arbitrary and capricious and should be withdrawn.

²³ 15-Day Notice, Attachment A-1, Section 95488.3(d).

VII. Conclusion

Thank you for the opportunity to comment on the 15-Day Notice of additional changes to the Low Carbon Fuel Standard amendments proposal. Please let us know if you have any questions regarding our comments. We look forward to continuing to participate in this program with our RNG and as Gevo begins commercial scale production of SAF and other biofuels.

Respectfully,

A handwritten signature in black ink, appearing to read 'KH' with a stylized flourish.

Kent Hartwig
Director of State Government Affairs
Gevo, Inc.

A handwritten signature in black ink, appearing to read 'Nancy N. Young' with a checkmark at the end.

Nancy N. Young
Chief Sustainability Officer
Gevo, Inc.

Comment Log Display

Here is the comment you selected to display.

Comment 65 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	James
Last Name	Duffy
Email Address	duffje@msn.com
Affiliation	
Subject	LCFS 15-Day Comments
Comment	<div></div>
Attachment	www.arb.ca.gov/lists/com-attach/7390-lcfs2024-VjJdLIUyAjdRLgNc.pdf
Original File Name	Duffy_LCFS_15-Day_Comments.pdf
Date and Time Comment Was Submitted	2024-08-27 10:39:47

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

August 27, 2024

Liane Randolph, Chair
Members of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Dear Chair Randolph and Members of the Board,

- 065.1 I helped develop and enthusiastically support the LCFS. A strong LCFS is critical to helping California achieve its zero emission transportation goals. In the 15-Day Notice, staff have proposed several improvements to the LCFS amendments proposal that I agree with. These improvements include:
- allowing pre-2011 transit to generate full credit,
 - classifying forest waste biomass as a specified source feedstock,
 - applying sustainability criteria to prohibit biofuel feedstock sourcing from land cultivated after 2008,
 - allowing staff to apply more conservative LUC CI values based on source of feedstock,
 - limiting avoided methane crediting to 20 years instead of 30 years,
 - removing hydrogen produced using fossil gas with CCS as eligible credit generator in 2031,
 - and a very weak, short-term signal discouraging soy and canola biomass-based diesel.

The short discussion below focuses on four issues related to the 15-Day Notice and Recirculated Draft Environmental Impact Analysis that I hope you will further consider for a second 15-Day Change Notice or direction to staff in the Board Resolution. This discussion is followed by an appendix which provides more detailed suggestions for changes to reduce pass-through costs and better align the LCFS with California's long-term transportation goals.

- 065.2 1. What do Donald Trump and CARB staff have in common? They both assume that you are foolish enough to believe that pass-through costs do not exist. While Trump continues to double-down on the claim that tariffs do not increase the cost of goods, CARB staff continue to double-down on the equally false claim that assessing LCFS deficits does not increase the cost of gasoline. **SAD!**

- 065.3 In the appendix to these comments, I have reiterated several suggestions from my 45-Day Comment Letter that will reduce the LCFS pass-through cost to consumers of gasoline. These actions involve limiting credit generation that does not advance California's long-term zero-emission transportation goals, eliminating excessive credit generation that only results in excessive profits, eliminating LCFS subsidies that do not result in additional global GHG emission reductions beyond what would already occur through other State and Federal programs, eliminating double-

counting of LCFS credits and GHG reductions purchased through the voluntary carbon market for DAC and CCS projects, removing Enhanced Oil Recovery as an eligible sequestration method for out-of-state CCS and DAC projects, and minimizing the potential for credit price spikes. Cutting out unnecessary and ineffective credit generation will allow for less stringent targets and lower pass-through costs, without sacrificing real, additional GHG reductions achieved by the program.

065.4

In addition to adopting the suggestions in the appendix, I encourage you to direct staff to split the LCFS program into two separate markets with two different percentage CI reduction targets. Credits generated in one market would not be fungible in the other market. One market would be restricted only to gasoline and substitutes and would have a less aggressive CI benchmark schedule, which will reduce pass-through costs to low-income gasoline consumers. The other market would include diesel, jet fuel, and their substitutes and would have a much more aggressive CI benchmark schedule to accommodate the high market penetration of renewable diesel, biodiesel, and negative CI dairy gas. Because of the more aggressive CI benchmark schedule, the diesel market will have much higher pass-through costs. Having two separate markets will insulate the gasoline consumer from high pass-through costs necessary to decarbonize the diesel side. Moreover, gasoline consumers in California should not be paying most of the cost to decarbonize the heavy-duty transportation sector when the State can more effectively pass much of those costs on to out-of-state consumers of goods passing through California ports.¹ While this is a major change that is likely not appropriate for a second 15-Day Change Notice, I do hope you will direct staff in the Board Resolution to consider it for future amendments. I fear that if CARB is unwilling to acknowledge that pass-through costs exist and take reasonable steps to address them, especially on the gasoline side, the LCFS may become hard to defend politically by 2035.

065.5

2. While the staff proposal discouraging soy and canola biomass-based diesel in section 95482(i) of the 15-day Change Notice² is a step in the right direction, it is not a cap and likely will not effectively reduce long-term use of these feedstocks. The proposal should be further strengthened to address the issues discussed below.

¹ Because much of the diesel consumed in California is used for goods movement, pass-through costs on the diesel side will ultimately get passed on to consumers of goods that move through California ports. Since most goods moving through California ports have a destination outside of California, these costs will mostly be passed on to consumers outside of the state.

² The proposed 15-day Change reads: "Biomass-based diesel produced from soybean oil and canola oil is eligible for LCFS credits for up to twenty percent combined of total biomass-based diesel annual production reporting, by company. Any reported quantities of biomass-based diesel produced from soybean oil or canola oil in excess of twenty percent on a company-wide basis will be assigned a carbon intensity equivalent to the carbon intensity benchmark shown in Table 2 in Section 95484(e) for the applicable data reporting year, or the certified carbon intensity for the associated fuel pathway – whichever is greater. For companies with biomass-based diesel pathways certified prior to the effective date of the regulation and for which the percentage of biomass-based diesel produced from soybean oil or canola oil was greater than 20 percent of combined reported biodiesel and renewable diesel quantities for 2023 LCFS reporting, this provision takes effect beginning January 1, 2028."

- Credit generation and avoided deficit generation are two sides of the same coin.³ It is important to recognize that for volumes more than 20%, CARB is proposing to assign a CI value equal to the carbon intensity benchmark shown in Table 2 of the LCFS regulation or the certified pathway CI, whichever is greater. CARB is not proposing to assign the CI value for fossil diesel. As such, it may still make economic sense for a company that produces only soy or canola renewable diesel to sell it in California, even if volumes above 20% are assigned a CI that does not generate credits or deficits. The LCFS incentive comes from a combination of the credit value and the higher market price for fuel in California versus other markets. The higher market price for diesel in California is driven in part by the LCFS pass-through cost⁴ and the Cap-and-Trade pass-through cost. Because the market price for biomass-based diesel follows the market price for diesel, the market price for biomass-based diesel in California likewise exceeds that in other states. And as the LCFS benchmark CI value decreases over time, the LCFS pass-through cost will continue to increase, resulting in a widening price gap between selling (bio or fossil) diesel in California versus other markets. The higher selling price may be sufficient to justify participating in the California market even if the biofuel does not generate credit.⁵ **If CARB is truly interested in removing the LCFS incentive to sell more than 20% of soy and canola-based diesel, I recommend assigning the carbon intensity of fossil diesel to volumes in excess of 20%.**
- Staff's proposal effectively self-sunsets in less than ten years⁶ and sooner if the auto-acceleration mechanism is triggered. The diesel benchmark CI declines every year and once the pathway CI is higher than the benchmark, all fuel volumes will be assigned the actual pathway CI. There will no longer be less incentive for volumes above 20%. In the 15-Day Notice, CARB staff claim that the "proposed addition avoids sending a long-term signal for virgin soy or canola oil to serve California demand". No, it does not. It provides a short-term signal. In the long-term, this proposal really does nothing, as beyond the year 2035 the

³ Most soy and canola renewable diesel pathways have CI values between 50 and 65 g/MJ. In 2028, the diesel benchmark CI is proposed to be 77.10 g/MJ. So as an example, if a company produces soy (and/or canola) renewable diesel with a CI of 60 g/MJ, those volumes below 20% will be assigned the pathway CI of 60 g/MJ and those volumes above 20% will be assigned the diesel benchmark CI of 77.10 g/MJ. All of the volume, however, will be displacing diesel which has a CI of 105.76 g/MJ. So, while there will be less LCFS incentive for selling volumes above 20%, there will still be some incentive because displacing the fossil diesel avoids the deficits generated by fossil diesel (and also avoids the Cap-and-Trade compliance obligation). In other words, credit generation and avoided deficit generation are two sides of the same coin.

⁴ The LCFS pass-through cost is a function of the credit price, and the quantity of deficits generated by a gallon of fossil diesel, which increases as the diesel benchmark decreases.

⁵ By similar reasoning, even when soy and canola renewable diesel start generating LCFS deficits, there will still be an incentive to sell it in California, as it will displace fossil diesel which generates considerably more deficits (and also incurs a compliance obligation from the Cap-and-Trade program).

⁶ The proposed diesel benchmark is scheduled to drop below 65 g/MJ in 2032 and drop to 50 g/MJ by 2035. In other words, the difference in CI value assigned to volumes above and below 20% decreases each year after the amendments are adopted and the provision effectively self-sunsets between the years 2032 and 2035 for most producers of biomass-based diesel.

proposal doesn't affect the incentive to sell soy and canola-based diesel in California. **Assigning the fossil diesel CI to volumes above 20% would send the appropriate long-term signal.**

- 065.6
- Under the staff proposal, an unlimited quantity of fuel produced from other crop-based feedstocks can be sold in California. The provision does not apply to oilseed crops such as camelina, sunflower, or carinata, so biomass-based diesel produced from these crops will not be affected. **Only applying the provision to soy and canola may result in some perverse incentives in the oilseeds market that can be avoided by applying the provision to all oilseed crops.**
 - Under the staff proposal, an unlimited quantity of soy or canola-based jet fuel, gasoline, and propane can be sold in California. The provision only applies to biomass-based diesel and not to renewable jet fuel, renewable gasoline, or renewable propane produced from soy and canola. Many renewable diesel biorefineries produce more than one product and some produce all of these fuels, but only the renewable diesel will be affected by the 20% threshold. An important question to ask staff is how flexible they will be in allocating feedstocks to finished fuels. For example, if a biorefinery produces renewable diesel and renewable jet fuel from used cooking oil and soy oil, will CARB allow them to avoid exceeding the 20% threshold for renewable diesel by arbitrarily saying that the jet fuel is produced from soy oil and the diesel is produced from used cooking oil, when in fact the biorefinery is fed a mixture of these oils? **I recommend applying the 20% limit to the combined volume of biomass-based diesel, renewable jet fuel, renewable gasoline, and renewable propane sold in California and specifically prohibiting arbitrary preferential allocation of feedstock to product.**

- 065.7
3. **Staff should be directed to correct the air quality assessment in the Draft Environmental Impact Analysis.** It is disappointing to see staff rely on science and mathematics when it is convenient, but then ignore both when they don't support their point of view. For example, staff clearly believes in statistics when a study shows that a higher rate in growth of dairies with digesters is not statistically significant (see slide 47 of a recent CARB presentation on [dairies](#)), but they don't believe in statistics when a study shows that using renewable diesel in new technology diesel engines does not result in statistically significant reductions in tailpipe emissions (see page viii of the recent [Low Emission Diesel Study](#) prepared for CARB⁷). As a second example, staff continue to assume that a reduction in the consumption of fossil diesel in California will result in a proportional reduction in oil production in California and then attribute the reduced criteria pollutant and GHG emissions associated with the oil production decline to the LCFS (see page B-1 of the SRIA for equations). These calculations ignore the obvious fact that California oil production has been in terminal decline for decades (see figure 1 on page 7 of

⁷ Page viii reads "There were no statistical differences in PM emissions in the NTDEs observed in any test fuel or test cycle compared to the CARB reference fuel, indicating that PM emissions are effectively controlled by the exhaust aftertreatment systems, no matter the biofuel blend or test cycle."

the California State Oil and Gas Supervisor Annual Report 2020) and oil production will continue to decline rapidly without the LCFS. Furthermore, staff has demonstrated no link between a decline in California refinery output and a decline in oil production in the State. CARB staff should provide the Board with the best available information to make an informed decision, not skew the data and calculations to support a pre-determined policy outcome. It is unfortunate to see CARB selectively use science and mathematics.

- 065.8 4. **Staff should address the potential for the Auto-Acceleration Mechanism (AAM) to overcorrect the market.** I suggest not allowing an acceleration to occur in either 2031 or 2032⁸ as the rate of CI decline for the benchmarks is already more than tripling starting in 2031 and an acceleration that occurs in either of these years would increase the rate of target CI decline more than sixfold. Such a rapid CI stepdown may result in an overcorrection of the market with the credit price going to the ceiling, at which it may be stuck for many years. Under the above scenarios, credit price at the ceiling may result in a pass-through cost of approximately \$1.30 per gallon of gasoline in the early 2030s. Such a pass-through cost would likely be politically untenable for the program.

As always, I am available to discuss these comments with you individually at a time of your convenience.

Best regards,

Jim Duffy

⁸ This caution assumes that the AAM has not already been triggered prior to 2030. If the AAM has previously been triggered, then the years of concern will advance by one year. In other words, I suggest not allowing an acceleration to occur in either of the two years following the transition from a 1.45% rate of benchmark decline to a 4.5% rate of decline.

Appendix: Actions that CARB can take to reduce the pass-through cost to consumers of gasoline.

These actions involve limiting credit generation that does not advance California's long-term zero-emission transportation goals, eliminating excessive credit generation, eliminating LCFS subsidies that do not result in additional global GHG emission reductions beyond what would already occur through other State and Federal programs, and minimizing the potential for credit price spikes. Cutting out unnecessary and ineffective credit generation will allow for less stringent targets and lower pass-through costs, without sacrificing real, additional GHG reductions achieved by the program.

Eliminate double counting of emission reductions from direct air capture (DAC):

In several provisions of the LCFS regulation amendments (e.g., book-and-claim electricity, book-and-claim RNG, book-and-claim hydrogen, renewable or low-CI process energy), the regulation text prohibits generating LCFS credits if the RECs or environmental attributes are "being claimed in any other voluntary or mandatory program with the exception of (insert list of programs where stacking is allowed)". However, such language is conspicuously absent from section 95490 for DAC or other CCS projects. It is public knowledge that Oxy 1PointFive is already preselling future emission reductions in the voluntary carbon market for its first DAC project and intends to bundle DAC emission reductions with crude oil being marketed as "carbon neutral crude" or "net zero oil". See:

- [1PointFive announces agreement with Airbus for purchase of 400,000 tonnes of carbon removal credits](#)
- [Amazon makes first investment in direct air capture climate technology | Reuters](#)
- [Oxy teams with Macquarie to deliver the world's first carbon-neutral oil from Permian basin to India](#)
- [1PointFive Announces Agreement to Sell 500,000 Metric Tons of Direct Air Capture Carbon Removal Credits to Microsoft](#)
- [1PointFive and AT&T Announce Direct Air Capture Carbon Removal Agreement](#)

While I agree that the LCFS value for CCS and DAC should stack with Federal 45Q tax credit, generating LCFS credit for emission reductions that are also sold to other entities in the voluntary carbon market and/or bundled with crude as "net zero oil" is a clear instance of double or maybe even triple counting of emission reductions. If your intention is to allow double or triple accounting, then that should be transparently stated and discussed in a public forum.

Remove Enhanced Oil Recovery (EOR) as an Eligible Sequestration Method: California SB 1314 prohibits the use of EOR as a sequestration method for CCS projects in California. Section 1 of SB 1314 reads "The Legislature finds and declares that the purpose of carbon capture technologies, and carbon capture and sequestration is to facilitate the transition to a carbon-neutral society and not to facilitate continued dependence upon fossil fuel production." CO₂ EOR is a tertiary oil production method that is only used when oil field production has declined to the point that it is no longer

profitable to continue producing using secondary production methods such as waterflood. As such, use of EOR results in the recovery of oil that otherwise would not be produced. The LCFS program should not be providing incentive to squeeze additional oil from these fields. Let's leave this oil in the ground! Out of consistency with California requirements, I strongly encourage the Board to remove EOR as an eligible sequestration method under the LCFS. This can be done by setting a grandfather date (e.g., 2028) after which projects using EOR cannot be certified.

Place a cap on out-of-state DAC projects: Based on press releases, DAC projects are expected to be massive, resulting in credit generation of up to one million MT annually for each project. At a credit value of \$200, a single out-of-state project may result in approximately \$200 million leaving the California economy annually, while providing no jobs for Californians, displacing no fossil fuels in California, resulting in no air pollution benefits to California communities, and not even counting toward California's AB32 emission reduction goals. Therefore, not only will Californians be paying for a large out-of-state project that provides no immediate benefit to the state, but they will also have to pay again for separate emission reductions that do count toward the State's goals. In effect, these DAC projects would act as "LCFS offsets", allowing oil companies to comply with the LCFS without affecting their fossil fuel sales. Credit generation for out-of-state DAC projects should either be quickly phased out through a grandfather date or tightly capped as is done in the Cap-and-Trade program for offsets. If left uncapped, a proliferation of DAC projects⁹ could result in repeated triggering of the Auto-Acceleration Mechanism leading quickly to excessive pass-through costs to California consumers.

Stop receiving new petroleum project applications in 2025 and phase out crediting by 2030: The innovative crude and refinery investment projects that have been approved to date are certainly not innovative and are excessively subsidized. These projects should not be credited through the LCFS. All projects certified under the innovative crude provision are for solar electricity, which is cost effective without LCFS credit value. Likewise, the refinery investment credit project certified for the Chevron refinery in Richmond is providing approximately 60,000 credits annually for a hydrogen plant upgrade that Chevron was planning to do before the LCFS was even adopted.¹⁰ These are certainly not additional emission reductions. In effect, the LCFS is subsidizing oil companies to meet their Cap-and-Trade obligation.

Stop overcompensating dairy digester projects: It is my understanding that capital financing for dairy digester projects is commonly paid off in ten years, after which only maintenance and operating costs remain. While dairy digester operators may reasonably argue that they need full avoided methane credit for the first ten years while paying of capital costs, having full avoided methane credit for the next twenty years is gross overcompensation. **Moreover, after paying off capital costs for the digester, it is no longer appropriate to assume a baseline of methane emissions to the**

⁹ Oxy 1PointFive has announced a [goal of completing 70 DAC projects by 2035](#).

¹⁰ See <https://ccpulse.org/2014/07/31/richmond-approves-stalled-modernization-plan-at-chevron-refinery-2/>

atmosphere. With avoided methane crediting, a dairy digester project generates approximately \$70 to \$125 per MMBtu in total value from the LCFS, RFS, and gas sales.¹¹ The operating and maintenance costs for a digester project are about \$25 per MMBtu (\$35 per MMBtu if trucking of the gas is required).¹² In other words, digester projects getting avoided methane credit are generating about 100 to 400 percent annual profit after paying off the digester. To avoid this needless overcompensation, I recommend assigning a fixed CI value of zero g/MJ for the remaining 20 years of LCFS crediting.¹³ At a CI value of 0 g/MJ, the dairy digester project would generate a combined value of approximately \$40 to \$60 per MMBtu, which is much more in line with the operating and maintenance costs.

Do not allow dairy projects to get more credit for increasing the herd size: Avoided methane credit should be capped based on the historic herd size before LCFS certification. This would prevent dairy projects from receiving additional credit for growing the herd size and exacerbating local air quality problems.

Apply biomethane deliverability requirements for all biomethane pathways: In a last-minute revision, staff decided to grandfather all RNG projects that break ground prior to 2030 from proposed deliverability requirements, and projects breaking ground in 2030 or later will only be affected by deliverability requirements starting in 2040. I recommend the Board direct staff to revert to the original concept discussed in workshops and apply deliverability requirements for all pathways starting in 2028. As an exception, I recommend that dairy digester projects that break ground prior to 2025 be allowed to complete their first 10-year crediting period under current deliverability requirements. These dates will provide sufficient time for out-of-state RNG projects that do not meet the deliverability requirements to contract with fleets outside of California and continue receiving value from the RFS. This timing will also allow these digester operators sufficient time to work with their own state legislatures to provide additional funding if necessary to avoid potential stranded assets. Gasoline consumers in California have jump started the dairy digester industry in these states, they shouldn't be asked to fund these projects in perpetuity.

Quickly phase-out book-and-claim accounting for landfill gas: Landfills do not need LCFS credit as the RFS incentive for these projects is already excessive. Moreover, over 98 percent of the landfill gas generating credit under the LCFS is from out-of-state sources. Producing landfill gas for transportation is estimated to cost approximately \$10

¹¹ At an LCFS credit price of \$100 to \$200, dairy digester gas generates approximately \$40 to \$80/MMBtu in value from the LCFS, \$26 to \$40/MMBtu in value from the federal Renewable Fuel Standard, and about \$5/MMBtu for the gas for a total value of approximately \$70 to \$125/MMBtu.

¹² See calculation details at <https://asmith.ucdavis.edu/news/digester-update>

¹³ This recommendation should be made together with a phase out of book-and-claim accounting for landfill gas.

per MMBtu¹⁴ but these projects currently receive about \$40 per MMBtu in incentive from the RFS. In other words, the LCFS providing incentive for these projects does not result in additional global GHG reductions, only more profits. I recommend eliminating book-and-claim accounting for landfills in 2028, which will provide sufficient time for out-of-state landfill gas operators to find a different purchaser for their gas.

Phase out crediting for light-duty and heavy-duty forklifts: Staff took a step in this direction by reducing the EER for light-duty forklifts but should go a step further and set phase out dates of 2030 for light-duty forklifts and 2040 for heavy-duty forklifts. With limited exceptions, all forklifts will be required by regulation to be zero-emission by 2040.¹⁵

Return to the Board if the Auto-Acceleration Mechanism (AAM) is triggered repeatedly: The AAM is designed to automatically increase the stringency of the program if there is a chronic excess of credit leading to a buildup of the credit bank and reduction of credit prices. In discussing the rationale for the AAM, CARB wrote “The existence of an AAM is expected to decrease market volatility and increase market confidence, which will promote low-carbon technology investments.” However, modeling released as part of the 15-Day Changes shows credit prices varying from a low of \$0 (approximately \$75 with one trigger of the AAM) to a high at the credit price ceiling. Will the AAM effectively set a credit price floor that is well above \$75? Will unexpected credit generation result in multiple triggers of the AAM and unexpectedly high pass-through costs, especially when credit prices subsequently increase to the price ceiling? Because of the uncertainty surrounding the impact of the AAM on credit price and pass-through cost, I recommend requiring that a rulemaking be initiated if the AAM is triggered twice in any six-year period. Moreover, this rulemaking should be completed before a third acceleration is allowed. Repeated triggering of the AAM indicates market conditions that staff and the Board did not anticipate when approving these amendments. Staff should be required to investigate and return to the Board with amendments to establish new compliance targets and address the cause(s) of the market imbalance, if necessary.

Address the potential for the AAM to overcorrect the market: I suggest not allowing an acceleration to occur in either 2031 or 2032 as the rate of CI decline for the benchmarks is already more than tripling and an acceleration that occurs in either of these years would increase the rate of target CI decline more than sixfold. Here are the scenarios of concern:¹⁶

¹⁴ See <https://www.erm.com/globalassets/documents/mjba-archive/issue-briefs/rngeconomics07152019.pdf>

¹⁵ See [workshop materials](#) for the forthcoming Zero-Emission Forklifts Regulation.

¹⁶ I wrote these scenarios assuming that the AAM has not already been triggered prior to 2030. If the AAM has previously been triggered, then the years of concern will advance by one year. In other words, I suggest not allowing an acceleration to occur in either of the two years following the transition from a 1.45% rate of decline to a 4.5% rate of decline.

- The AAM is triggered in May of 2030. This trigger has occurred because the market is generating too many credits based on an annual benchmark decline from 2026 through 2030 of 1.45 percent. In 2031, the rate of benchmark decline is already scheduled to more than triple to 4.5 percent. An acceleration in 2031 would more than sextuple the rate of benchmark decline to 9 percent.
- The AAM is triggered in May of 2031. Again, this trigger has occurred because the market is generating too many credits based on an annual benchmark decline from 2026 through 2030 of 1.45 percent. In 2031, the benchmark has already declined by 4.5 percent, which may itself correct the market. However, in 2032, an acceleration will occur increasing the target CI reduction another 9 percent.

Either of these scenarios may result in an overcorrection with the credit price going to the ceiling, at which it may be stuck for many years. Under the above scenarios, credit price at the ceiling will result in a pass-through cost of approximately \$1.30 per gallon of gasoline. Such a pass-through cost would be politically untenable for the program.

Comment Log Display

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Comment 66 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Sherrie
Last Name	Marrow
Email Address	smerrow@transportproject.org
Affiliation	The Transport Project
Subject	Comments on the August 2024 Proposed Changes to the LCFS

Comment

066.1

Chair Randolph:

The Transport Project (TTP) respectfully submits the attached comments on the California Air Resources Board (CARB) staff proposed modifications to the California Low Carbon Fuel Standard (LCFS) program and in support of the objective, to continue to incentivize the lowest carbon fuels and technologies available to the transportation market. The LCFS modifications proposed by CARB staff are comprehensive and represent significant efforts that are appreciated. It is our belief that California should continue to be fuel neutral through the LCFS, using national standards and the Argonne GREET model to determine the best LCFS credit generators.

The Transport Project is a national coalition of fleets, vehicle and engine manufacturers and dealers, servicers and suppliers, and fuel producers and providers dedicated to the decarbonization of North America's transportation sector. Through the increased use of gaseous motor fuels including renewable natural gas and hydrogen, California can help achieve ambitious climate goals and greatly improve air quality safely, reliably, and effectively without delay and without compromising existing commercial business operations.

Thank you for your consideration of our comments and please let me know if you have any questions.

Sincerely,

Sherrie Merrow
The Transport Project Director of State Government Affairs

Attachment	www.arb.ca.gov/lists/com-attach/7392-lcfs2024-UyddLwR1V1sAZQFu.pdf
Original File Name	TTP Comments on CA LCFS Staff Proposed Modifications - 8.27.2024.pdf
Date and Time Comment Was Submitted	2024-08-27 10:45:57

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 27, 2024

Liane M. Randolph, Chair
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95814

RE: The Transport Project Comments on the CARB Staff Proposed Modifications to the CA LCFS

Chair Randolph:

The Transport Project (TTP) respectfully submits the following comments on the California Air Resources Board (CARB) staff proposed modifications to the California Low Carbon Fuel Standard (LCFS) program and in support of the objective, to continue to incentivize the lowest carbon fuels and technologies available to the transportation market. **The LCFS modifications proposed by CARB staff are comprehensive and represent significant efforts that are appreciated. TTP supports most changes with some caveats as detailed in the paragraphs on the second page. It is our belief that California should continue to be fuel neutral through the LCFS, using national standards and the Argonne GREET model to determine the best LCFS credit generators.**

The Transport Project is a national coalition of fleets, vehicle and engine manufacturers and dealers, servicers and suppliers, and fuel producers and providers dedicated to the decarbonization of North America's transportation sector. Through the increased use of gaseous motor fuels including renewable natural gas and hydrogen, California can help achieve ambitious climate goals and greatly improve air quality safely, reliably, and effectively without delay and without compromising existing commercial business operations.

California has achieved significant emission reductions through the LCFS program, but is falling behind in achieving its longer-term goals as stated in the following two current articles:

[California needs to triple pace of emissions cuts to meet 2030 goal, report says | Reuters](#)

[CA isn't on track to meet climate change mandates, report says - CalMatters](#)

The information presented above coupled with significant issues in electric vehicle (EV) performance in the Medium- and Heavy-Duty vehicle market including, cost, range, technical issues, battery issues, a lack of 1 to 1 vehicle replacement for duty cycles (including the need for more drivers for the additional EVs needed) and the lack of stations and grid availability raise questions as to the effectiveness of relying primarily on potential emissions reductions from EVs.

Zero Emission Vehicles (ZEV) have played a role in California's vehicle emissions reductions, but low carbon and low NOx fuels have produced most of these emissions reductions to date, and there is a need to retain these fuels until ZEV technology, charging/fueling and supply reach full operational capacity. There is **no one solution** to the pressing environmental issues facing the transportation sector. Policy makers should move quickly to deploy those technologies and solutions that are readily available,

maximize cost-effective emission reductions, and provide a real pathway to carbon neutral or carbon-negative emissions.

The Transport Project offers the following comments regarding the CARB staff LCFS proposed amendments outlined in the “Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information:”

- 066.2 **Page 3, New Subsection 95482(h)** – Removes LCFS credit generation eligibility for hydrogen produced using fossil gas as a feedstock, effective January 1, 2031 (this aligns with the current operational timeline for projects funded under the hydrogen hub grants). Hydrogen is to be low-carbon renewable hydrogen produced through steam methane reformation of biomethane, electrolysis and biomass gasification. **TTP requests that CI scores be the driver for LCFS fuels recognizing that a blended fossil natural gas and renewable natural gas producing a lower CI score for hydrogen is a necessary path to hydrogen that will likely be needed beyond the January 1, 2031 date.**
- 066.3 **Page 5, Section 95484** – Increases the near-term average carbon intensity benchmarks’ stringency to a 9% CI reduction in 2025 from the 5% year-to-year increase included in the initial amendments’ proposal (will help bring the deficits and credits back into balance). The compliance targets between 2025 and 2030 are adjusted in the 15-day modifications package to smooth the curve between the more ambitious 2025 compliance target and the originally proposed 30% reduction in 2030 that will be maintained. **TTP commends the 9% CI reduction and encourages CARB to move to a 35% reduction in 2035.**
- 066.4
- 066.5 **Page 10, Section 95488.3** – Staff proposes to specify a process by which the Executive Officer may correct the Tier 1 CI Calculators to align more closely with the CA GREET 4.0 model and facilitate modeling consistency and efficiency. **TTP believes this would be appropriate if the alignment mirrors the national GREET model. Specific CA parameters make sense if they are calculated using the methods of the national GREET model.**
- 066.6 **Page 12, Section 95488.8** – Modifications to deliverability requirements for book-and-claim accounting for biomethane where a gas pipeline system map identifying interstate pipelines and their majority directional flow based on specified flow data by July 1, 2026. LCFS pathways for bio-CNG, bio-LNG and bio L-CNG combustion in vehicles would have to show physical flow to CA after December 31, 2037. **TTP requests that the pipeline map be approved as of January 1, 2026 to extend the deliverability time for NGVs.**
- 066.7 **Page 12, Section 95488.9** – Staff proposes to reduce the total number of crediting periods for avoided methane emissions crediting periods to two, rather than three, to align more closely with the end dates for avoided methane pathways that break ground after December 31, 2029. **TTP is concerned that this reduction in crediting periods will adversely affect the number of avoided methane projects that will be eligible and asks that there be no change.**
- 066.8 **Page 13, Section 95488.10** – Staff proposes to expand the credit true up to include periods using temporary pathway CIs after annual verification, enabling the eventual recovery of credits based on verified operational data. **TTP agrees with this true up and appreciates the ability to recover credits. However, we oppose the process that would impose a four-to-one CI penalty mechanism for CI changes on a project as being unnecessary since there already is a path for correction through the Annual Fuel Pathway Reporting process.**

The Transport Project thanks CARB for their work and requests consideration for our comments and requests made with regard to the proposed LCFS modifications. We strongly believe that multiple fuels and technologies will be needed to reduce emissions, and that the “best fit for the purpose” should be the guiding principle. The key is to find proven products that are available, that effectively and affordably lower emissions, have existing infrastructure for fueling/charging and fit the current business model.

Please contact me with any questions.

Sincerely,

A handwritten signature in dark ink, appearing to read "Sherrie Merrow". The signature is fluid and cursive, with the first name "Sherrie" and last name "Merrow" clearly distinguishable.

Sherrie Merrow
The Transport Project Director of State Government Affairs

Comment Log Display

Here is the comment you selected to display.

Comment 67 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Sara
Last Name	Olsen
Email Address	solsen@edf.org
Affiliation	Environmental Defense Fund
Subject	Environmental Defense Fund LCFS Comments
Comment	<div>Please find Environmental Defense Fund's comments regarding the 15-day public notice for the proposed amendments to California's Low Carbon Fuel Standard</div>
Attachment	www.arb.ca.gov/lists/com-attach/7393-lcfs2024-VDgAZQRjAiIDWldm.pdf
Original File Name	LCFS 15-Day Package - EDF Comments.pdf

Date and Time Comment Was Submitted 2024-08-27 10:54:56

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 27, 2024

Ms. Liane Randolph
Chair, California Air Resources Board
1001 I Street Sacramento, CA 95814

Submitted Electronically

Re: Comments regarding the 15-day public notice for the proposed amendments to California's Low Carbon Fuel Standard

Dear Chair Randolph,

Thank you for the opportunity to provide comments on the 15-day public notice for the proposed amendments to California's Low Carbon Fuel Standard. Environmental Defense Fund (EDF) appreciates the work CARB staff has dedicated to amending the Low Carbon Fuel Standard. EDF looks forward to continuing to engage in this rulemaking and supporting the successful decarbonization of California's transportation sector.

As we have stated in previous comments, updating LCFS to increase the program's ambition and efficacy will be integral to ensuring California can deliver the outcomes and emissions reductions envisioned in the final Climate Change Scoping Plan, as well as achieve carbon neutrality by 2045.

We are pleased to see amendments that strengthen the CI reduction benchmarks both pre- and post-2030. EDF hopes that this increased rigor alongside other amendments will sustain the LCFS's role in promoting the use of lower carbon alternatives, thus bringing substantial health, economic, and environmental benefits. To that end, we offer the following comments regarding three aspects of the proposed LCFS amendments: 1) crediting for manure biogas, 2) crediting for medium- and heavy-duty vehicle charging, and 3) sustainable decarbonization of the aviation sector.

1. Crediting for Manure Biogas

067.1 Agriculture, particularly the dairy industry, is a major source of California's methane emissions. Almost 25% of California's total methane emissions are estimated to come from dairy manure. Addressing dairy manure methane emissions is a key action needed to meet California's climate goals. We applaud the state for establishing a specific methane reduction for the dairy and

livestock sectors in SB 1383 (Lara, 2016). California dairy farmers, as price takers, have little market power to pass costs associated with methane reduction solutions on to the consumer, we therefore also recognize the significant role that programs such as the LCFS continue to play in incentivizing and supporting reductions in livestock methane sources.

We appreciate CARB's stance that capturing methane from landfills, dairies, and wastewater is critical to achieving climate targets, and we are aligned with CARB's preference for biomethane to be used to produce low-carbon intensity hydrogen and electricity. We agree that attention is needed to ensure methane capture projects are not abandoned as LCFS transitions away from combustion vehicles towards hard-to-decarbonize sectors.¹

Manure biogas systems, when operated and installed in a responsibly maintained farm system, are a proven technology that can address existing sources of agriculture methane (from dairy manure storage systems) while replacing fossil fuel-derived methane. Given the considerable number of liquid manure systems that exist in California (and US) dairies, continuing to include manure biogas systems—as part of an environmentally comprehensive farm nutrient management system—in the LCFS is a powerful tool to drive agriculture methane reductions from existing sources. Continued eligibility is important to meet California's climate goals and drive further agriculture methane reductions across the US.

Today, the LCFS is the most impactful market-based tool to incentivize livestock farmers to adopt methane capture technologies. However, as with any program, it is not perfect. We cannot focus on solving methane, a global climate pollutant, without also ensuring meaningful improvement in the local environment and community.

Local air quality impacts that result either directly or indirectly from anaerobic digestion must be addressed.

One of the most significant local air pollutants of concern surrounding biogas systems is ammonia. Approximately 80% of ammonia emissions in the United States, encompassing emissions from both natural sources and human activities, are from agricultural sources. Notably, around 60% of these national emissions stem from livestock manure.² Ammonia is a health concern, as it has the potential to form fine particulate matter (PM_{2.5}), which can lead to respiratory and pulmonary issues in nearby communities.³ Ammonia emissions also present an environmental risk contributing to soil acidification and/or eutrophication in downwind ecosystems.⁴

¹ <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>

² <https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data#doc>

³ <https://pubmed.ncbi.nlm.nih.gov/20458016/>

⁴ <https://www.sciencedirect.com/science/article/pii/S0301479722018588?via%3Dihub>

During anaerobic treatment or storage, manure organics decompose in an oxygen-free environment and produce methane, ammonia, and other gases. In open-system manure storage or treatment lagoons, as the manure undergoes anaerobic decomposition, most of these compounds are lost to the atmosphere. If the anaerobic decomposition takes place in an enclosed environment (such as a covered lagoon or anaerobic digester), the methane degases from the liquid phase and is captured under the cover where it can be collected and flared or used as a fuel. However, the ammonia stays in the solution and hence the dissolved ammonia becomes concentrated inside the anaerobic digester, particularly relative to that remaining dissolved in an open lagoon.

Once the digestate from the anaerobic digester or covered lagoon is discharged from beneath the cover into an open lagoon or storage tank, the ammonia is lost to the atmosphere in the same quantity or perhaps somewhat higher quantities, relative to that lost in an open lagoon, presenting a serious health risk to downwind communities.

We strongly recommend that any LCFS credit generated from biogas created from manure in covered lagoons or anaerobic digesters for hydrogen production should be predicated upon the management of the digestate to reduce ammonia losses. Specifically, in Section 95488.9(f)(1). *Special Circumstances for Fuel Pathway Applications: Carbon Intensities that Reflect Avoided Methane Emissions from Dairy and Swine Manure or Organic Waste Diverted from Landfill Disposal*, we recommend adding an additional requirement that the digestate from the digester from which the biomethane is captured must be treated to control ammonia emissions by using a cover or other mechanism to substantially reduce ammonia emissions.

Keeping the digestate in an enclosed system would greatly reduce the loss of ammonia from the digestate as well as allow for the capture of the residual methane in the digestate. The residual methane could be added to the digester biogas and used as fuel. An impermeable cover on the digestate reduces ammonia losses by 55-100% and residual methane emissions by 90%^{Error!} **Bookmark not defined.** while a permeable cover is estimated to reduce ammonia by 40-80%.⁵

Farm systems can have a negative impact on local communities, specifically around air pollutants, odors, and other downwind ecosystem and water concerns. Producers of biomethane from digesters should have a robust system in place to participate in LCFS to ensure the digester and its nutrients are managed properly. It is critical that crediting be contingent upon meeting specific standards that further reduce environmental and community impacts.

2. Crediting for Medium- and Heavy-Duty Vehicle Charging

Medium- and heavy-duty vehicles are responsible for a disproportionate amount of greenhouse gas (GHG) emissions and local pollution relative to the size of their population. In California,

⁵ <https://extension.colostate.edu/topic-areas/agriculture/best-management-practices-for-reducing-ammonia-emissions-lagoon-covers>

despite the fact that trucks are just seven percent of all vehicles in the state, they emit nearly 33% percent of particulate matter, 25% percent of nitrogen oxides (NOx), and nearly 9% percent of greenhouse gas emissions⁶ from the transportation sector; electrifying these vehicles will therefore produce outsized climate and local air pollution benefits. This is particularly important in the state's disadvantaged communities, because while the health impacts, which can negatively affect "every organ in the body,"⁷ are experienced to some extent all across the state, "low-income and communities of color...are often disproportionately affected by emissions from freight movement due to their proximity to transportation infrastructure,"⁸ such as ports, railyards, and freight corridors. Because of this disproportionate impact, there is an urgent need to electrify medium- and heavy-duty vehicles in these neighborhoods.

067.3

CARB should remove the minimum nameplate power rating requirement for the MHD FCI program.

While EDF appreciates CARB lowering the FSE minimum nameplate power rating to 50kW, we still recommend removing the minimum nameplate power rating entirely. As noted in our previous comments, while some electric trucks and buses will rely on direct current fast chargers (DCFCs) with higher nameplate capacities, many will not require the same level of charging. This is particularly true for fleets operating out of and charging at private depots which may have shorter duty cycles and can spread their charging overnight and/or several daytime blocks with lower-power DCFC or level-2 charging. Removing the nameplate requirement would allow these fleets to optimize their charging based on their own operational needs, resulting in grid-beneficial charging behavior, while still remaining eligible for the program. Consistent with this recommendation, CARB should also remove or modify the limitation that no more than ten chargers per applicant per site would be eligible for credits. The proposed 10 MW cap per customer per site is a sufficient constraint on individual customers accumulating credits while retaining the flexibility for applicants to deploy chargers in number and capacity consistent with their needs. Otherwise, applicants would potentially be incentivized to oversize chargers' nameplate capacity to maximize credit eligibility.

3. Sustainable Decarbonization of the Aviation Sector

For almost a decade, EDF has been working to reduce harmful pollution from aviation to mitigate climate change and deliver public health benefits utilizing alternative fuels. This includes engagement in climate policy at the International Civil Aviation Organization (ICAO), leading and participating in expert working groups developing ICAO's Sustainability Framework for Sustainable Aviation Fuel (SAF) – an effort that builds heavily on California's Low Carbon Fuel Standard (LCFS). We were also deeply involved in the inclusion of SAF tax credits in the federal Inflation Reduction Act (IRA).

⁶ <https://ww2.arb.ca.gov/ghg-inventory-graphs>

⁷ <https://www.ucsusa.org/resources/cars-trucks-buses-and-air-pollution#toc-effects>

⁸ https://ww2.arb.ca.gov/sites/default/files/2021-09/Proposed_2020_Mobile_Source_Strategy.pdf

The Low Carbon Fuel Standard program plays a significant role in California's decarbonization efforts in the aviation sector and any proposed reforms warrant thorough consideration. EDF believes that expanding the scope of LCFS to include aviation fuels beyond the existing voluntary opt-ins for alternative jet fuels⁹ is a necessary step towards achieving carbon neutrality in California by 2045 and will likewise support collective climate ambition. The structured deployment of sustainable aviation fuels (SAF) in California is crucial for the civil aviation sector to reach the International Civil Aviation Organization (ICAO)'s global goal of net-zero climate impact by 2050.

067.4 *CARB should consider the inclusion of all fossil jet fuel in California during the next regulatory process.*

EDF recommends that in the next regulatory process, CARB carefully consider the inclusion of all fossil jet fuel uplifted in California. Considering the full scope of aviation fuel ensures the greatest degree of climate benefits and that the aviation sector shares responsibility for a portion of the cost of deploying SAF uplifted in California. In the meantime, the State Strategy for the State Implementation Plan represents a unique opportunity for CARB to take a leadership role in protecting communities adversely affected by aviation's toxic emissions.

067.5 *CARB must protect workers' and airport-adjacent communities' health by considering action under the State Strategy for the State Implementation Plan.*

Jet fuel-related emissions from landing and take-off operations disproportionately affect local communities, as well as workers within the airport envelope. Communities living in proximity to airports are exposed to elevated levels of ultrafine particles (UFP) and are at risk of adverse health effects, a critical issue upon which CARB needs to act without further delay.

While SAF blends uplifted in California have the potential to reduce harmful aviation emissions from take-off operations by reducing aromatic content, such an outcome will not happen unless additional regulations are enforced. Furthermore, the gradual scale-up of SAF means that a fuel swap will help only marginally in the near term - if at all - which is insufficient to protect overburdened communities already suffering decades' worth of accumulated adverse health effects.

To deliver tangible near-term public health benefits, CARB should expeditiously consider action under the State Strategy for the State Implementation Plan, with the goal of regulating jet fuel composition. Jet fuel aromatic content could be reduced with existing refining infrastructure in California while tapping on IRA's generous clean hydrogen subsidies to cushion price impacts

⁹ Important to note, 'alternative jet fuels' denotes a broader category than does 'SAF.' Per definitions established at the federal and international levels, 'SAF' refers solely to fuels produced using renewable energy sources, wastes and residues and meet sustainability criteria.

and GHG emissions penalties. This is low-hanging fruit measure that could slash PM2.5 emissions without adversely affecting safety, i.e., in a manner that would be fully compatible with existing federal airworthiness certifications.

Thank you for your consideration of these comments. EDF looks forward to continuing to work with CARB to update the LCFS. If you have questions or would like to discuss any of these recommendations, please contact Katelyn Roedner Sutter at kroedner@edf.org.

Sincerely,

A handwritten signature in dark ink, reading "Katelyn Roedner Sutter". The signature is written in a cursive, flowing style.

Katelyn Roedner Sutter
California State Director

Comment Log Display

Here is the comment you selected to display.

Comment 68 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Christopher
Last Name	Lish
Email Address	lishchris@yahoo.com
Affiliation	
Subject	Please further strengthen the Low Carbon Fuel Standard -- Notice of Public Availability of

Comment

Tuesday, August 27, 2024

Clerks' Office
California Air Resources Board
1001 I Street
Sacramento, California 95814

Subject: Please further strengthen the Low Carbon Fuel Standard --
Notice of Public Availability of Modified Text and Availability of
Additional Documents and/or Information for the Proposed Low Carbon
Fuel Standard Amendments

To Governor Gavin Newsom, CARB Chair Liane M. Randolph, and CARB
Board Members:

I am deeply concerned about the current state of California's Low Carbon Fuel Standard (LCFS), the program that's supposed to incentivize transition to "low-carbon" transportation, and, therefore, am greatly appreciate that the California Air Resources Board has released a proposed update to the LCFS. Disappointingly, the revision doesn't go far enough. Despite persistent opposition from the environmental justice community, it continues those parts of the program that provide financial support for harmful practices, such as biofuel produced from virgin soy and canola oil, and factory farm production of "biomethane." I implore you to take immediate action to address the environmental injustices embedded in the program.

Originally intended as a tool to combat climate pollution in the transportation sector, the LCFS has been manipulated by powerful

068.1

industries, particularly Big Ag and Big Oil. It has become the nation's largest and most lucrative pollution trading scheme for factory farm biogas, perpetuating harmful practices rather than serving its environmental objectives.

068.2

The proposal to remove credits for hydrogen produced from fossil fuels is a positive step. But delaying implementation of this measure until 2030 means production of hydrogen from fossil fuels will continue to receive financial rewards for another five-plus years, thus incentivizing the harm we should be preventing.

068.1 cont

Biofuels produced from virgin soy or canola oil have major negative consequences, including deforestation, and incentivizing industrial agriculture that generates large amounts of greenhouse gas and other pollution, and drives up food prices. The proposed revision acknowledges such problems, but continues to provide credits for the production of biofuels that include up to 20 percent from these destructive sources. And even this weak restraint will not take effect until 2028. Environmental justice advocates have repeatedly called instead for caps on vegetable-oil based biofuels.

068.3

The proposed draft continues to provide credits for industrial dairy "biogas," a false solution that has infected California's climate policies. This financial support continues to incentivize the expansion of large-scale factory dairy farms, causing serious harm to the health of surrounding communities, increasing the greenhouse gases and pollution generated by the production of feed for cows confined to barns; concentrated methane emitted by pools of waste; the inevitable leakage of methane during storage and transportation; and greenhouse gas emissions produced by combustion of the product. Incentivizing the buildout of dirty factory farms

068.4

not only enables pollution but disproportionately harms low-income communities and communities of color. Factory farms, predominantly situated in these marginalized areas, inflict severe damage on air, water, public health, rural economies, and overall quality of life. Collecting methane from factory farm cesspits does nothing to alleviate the massive harm mega-dairies and other large factory farms do to these communities. I strongly urge CARB to phase out support for biomethane as rapidly as possible.

Unlike previous versions of the LCFS, the new proposal does not require airlines to take any responsibility for the combustion of fossil jet fuel, even for intrastate travel. This is a step backward, excluding a major source of greenhouse gases and pollution from fossil fuel combustion.

Instead of doubling down on dirty factory farm gas, I demand a future free from the clutches of Big Oil and Big Ag and to prioritize Californians over corporate profits.

Thank you for your consideration of my comments. Please do NOT add my name to your mailing list. I will learn about future developments on this issue from other sources.

Sincerely,
Christopher Lish
San Rafael, CA

Attachment

Original File Name

Date and Time Comment Was Submitted 2024-08-27 10:59:15

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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Comment 69 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Rhiannon
Last Name	Davis
Email Address	rhannon.davis@electrifyamerica.com
Affiliation	
Subject	Electrify America comments on Proposed 15-Day Changes
Comment	Please see attached letter. Thank you.
Attachment	www.arb.ca.gov/lists/com-attach/7395-lcfs2024-UTRSOFA0UWEGdFQm.pdf
Original File Name	Electrify America LCFS 15-Day Comment final.pdf
Date and Time Comment Was Submitted	2024-08-27 10:40:51

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 27, 2024

Rajinder Sahota
California Air Resources Board (CARB)
1001 I Street
Sacramento, California 95814

RE: Electrify America comments on Proposed 15-Day Changes to the Proposed Low Carbon Fuel Standard (LCFS) Amendments

Dear Ms. Sahota:

Electrify America is grateful for the opportunity to provide feedback on the newly proposed 15-Day Changes to proposed amendments to the LCFS regulations. Electrify America is the nation's largest open network of DC fast chargers for electric vehicles (EVs), with over 4,250 fast chargers across more than 950 locations in North America, and over 1,100 chargers across more than 250 locations open to the public in California.

We strongly support the LCFS, which is critical to advancing development of electric vehicle (EV) charging infrastructure and the state's transportation electrification goals, and we appreciate the efforts of CARB staff to engage stakeholders and strengthen the program to ensure its ongoing durability. While we believe a stronger 2030 carbon intensity target and more responsive auto acceleration mechanism (AAM) are necessary to achieve the state's 2030 targets identified in the 2020 Scoping Plan,¹ we strongly support a step-down in stringency of at least 9% and the inclusion of the AAM as a new feature of the program. We also support the proposed amendments related to fast charging infrastructure (FCI) crediting. We request minor additional changes to the proposed verification requirements for EV charging to better align practical implementation considerations.

Proposed step down of at least 9% is crucial to address credit oversupply

We appreciate CARB's willingness to re-evaluate the step-down percentage in the 15-Day Changes. While we support the ICF analysis suggesting that a step-down of 10.5-11.5% is needed to achieve a targeted credit bank of 2-3x quarterly deficits,² a 9% step down will nonetheless narrow the accumulated credit bank and support ongoing investment in EV charging and other low carbon fuels under the program.

¹ See Electrify America's previous comments on LCFS amendments, for example here: <https://www.arb.ca.gov/lists/com-attach/6868-lcfs2024-UTRUPIA0V2dXJQI7.pdf>

² <https://www.arb.ca.gov/lists/com-attach/7078-lcfs2024-VDVcNFlyVGsLdFQu.pdf>

069.2 cont **The auto acceleration mechanism should be more responsive to market conditions**

The auto acceleration mechanism (AAM) is an important new element of the LCFS program that complements existing cost containment features and will provide greater ongoing market certainty to support ongoing investment in clean fuels and ZEV infrastructure for California. We strongly support its inclusion in the Proposed Amendments.

However, in its current form, the first year the ratchet mechanism could be implemented would not be until 2028. This would greatly limit its potential to stabilize near-term market conditions and support achievement of carbon intensity outcomes in 2030 that will likely be necessary to achieve Scoping Plan objectives.³ The AAM is conservatively designed to only trigger when market conditions warrant and there is both a significant, and growing, credit bank. Accordingly, the AAM should be allowed to take effect based on end-2025 market conditions, with a May 2026 mechanism announcement to take effect with the 2027 compliance year. This would allow issues of credit oversupply to be corrected as soon as necessary, while by design, the AAM would not take effect unless it is needed.

Electrify America believes a more responsive AAM will help maximize the potential of this new element of the program. We recommend applying the AAM one year earlier, with accelerated targets taking effect if needed in 2027, which would allow the mechanism to adjust program stringency more proactively in response to near-term market developments, without creating undue risk to the credit bank and the LCFS program as a whole. Especially if the step-down remains below 10.5-11.5%, which ICF has identified as necessary to return the credit bank to levels below those in the AAM trigger, a more responsive AAM will help ensure ongoing health of the program. We also encourage changes to allow the AAM to apply in consecutive years, should it be appropriate given the dual trigger.

069.5 **The verification process should reflect the distinct differences between EV charging stations and other fuel pathways**

Electrify America understands CARB's need to validate and verify that fuel pathway holders are operating in line with LCFS regulations. We support efforts to ensure accurate and transparent data sharing and have implemented robust data verification procedures internally to ensure accuracy of reported data. However, we have concern that the language in §95501(b)(3) pertaining to site visits has not been sufficiently updated to address the EV charging use case.

The regulation's stated goals of verification site visits—such as interviewing personnel and examining data management practices—are sensible in the context of biofuel production facilities. However, unlike biofuel plants or refineries, EV charging stations are typically unstaffed facilities where the actual data validation and accounting practices do not occur. Therefore, verifiers would gain little value from on-site visits, and would not be able to accomplish many of the regulation's verification requirements, as there would be no personnel

³ <https://www.arb.ca.gov/lists/com-attach/132-lcfs-wkshp-nov22-ws-VDFWMQNdv2cEbVQ5.pdf>

on site to interview nor data management systems to inspect. Additionally, CARB should strive to ensure that any on-site verification procedures do not duplicate or overlap with measurement requirements that already exist under California Department of Food and Agriculture's Division of Measurement Standards regulations.⁴

Electrify America recommends CARB establish a separate verification process that minimizes or eliminates the site visit requirement for electric vehicle service providers (EVSPs). A verification approach focused on data checks and desktop review would better accommodate the operational realities of the charging station model, while still effectively verifying the fuel dispensed at the charger level. Verification processes may include phone or video interviews with relevant EVSP staff, as they would not be present at individual charging stations. This modified EVSP verification approach would uphold the integrity of the LCFS program and prove more cost-effective for CARB and program participants.

Our continued support of the LCFS program and the transparent stakeholder process

Electrify America appreciates the opportunity to provide comments on CARB's latest proposal for the Low Carbon Fuel Standard (LCFS) program. We believe the proposed changes represent a meaningful step towards cleaning up California's transportation sector and supporting the EV transition. However, we do hope CARB will consider minor additional changes, including advancing the AAM trigger date by a year and revisiting site visit requirements around EV charging stations.

Electrify America remains committed to partnering with CARB through the LCFS amendment process to advance California's clean transportation and climate priorities. We welcome the chance to discuss our feedback and recommendations further. Please don't hesitate to reach out if you have any questions.

Sincerely,

/s/

Rhiannon Davis
Director of Government Affairs
Electrify America, LLC

⁴ https://www.cdfa.ca.gov/dms/pdfs/regulations/EVSE-OAL_EndorsedLetter-and-FinalText.pdf

Comment Log Display

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Comment 70 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Amanda
Last Name	DeMarco
Email Address	amanda@csgcalifornia.com
Affiliation	
Subject	WRI comments on proposed 15 day changes
Comment	<div>Comment letter submitted on behalf of the World Resources Institute.</div>
Attachment	www.arb.ca.gov/lists/com-attach/7396-lcfs2024-BnFTJwdvU18HYIM8.pdf
Original File Name	WRI comments on the LCFS 15 Day Proposal.pdf
Date and Time Comment Was Submitted	2024-08-27 11:02:57

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)



August 27, 2024

Liane Randolph
Chair, California Air Resources Board

cc: Rajinder Sahota, Deputy Executive Officer, Climate Change & Research
Matthew Botill, Chief, Industrial Strategies Division

Re: WRI comments on the proposed 15-day changes to the proposed amendments to the LCFS

Dear Liane,

Thank you for the opportunity to comment on the proposed 15-day changes to the proposed amendments to the LCFS regulation. This letter focuses on the issue of crop-based biofuels and also provides feedback on proposed amendments related to aviation fuel.

- 070.1 WRI greatly appreciates the additional environmental safeguards included in the 15-day changes, which have the potential to address the risk that expanded reliance on crop-based biofuels would drive deforestation and a net increase in greenhouse gas emissions. To realize this potential, however, it is
- 070.2 essential to expand the proposed limit on LCFS credits generated by biomass-based diesel produced from soybean oil and canola oil to cover all virgin vegetable oils.

A 20 percent limit on LCFS credits generated by biomass-based diesel made from virgin vegetable oils could be an appropriate and effective mechanism to fulfill CARB's commitment that biofuels production must not come at the expense of deforestation and food production, particularly if other clean fuel programs adopt similar limits. As CARB staff noted at the April 10th workshop, 6 million tons of US soybean production is already going to non-food uses, particularly biofuels—A 50% increase since 2020. CARB staff also noted that increased demand for biofuels has contributed to increasing the price of vegetable oils.

Basic economic logic tells us that increased vegetable oil prices result in increased production, and empirical studies show that at least some of that increased production comes from deforestation. Globally, net cropland area expansion accelerated from 5 million hectares per year during 2004-2007 to 9 million hectares per year during 2016-2019 according to the best available [satellite-based estimates](#). Regardless of the specific source of feedstocks for crop-based biofuels, this market-driven land use change, including deforestation, and the associated LUC emissions are the reason why safeguards are needed, such as the proposed 20 percent limit on LCFS credits generated soybean oil and canola oil. The price of vegetable oils from all crops are highly correlated, however, which implies that there is no basis for limiting the cap to just soybean and canola oil. CARB should apply the 20% cap to all virgin vegetable oils. The cap should also apply to aviation fuel, which is functionally equivalent to biomass-based diesel with respect to the risk of driving land use change due to demand for crop-based fuel.

Any use of virgin vegetable oil in excess of the 20% limit should be assigned the carbon intensity of the fossil baseline, not the carbon intensity (CI) benchmark. Assigning additional fuels made from virgin vegetable oil a CI equal to the benchmark would mean continuing to incentivize them relative to fossil fuels, which conflicts with CARB's commitment that biofuels production must not come at the expense of deforestation and food production.

- 070.3 Relatedly, it will be essential for CARB to be vigilant in preventing fraud in the waste oil market. The enhanced chain-of-custody tracking for biomass feedstocks proposed in the 15-day changes will be an important mechanism to ensure that virgin vegetable oil is not contaminated with used oil in order to qualify for the lower carbon intensity appropriately assigned to waste oils.
- 070.4 As noted in previous comments, the biofuel ILUC values generated by the GTAP model have no reasonable scientific basis and are systematically biased downward as demonstrated clearly by the report [submitted to the 45 day LCFS docket](#) by Professor Berry. WRI therefore welcomes the 15-day proposal to give the Executive Officer additional authority to assign more conservative LUC values to biofuels based on the best available empirical evidence. We urge CARB to use this authority to reevaluate the LUC values of all crop-based biofuels using empirically validated methods.
- 070.5 While WRI appreciates and supports most of the proposed 15-day changes, we are disappointed that CARB is proposing to continue exempting all aviation fuel from the LCFS. The rationale offered for this change does not withstand scrutiny. As a market-based program, no deficit generator in the program is required to directly substitute lower carbon fuels for fossil fuels. This in no way eliminates the benefit of including aviation fuel in the program, which would establish an incentive to develop genuinely lower carbon aviation fuels (such as those made from clean hydrogen and captured CO₂) and strengthen the program overall. As one of the fastest growing emission sources in California and globally, eliminating the LCFS exemption for aviation fuels would be an important signal for CARB to send, both for emissions within the state and as a model for other jurisdictions.

Sincerely,
Dan Lashof, U.S. Director, World Resources Institute

Comment Log Display

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Comment 72 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Chris
Last Name	Wilson
Email Address	Chris.Wilson@Electrochaea.com
Affiliation	Electrochaea Corporation
Subject	LCFS 15-day Changes
Comment	<div></div>
Attachment	www.arb.ca.gov/lists/com-attach/7398-lcfs2024-UTRdNwdjADBRI1lg.pdf
Original File Name	Electrochaea Comment LCFS 15-day.pdf
Date and Time Comment Was Submitted	2024-08-27 11:09:59

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 27, 2024

Submitted electronically: <https://ww2.arb.ca.gov/lispub/comm/bclist.php>
The Honorable Liane Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, California 95814

Dear Chair Randolph:

Electrochaea Corporation (Electrochaea) appreciates the opportunity to submit a public comment on the proposed amendments to the Low Carbon Fuel Standard 15-Day Changes recently posted by the California Air Resources Board. Electrochaea's comments are in support of the increase in stringency of the annual carbon intensity benchmarks.

Electrochaea is a technology provider for a process that produces low CI synthetic methane using CO₂ and hydrogen. Our process uses a microorganism, an archaea, to synthesize methane at grid scale which can be used as RNG/biomethane to replace fossil fuels in transportation and beyond.

072.1 Electrochaea supports the proposed modification to Section 95484 of the annual carbon intensity (CI) benchmarks to further advance the States attainment of a net-zero carbon economy. The proposed 9% reduction in the annual CI benchmark for fuels, used as a substitute for fossil fuels, from the previously proposed 5% reduction, is a welcome modification. The increased stringency should have a positive outcome on the further adoption of low CI fuels in the California transportation market.

072.2 Electrochaea also supports the Automatic Acceleration Mechanism as described in Section 95484. This mechanism, designed to bring into balance the credit bank, credits, and deficits in the LCFS program, can reduce the oversupply of credits and provide a market signal to sustain the success and importance of the LCFS program.

Electrochaea supports science-based approaches and technologies that can reduce the use of fossil fuels and reduce GHG emissions. Use of low CI synthetic methane is an important component in the fight against climate change. Thank you for your consideration of our public comment.

Sincerely,

/s/ Chris Wilson

Chris Wilson
Global Sustainability Manager
Electrochaea Corporation
Chris.Wilson@Electrochaea.com

Comment Log Display

Here is the comment you selected to display.

Comment 73 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Maria
Last Name	Pica
Email Address	maria.pica@adm.com
Affiliation	ADM
Subject	ADM comments on August 12 LCFS 15-day changes
Comment	<div>Attached, please find comments from ADM Senior Vice President of Ag Services & Oilseeds Greg Morris related to the subject matter above.</div>
Attachment	www.arb.ca.gov/lists/com-attach/7399-lcfs2024-AGFXNVY6BAhVMAVk.pdf
Original File Name	ADM CA LCFS Comments 8-27-24.pdf

**Date and Time Comment Was
Submitted**

2024-08-27 11:12:00

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)



77 West Wacker Drive
Suite 4600
Chicago, Illinois 60601

312-634-8100

August 27, 2024

SUBMITTED ELECTRONICALLY

Re: Comments on August 12, 2024 Proposed 15-Day Changes to Proposed Regulation Order

Ms. Rajinder Sahota
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Ms. Sahota:

We reviewed with interest and concern the Proposed 15-Day Changes to the Low Carbon Fuel Standard (LCFS) proposed amendments. ADM and the broader biofuels sector has been central to the LCFS as a landmark policy in emissions reduction. Our company and industry are integral to the greenhouse gas (GHG) reduction California has seen under the program, and in order to continue this positive trajectory, all manner of biofuels must contribute, including those produced from crop-based feedstocks. Deployment of these fuels is essential to decarbonizing the transportation sector in California, North America, and the world. In fact, according to the International Energy Agency, biofuels must triple globally by 2030 in order to remain on the organization's net zero pathway.¹

CARB's mission is "to promote and protect public health, welfare, and ecological resources through effective reduction of air pollutants while recognizing and considering effects on the economy."² And one of its foremost values, as identified in the agency's most recent Roadmap is, "Science-based: We develop and implement research, policies, and technologies on evidence-based foundations to create positive change."³

- 073.1 On both counts, this latest proposal falls short of both objectives. Rather than trusting CARB's own carbon intensity scoring model and allowing the market to work as intended, it arbitrarily establishes a cap on biofuels derived from oilseeds. This neither considers "effects on the economy" nor relies on "evidence-based foundations." In reality, the proposed 9% stepdown
- 073.2

¹ <https://www.iea.org/commentaries/india-could-triple-its-biofuel-use-and-accelerate-global-deployment>

² <https://ww2.arb.ca.gov/about>

³ https://ww2.arb.ca.gov/sites/default/files/2021-01/CARB_vision_roadmap_0121.pdf

in GHG emissions and increase in stringency will promote low carbon intensity feedstock fuels immediately, making a crop-based biofuel cap wholly unnecessary. Importantly, this would allow California to maintain optionality and better navigate potential reactionary fuel price impacts on drivers.

Further, this latest proposal – which was released without the benefit of stakeholder engagement, despite numerous public workshops focused on every other proposed amendment to the program – would disincentivize farmers from investing in more sustainable practices at a time that they are adopting them at a rapid pace. Squelching agricultural innovation at this time sends the wrong signal to the largest current and future source of significant carbon intensity reductions for California’s transportation fuel market. ADM recently announced the establishment of Gradable, a joint venture with Farmers Business Network to expand a technology platform that enables more farmers and buyers to derive value from grain produced using sustainable practices. 20,000 farmers across more than 12 million acres already are leveraging this program. It has scored for carbon intensity reductions more than 200 million bushels of corn and soybeans, analyzed 48 million acre-years of agronomic events, and facilitates over \$30 million in financial incentives for sustainable practices each year. We cannot afford to squander this progress.

Our company does not offer these observations lightly. ADM made substantial contributions to low-carbon energy policy long before passage of California’s AB 32. Since our founding, we have transformed crops into products that serve the energy and food security needs of a growing world. Specific to biofuels, we first produced ethanol in 1978 and added biodiesel production in 2006. Each year in the U.S., we manufacture more than 1.4 billion gallons of corn-based ethanol and produce or market more than 400 million gallons of biodiesel. This production directly supports CARB’s aim to reduce GHG emissions, displacing nearly two billion gallons of fossil fuels each year. These contributions across the biofuels sector are the most significant reason for the success of the LCFS over the years.

Following are specific comments regarding the most recent proposal’s more ambitious target reduction for 2025; soy and canola feedstock cap; and updated sustainability requirements. **We appreciate your careful consideration of our comments and respectfully request an additional workshop before the November Board meeting to receive answers to our and sector questions on the proposal.**

073.2 cont ***Nine percent increase in stringency for 2025 in benchmark schedule***

ADM has consistently supported and contributed to GHG reduction targets under the LCFS. As noted, our record of biofuels production and deployment of these fuels to the California market have been critical to the success of the program. Signaling our commitment, we joined other industry stakeholders last year in urging CARB to finalize its updated GHG targets in 2024 and ensure their applicability this compliance year. The latest proposal to increase the 2025 stepdown immediately by 9% is an admirable action to further displace fossil fuels and will likely reduce the bank of excess credits in the system significantly, particularly if the increased stringency applies to the full calendar in 2025. This increased stringency would promote less carbon intense fuels naturally and render the 20% oilseed-based feedstock cap unnecessary.

073.1 cont *Virgin soy or canola oil cap*

ADM, our biofuels sector partners, and the broader agricultural community have engaged CARB staff in good faith during the consideration of these amendments over the past eight months and since the outset of this process through all of 2023, seeking to find a reliable path forward on sustainability practices. Our dialogue has yielded positive policy concepts to address concerns on deforestation and environmental justice; supply California with reliable, verified fuels; and support U.S. farmers who supply the feedstock for cleaner fuels and the consumers who realize lower prices thanks to their availability.

We were therefore disappointed by the recent proposal to establish in 2028 a 20% eligibility cap on a company's biomass-based diesel produced from virgin soy or canola oil. The proposal was dropped in the 15-day package with no notice or supporting stakeholder engagement through the workshop process. Throughout the workshops CARB staff signaled its perspective that arbitrary feedstock caps would undermine the effectiveness of the program while noting that additional guardrails (i.e., the sustainability provisions) needed to be integrated into the program.

While the impact on fuels production and flows may not be immediate, the arbitrary cap sends a chilling message to the biofuels sector and our farmer partners who have contributed dutifully to the program's GHG goals since its inception. The most consequential impacts:

- 073.3
- Lack of uniform traceability across feedstocks: With the more stringent 9% stepdown, it is essential that additional fuels flowing into the California market be fully and transparently verified as to their origin, composition, and supply chain. If oils from crop-based feedstocks must be fully traceable and meet sustainability provisions, so too should oils derived from waste-based feedstocks. As proposed, this is not the case. The absence of traceability for waste oils could be an incentive for feedstock providers to blend them with virgin oils, with feedstocks ranging from oilseeds to palm and more.

- 073.4
- Undermining of Climate Smart Agriculture and farmers: Regenerative and Climate Smart agriculture is critical to driving new value for feedstocks and reducing carbon intensity through more sustainable farm practices. ADM's regenerative agriculture program features direct financial support for farmers; easy processes and cutting-edge technologies to ensure low barriers to entry; and a broad range of support and guidance from third-party experts. That is what will allow us to enroll 5 million acres of farmland globally by 2025. Our program helps customers, including those in the fuels space, meet emissions commitments and requirements. Sustainability is a hallmark across the agricultural sector. You may be aware that the American Soybean Association is a founding partner of the Soy Sustainability Assurance Protocol (SSAP), which verifies and documents sustainable production on a national scale.

If oilseed feedstocks are limited in the California market, more farmers practicing regenerative agriculture will be left on the sidelines. Shutting them— and the clean fuels they help to provide — out will restrict supply and drive costs higher.

A significant enabler of our nation's path to energy security has been the agricultural sector. Even before – but especially since – the U.S. Renewable Fuel Standard (RFS), liquid biofuels have been an essential part of our domestic energy mix. Other programs to incentivize use of these lower-carbon fuels globally and here at home – including the LCFS – have followed suit. Such programs have had a parallel benefit to farmers, whose crops not only meet the world's food needs, but can also drive cleaner energy. Farmers have long shouldered the responsibility of feeding and fueling society, and limiting their involvement in the LCFS would be a clear sign that the California market is no longer open for their business.

Despite this artificial cap's impacts on liquid fuels for on-road transportation, we do recognize and support the fact that it would not apply to sustainable aviation fuel. This nascent market needs feedstock variety. Our sector is prepared to be a foundation of this new market, just as it has for on-road transportation emissions reductions. However, it should be recognized that refiners that produce SAF also produce significant volumes of renewable diesel as a matter of plant design and optimal efficiency. Thus, the proposal to cap virgin oil feedstocks may have the unintended consequence of constraining the production of SAF. Feedstock diversity across the transportation fuels system is essential, and the proposed cap should not be adopted.

Sustainability requirements

In our February 20, 2024 comments to the December 2023 proposed amendments, we and others in our sector provided very specific feedback on CARB's proposed sustainability criteria. The April workshop was so heavily attended that not all stakeholders were able to fully engage and receive clarity on how the sustainability requirements would be administered. This is another reason why an additional workshop before November is warranted.

The latest proposed changes to these criteria leave us with similar questions to those raised earlier this year, largely regarding the administration and predictability of these proposed new elements of the program. For example, we understand that beginning in 2026, fuel producers must collect and submit supply chain data including spatial data of farm boundaries where feedstocks are sourced; and maintain an attestation letter that assures that the feedstocks have not been sourced by lands that were converted after 2008.

To comply, a company would need to have attestations and spatial data for canola or soy that is harvested in 2025. Contracting with canola and soy growers will begin over the next two months. Therefore, we will be entering into contracts and making business decisions with no clear guidance on what will be required and how the requirements will be administered. To enable planning, participation and provide a degree of investment certainty, delaying implementation of these requirements to 2027 would ensure feedstock providers can make business decisions and enter into contracts with a full understanding of the requirements.

Likewise, we understand that beginning in 2028, fuel producers must obtain third party certification that, at a minimum, ensures feedstocks are not sourced on lands converted after 2008. Again, clarity on the administration of these requirements is important. As discussed with CARB staff and noted below, we believe there are existing standards that are consistent with the proposed sustainability provisions and, as such, there is no benefit in creating new

073.5

073.6

duplicative or inconsistent standards. We are prepared to work with staff on subsequent implementation guidance which will be critical for effective administration of the provisions.

As a reminder, under the RFS, sustainability criteria as proposed by CARB are met and in some cases exceeded. Specifically, under the RFS:

- Fuel feedstocks must not be sourced from agricultural land cleared or deforested after December 19, 2007.
- Environmental, social, and economic criteria are taken into account in developing annual fuel volumes under the program.
- Transparent public review of and comment on proposed annual volumes and changes to the rule are central to the continual development of the program. Proposed changes, public comment, and associated documents are posted on the U.S. EPA's website to review by stakeholders and the general public.
- Scientific experts within EPA and associated technical advisory panels provide regular input into changes to the program.
- A rigorous audit program via EPA, including high standards, training to ensure competency, and transparency to the public, is maintained.

On each of these and more points, the comprehensive RFS meets or exceeds sustainability certification criteria as proposed by CARB. Moreover, as we highlighted in our February comment letter, recognizing the RFS in this manner would avoid the burden of duplicative criteria and reporting, allowing the program to stand on firm, proven ground on sustainability while ensuring that biofuels producers and feedstock providers are held to account.

073.7

Finally, in our review of the latest proposed changes, there are no sustainability criteria applied to waste oils and foreign waste importers. For reasons explained earlier in this letter, ensuring the validity of these feedstocks is necessary to ensure the LCFS program operates with the integrity expected by all stakeholders. Please note that the European Union is establishing a Union Database to trace all feedstocks, including used cooking and waste oils, and biofuels to ensure integrity of the supply chain. The database is backed by the data and verification practices of the International Sustainability & Carbon Certification (ISCC) and should be a model and resource for CARB.

Conclusion

ADM has long been and continues to be a leader in biofuels production and an innovator in sustainable agricultural practices. The most recent proposal from CARB staff would reverse course on the progress our company, sector, and country are making on both. We appreciate your consideration of our comments and look forward to engaging with CARB staff at an additional workshop before the Board's November vote. Ultimately, we ask that CARB consider an additional set of 15-day amendments to remove the provision concerning the establishment of an arbitrary cap on certain feedstocks.

073.8

As always, we offer the opportunity to discuss our comments further at your convenience. We associate ourselves with comments submitted by Growth Energy, Clean Fuels Alliance America, National Oilseed Processors Association, American Soybean Association, and California Advanced Biofuels Association.

If you have any questions or need further clarification and detail, please contact me at greg.morris@adm.com.

Sincerely,

A handwritten signature in black ink, appearing to read "Greg Morris".

Greg Morris
Senior Vice President
President, Ag Services & Oilseeds

cc: Liane M. Randolph, Chair
California Air Resources Board (CARB)

The Honorable Board Members of CARB

The Honorable Steven S. Cliff, Ph.D., Executive Officer
California Air Resources Board

Comment Log Display

Here is the comment you selected to display.

Comment 74 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Matt
Last Name	Miyasato
Email Address	matt.miyasato@firstelementfuel.com
Affiliation	FirstElement Fuel
Subject	FirstElement Fuel comments on 15 day changes
Comment	
Attachment	www.arb.ca.gov/lists/com-attach/7400-lcfs2024-VjBQMwNkVVkFMIRh.pdf
Original File Name	FEF 15 day comments.pdf
Date and Time Comment Was Submitted	2024-08-27 11:21:29

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

Ms. Rajinder Sahota
Deputy Executive ONicer, Climate Change and Research
California Air Resources Board
1001 I Street, Sacramento
California 95814

Subject: LCFS 15-day Notice Comments

Dear Ms. Sahota,

FirstElement Fuel (FEF) is pleased to provide these comments on the proposed changes in the subject notice. While we are encouraged by some of the proposed language on the Hydrogen Refueling Infrastructure (HRI) provisions, we are still very concerned about the delayed timing of the regulation and the overall ambition of the program. Our overall comments are prioritized below.

Program Ambition

074.1 Although staff has outlined a steeper initial stepdown of 9% (compared to the original 5%), the size of the credit bank will likely remain at historically high levels until post-2027. This 3 year period of depressed value will exacerbate the financial hardship our industry has suffered and further limit our ability to aggressively build hydrogen refueling stations (HRS) as desired by the state. The delays in amending this regulation and bringing credit prices back to reasonable levels has significantly damaged our reputation with fuel cell vehicle drivers, the vehicle manufacturers and the policy makers in the legislature, and has crippled our ability to continue building stations due to lack of capital. We urge the staff to adopt a steeper stepdown followed by implementation of the AAM as soon as practicable.

Renewable Content

074.2 We applaud the vision of the staff for the aggressive renewable content (80% after 2030) proposed for hydrogen, but we are equally concerned about a level playing field with electricity and the grid. Furthermore, staff is eliminating fossil-based feedstock for hydrogen after 2030. These actions overly rely on production of renewable hydrogen through the ARCHES program, which will likely not come online until after 2030. We believe that hydrogen and the grid should maintain equitable renewable content and carbon intensity. So, we recommend that the renewable hydrogen content be made consistent with grid electricity.

HRI – Light and Medium Duty (LMD)

074.3 We thank the staff for adjusting the HRI program to incorporate MD with LD, which is how the US truck makers envision fueling of their vehicles¹. We agree with the deletion of the disadvantaged community geographic requirements but remain concerned regarding the low station capacity requirements at 2,000 kg/d with a 50% derate. Our latest generation LD stations are capable of 1,600 kg/d and garner 1,200 kg/d HRI credits. Under the staff proposal, we would need to build larger stations that would receive even less HRI credit than the current program for MD trucks. We would need to build stations 20% larger and receive 20% less credits.

Furthermore, staff is also proposing to limit credits by capping the cumulative credit generation to 1.5 times the capital expenditures (capex). The HRI capacity credit is intended to offset the station's ongoing operations and maintenance (O&M) costs and thereby reduce the cost to the drivers. Tying the cumulative HRI credits to capex ignores this intent. It reduces the ability of station providers to (a) provide ongoing O&M support while keeping hydrogen prices low and (b) continue building additional stations. We highly recommend that the 50% derate for public stations and the capex limit be removed.

We also believe that further constraining participants in the HRI program to 1% of total deficits will slow the growth of the network, especially since we have grants from the California Energy Commission for an additional 41 LD stations under GFO-19-602 and have made significant capital investments in leases, permitting and equipment for these stations. We did not intend to be the market leader in retail stations and hoped for competition to increase fuel availability, lower supply costs, and increase vehicles on the road. However, with Shell's departure from the LD station market, we do not want to be unintentionally disincentivized from building and deploying stations in the future. We ask that any stations previously awarded through competitive solicitations by the CEC be grandfathered into the existing HRI rubric at the 1,200 kg/d capacity cap.

HRI - Heavy-duty (HD)

074.4 We appreciate staff including a HD HRI mechanism and expanding the proximity to the FHWA corridors to 5 miles instead of 1 mile. However, many HD station locations will necessarily be near warehousing centers or truck parking that are further than 5 miles from an existing or proposed corridor. We recommend adding a case-by-case approval mechanism by the Executive Officer. This could also include the exception of funding by local air districts or other local and regional entities that considered location in a competitive bid as opposed to only state or federal grants. We recommend this minor addition:

1

https://uscar.org/publications/?q=medium%20duty%20hydrogen&catid=50&show_pagination=1&paged=1&limit=20


§ 95486.4. Generating and Calculating Credits for ZEV Fueling Infrastructure Pathways for Heavy-Duty Vehicles.

(1) (B) (3) Has received capital funding from a State, ~~or~~ Federal, or local competitive grant program for heavy-duty hydrogen refueling that includes location evaluation as criteria.

We also urge staff to reduce the discount (derate) of the station capacity as proposed by the California Hydrogen Coalition, California Hydrogen Business Council, and the Green Hydrogen Coalition in their May 10, 2024 letter. The original 50% discount rate was intended to prohibit over-credit generation while still incentivizing larger stations (6,000 kg/d maximum). Staff's proposal to increase the stepdown to 9% and 30% by 2030 will further reduce the credits allowed for HRI making the discount in effect even greater. We recommend either a lower discount rate of 25% instead of 50% OR allow increased station capacity of 8,000 kg/d to address this new stepdown and 2030 target.

We appreciate CARB staff's work on enabling zero-emissions transportation technologies, and our company was built to enable these same goals through infrastructure. Indeed, the LCFS HRI program is critical to our continued success. However, without the changes recommended herein, we are concerned about the sustainability of our business and the ability of the state to reach our common zero emissions, carbon intensity goals. We look forward to working with staff to implement these changes.

Respectfully,



Matt Miyasato, Ph.D.
Chief Public Policy & Programs Officer

Comment Log Display

Here is the comment you selected to display.

Comment 75 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Steven
Last Name	Fenaroli
Email Address	sfenaroli@cbbf.com
Affiliation	
Subject	California Farm Bureau's Comments Relating to the Proposed Low Carbon Fuel Standard Amendm

Comment

These comments are identical to the comments in the actual PDF. Find the highlighted comments below.

RE: California Farm Bureau's Comments Relating to the Proposed Low Carbon Fuel Standard Amendments

Dear Chair Randolph,

We appreciate this opportunity to provide feedback on the proposed amendments to the Low Carbon Fuel Standard.

California Farm Bureau (CAFB) is an innovative, service-based organization dedicated to being the foremost advocate, protecting the future and quality of life for all California farmers and ranchers. CAFB protects California's diverse farming and ranching legacy and enables the whole agriculture community to thrive. With over 29,000 members, CAFB is California's largest agricultural association.

California family farmers are community members and are committed to the health and wellbeing of their neighbors. Unlike other economic sectors, the products California's farmers produce are used and needed by all Californians. We take great exception to much of the anti-farming, and anti-science rhetoric being offered up at the workshop by representatives of the AB 32 Environmental Justice Advisory Committee and some public comments which are clearly attacks on the agriculture community.

Section 95481

CAFB supports the need to protect our forests. As such, we support language that defines forest biomass waste. However, the language that CARB has inserted in Section 95481 critically leaves out many or even most wildfire mitigation and forest restoration projects in California. That is because wildfire mitigation, forest restoration, and fuel removal to address bark beetle or other

forest health issues generally includes some amount of merchantable residues. In addition, all forest biomass waste can be converted to wood pellets or biochar, which are "wood products," so the exclusion of biomass that can be converted into other wood products effectively excludes all forest biomass waste. Biochar is recognized and defined as an Auxiliary Soil and Plant Substance by the California Department of Food and Agriculture with benefits as a soil amendment. Biochar is primarily composed of carbon and can be used as a long-term carbon storage sink in soils. It contributes directly to carbon sequestration and efforts to mitigate climate change".

To ensure that LCFS eligible forest biomass waste is environmentally sustainable and protects forest health, CAFB recommends the following edits to the definition:

"Forest Biomass Waste" means residues that are 1) removed for wildfire mitigation, forest restoration projects, or the protection of public safety, or 2) small-diameter, non-merchantable residues, limited to forest understory vegetation, ladder fuels, limbs, branches, and logs that do not meet regional minimum marketable standards for processing into wood products."

These changes will also make the definition of forest biomass waste consistent with the requirements of Section 95488.8(g)(1)(A)(3) which references wildfire mitigation, the need for defensible space (which often requires clearcutting), forest restoration, and threats to public safety or infrastructure.

Section 95482

Rather than outright eliminate credit generation for hydrogen produced using fossil gas as a feedstock, CARB would be better suited to incentivize non-fossil gas hydrogen at a higher level. We

currently need all the hydrogen we can produce. Eliminating credits entirely from hydrogen from fossil gas does nothing to encourage and develop a hydrogen market.

Further, CAFB recommends that CARB not place a cap on crop-based fuels. We ought to be encouraging more native and homegrown fuel sources than limiting ourselves on a fuel source that we know is better and cleaner than diesel.

If CARB must place a cap on biofuels, we recommend the cap be based on science and available data and not just an arbitrary number.

CARB's own research shows a negative impact by placing a cap on crop-based fuels. By doing this, we continue to send the signal that LCFS is a bridge fuel, while removing diesel from the system.

Section 95488.9(g)

CAFB is very concerned that section 95488.9(g), which was originally written to ensure the sustainability of crop-based fuels, has been expanded to cover all waste biomass and the sustainability certification requirements. CAFB supports efforts to reduce deforestation, however the requirements in this section are entirely inappropriate for agricultural or forest residues where the feedstock is a waste product, and the fuels producer has no control over the crop growing practices. Applying the same standards to agricultural or forest residues as to purpose grown crops does not make sense and will effectively close the door to fuels that could be produced from agricultural and forest residues.

Section 95490(a)

CAFB supports the use of CCSU to drive down carbon intensities and

generate carbon negative emissions where possible. The proposed amendments, however, limit sequestration to geologic storage and limit the use of captured carbon to fuels production. These restrictions exclude the use of biochar, which can be a co-product of hydrogen, electricity or biofuels production from waste biomass.

Biochar can be used for carbon sequestration in soil or to reduce emissions from cows, livestock manure and compost. Biochar can also be used in the production of concrete, pavement, tires, ink and other products. And biochar can replace charcoal for water filtration and purification. These are all beneficial uses that either sequester carbon or displace fossil fuel and higher emitting alternatives. Excluding the use of biochar will harm the economics and viability of forest waste and agricultural waste to fuel projects and contradicts the recommendations in the 2022 Climate Change Scoping Plan to increase the use of bioenergy with CCS (BECCS).

CAFB urges CARB to revise the definition of CCS in section 95490(a) as follows:

(a)(1) Alternative fuel producers, petroleum refineries, and oil producers that capture CO₂ on-site, including at the location of the production of hydrogen used as an intermediate input, and geologically sequester CO₂ geologically or in the form of biochar, either on-site or off-site.

CAFB urges CARB to revise the definition of CCS on page 8 as follows:

"Carbon capture and sequestration (CCS) project" means either 1) a project that captures CO₂ by an eligible entity specified in

section 95490(a) of this sub article, transports the captured CO2 to an injection site, and injects and permanently sequesters the captured CO2 pursuant to the Carbon Capture and Sequestration Protocol and as specified by section 95490 of this sub article, or 2) a project that captures carbon in the form of biochar during the conversion of waste biomass to fuels and that biochar is used in a manner that sequesters the carbon.

These changes will allow for the use of biochar to sequester or use carbon that is captured during gasification or pyrolysis of waste biomass.

Sincerely,

Steven Fenaroli
Political Affairs Director, California Farm Bureau

Attachment	www.arb.ca.gov/lists/com-attach/7401-lcfs2024-BmpWM1QzWXkEXQk5.pdf
Original File Name	LCFS_08272024_CAFBcomments_08722024.pdf
Date and Time Comment Was Submitted	2024-08-27 11:26:10

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August 27, 2024

The Honorable Liane M. Randolph, Chair

California Air Resources Board

P.O. Box 2815

Sacramento, California 95812

RE: California Farm Bureau's Comments Relating to the Proposed Low Carbon Fuel Standard Amendments

Dear Chair Randolph,

We appreciate this opportunity to provide feedback on the proposed amendments to the Low Carbon Fuel Standard.

California Farm Bureau (CAFB) is an innovative, service-based organization dedicated to being the foremost advocate, protecting the future and quality of life for all California farmers and ranchers. CAFB protects California's diverse farming and ranching legacy and enables the whole agriculture community to thrive. With over 29,000 members, CAFB is California's largest agricultural association.

California family farmers are community members and are committed to the health and wellbeing of their neighbors. Unlike other economic sectors, the products California's farmers produce are used and needed by all Californians. We take great exception to much of the anti-farming, and anti-science rhetoric being offered up at the workshop by representatives of the AB 32 Environmental Justice Advisory Committee and some public comments which are clearly attacks on the agriculture community.

Section 95481

CAFB supports the need to protect our forests. As such, we support language that defines forest biomass waste. However, the language that CARB has inserted in Section 95481 critically leaves out many or even most wildfire mitigation and forest restoration projects in California. That is because wildfire mitigation, forest restoration, and fuel removal to address bark beetle or other forest health issues generally includes some amount of merchantable residues. In addition, all forest biomass waste can be converted to wood pellets or biochar, which are "wood products," so the exclusion of biomass that can be converted into other wood products effectively excludes all forest biomass waste. Biochar is recognized and defined as an Auxiliary Soil and Plant Substance by the California Department of Food and Agriculture with benefits as a soil amendment. Biochar is primarily composed of carbon and can be used as a long-term carbon storage sink in soils. It contributes directly to carbon sequestration and efforts to mitigate climate change".

075.1

To ensure that LCFS eligible forest biomass waste is environmentally sustainable and protects forest health, CAFB recommends the following edits to the definition:

“Forest Biomass Waste” means residues that are 1) removed for wildfire mitigation, forest restoration projects, or the protection of public safety, or 2) small-diameter, non-merchantable residues, limited to forest understory vegetation, ladder fuels, limbs, branches, and logs that do not meet regional minimum marketable standards for processing into wood products.”

These changes will also make the definition of forest biomass waste consistent with the requirements of Section 95488.8(g)(1)(A)(3) which references wildfire mitigation, the need for defensible space (which often requires clearcutting), forest restoration, and threats to public safety or infrastructure.

075.2 **Section 95482**

Rather than outright eliminate credit generation for hydrogen produced using fossil gas as a feedstock, CARB would be better suited to incentivize non-fossil gas hydrogen at a higher level. We currently need all the hydrogen we can produce. Eliminating credits entirely from hydrogen from fossil gas does nothing to encourage and develop a hydrogen market.

075.3 Further, CAFB recommends that CARB not place a cap on crop-based fuels. We ought to be encouraging more native and homegrown fuel sources than limiting ourselves on a fuel source that we know is better and cleaner than diesel.

If CARB must place a cap on biofuels, we recommend the cap be based on science and available data and not just an arbitrary number. CARB’s own research shows a negative impact by placing a cap on crop-based fuels. By doing this, we continue to send the signal that LCFS is a bridge fuel, while removing diesel from the system.

075.4 **Section 95488.9(g)**

CAFB is very concerned that section 95488.9(g), which was originally written to ensure the sustainability of crop-based fuels, has been expanded to cover all waste biomass and the sustainability certification requirements. CAFB supports efforts to reduce deforestation, however the requirements in this section are entirely inappropriate for agricultural or forest residues where the feedstock is a waste product, and the fuels producer has no control over the crop growing practices. Applying the same standards to agricultural or forest residues as to purpose grown crops does not make sense and will effectively close the door to fuels that could be produced from agricultural and forest residues.

075.5 **Section 95490(a)**

CAFB supports the use of CCSU to drive down carbon intensities and generate carbon negative emissions where possible. The proposed amendments, however, limit sequestration to geologic storage and limit the use of captured carbon to fuels production. These restrictions exclude the use of biochar, which can be a co-product of hydrogen, electricity or biofuels production from waste biomass. Biochar can be used

for carbon sequestration in soil or to reduce emissions from cows, livestock manure and compost. Biochar can also be used in the production of concrete, pavement, tires, ink and other products. And biochar can replace charcoal for water filtration and purification. These are all beneficial uses that either sequester carbon or displace fossil fuel and higher emitting alternatives. Excluding the use of biochar will harm the economics and viability of forest waste and agricultural waste to fuel projects and contradicts the recommendations in the 2022 *Climate Change Scoping Plan* to increase the use of bioenergy with CCS (BECCS).

CAFB urges CARB to revise the definition of CCS in section 95490(a) as follows:

(a)(1) Alternative fuel producers, petroleum refineries, and oil producers that capture CO₂ on-site, including at the location of the production of hydrogen used as an intermediate input, and ~~geologically~~ sequester CO₂ **geologically or in the form of biochar**, either on-site or off-site.

CAFB urges CARB to revise the definition of CCS on page 8 as follows:

“Carbon capture and sequestration (CCS) project” means **either 1)** a project that captures CO₂ by an eligible entity specified in section 95490(a) of this sub article, transports the captured CO₂ to an injection site, and injects and permanently sequesters the captured CO₂ pursuant to the Carbon Capture and Sequestration Protocol and as specified by section 95490 of this sub article, **or 2) a project that captures carbon in the form of biochar during the conversion of waste biomass to fuels and that biochar is used in a manner that sequesters the carbon.**

These changes will allow for the use of biochar to sequester or use carbon that is captured during gasification or pyrolysis of waste biomass.

Sincerely,

Steven Fenaroli

Political Affairs Director, California Farm Bureau

Comment Log Display

Here is the comment you selected to display.

Comment 76 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	George
Last Name	Kivork
Email Address	george.kivork@jobyaviation.com
Affiliation	Joby Aviation
Subject	Joby Aviation Comments on the Low Carbon Fuel Standard's August 2024 15-Day Comment Period
Comment	<div></div>
Attachment	www.arb.ca.gov/lists/com-attach/7402-lcfs2024-V2cGOAcoA2IGNwUr.docx
Original File Name	08.27.2024_Joby_LCFS 15-Day Changes_Final.docx
Date and Time Comment Was Submitted	2024-08-27 11:19:31

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August 27, 2024

California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812
[submitted electronically]

RE: Joby Aviation Comments on the Low Carbon Fuel Standard's August 2024 15-Day Comment Period

Joby Aviation¹ (Joby) appreciates the opportunity to submit comments to the California Air Resources Board (CARB) on the 15-Day Changes released on August 12, 2024.

Joby's mission is to help the world connect faster and more easily with the people and places that matter most by delivering a new form of clean, quiet, electric vertical take-off and landing (eVTOL) aerial transportation. Building on recent advancements in energy storage, microelectronics, material science, and software, we are developing an all-electric aircraft with zero operating emissions that will transport a pilot and four passengers at speeds of up to 200 mph, while also having the ability to take off and land vertically.

Joby is headquartered in Santa Cruz, California, with over 1,400 employees across the state. In 2022, we completed the construction of our pilot production lines in San Carlos and Marina, California, and we began manufacturing our production prototype aircraft. We are excited to support the clean transportation and climate goals of our home state.

As expressed in our comments submitted in response to the April 10 LCFS Workshop, Joby believes CARB can be instrumental in helping California unlock zero-emission and sustainable aviation technologies and fuels.² This includes the LCFS, which will play an important role in incentivizing a less carbon-intensive aviation industry. To do so, CARB should not only seek to streamline the participation of the aviation sector in the LCFS but also initiate a rulemaking process to implement its aviation goals.

Joby Supports the Increased Stringency Proposed in the 15-Day Comment Period

076.1

First and foremost, Joby supports increasing the carbon intensity (CI) reduction target of the LCFS program. As expressed in our previous comments, a more ambitious initial step-down – when paired with the “auto-acceleration mechanism” – will help to expedite investments in low-carbon

¹ See <https://www.jobyaviation.com/>.

² Joby Aviation Comments in Response to April 10 Workshop. Available at: <https://ww2.arb.ca.gov/form/public-comments/submissions/11311>.



076.2

fuels and serve to maximize California's potential for emissions reduction in the transportation sector.³ Therefore, Joby is appreciative of the proposed near-term increase in stringency to a 9% CI reduction in 2025 in the 15-Day Changes.⁴ This increased stringency aligns with the 2022 Scoping Plan Update, which finds that the aviation sector holds an important role in California's ambitious journey toward carbon neutrality by 2045.⁵

Joby Encourages Explicit Inclusion of Electric and Hydrogen Aviation for Capacity Credits

076.3

As expressed in our previous comments, Joby is supportive of the hydrogen refueling provisions and their inclusion of both private and public infrastructure.⁶ While the hydrogen refueling station pathways proposed in the 15-day changes are to be grouped in a new manner – one category for light- and medium-duty (LMD-HRI) hydrogen refueling stations and a separate one for heavy-duty (HD-HRI) – Joby nevertheless believes it is imperative that electric and hydrogen aviation be

076.4

explicitly included within the relevant definitions.

The inclusion of electric and hydrogen aviation will likely have national impacts given that California policy frameworks are often used as models for federal legislation. Specifically, California's LCFS is often replicated by other states. To date, four states have adopted similar clean fuel programs and an additional eight states have pending policies.⁷ Therefore, the explicit inclusion of electric and hydrogen aviation can help set precedent for a cleaner aviation sector nationally.

Conclusion

In summary, Joby is appreciative of CARB's continued work on the LCFS and looks forward to working with CARB on achieving California's zero-emission aviation and larger climate goals.

Sincerely,

/s/ George Kivork

George Kivork

Head of U.S. State & Local Policy

Joby Aviation

³ Ibid.

⁴ https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_notice.pdf

⁵ CARB 2022 Scoping Plan at p.73. Available at: <https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>

⁶ Joby Aviation Comments in Response to April 10 Workshop.

⁷ David M. McCullough, Matthew W. Morrison, Elorm K. Sallah, Steve R. Brenner, "Revving Up: Eight States in Gear with Low-Carbon Fuel Standard Legislation," April 2024. Available at: <https://www.pillsburylaw.com/en/news-and-insights/eight-states-low-carbon-fuel-standard-legislation.html#:~:text=In%20March%202024%2C%20New%20Mexico,fuel%20standard%20legislation%20or%20regulations.>

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Comment 77 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Matthew
Last Name	Amick
Email Address	mamick@mosoy.org
Affiliation	
Subject	LCFS Comments
Comment	See attached comments from Biodiesel Coalition of Missouri.
Attachment	www.arb.ca.gov/lists/com-attach/7403-lcfs2024-VDYHYgZqWFQLbgFg.pdf
Original File Name	BCM CARB 15 Day Comments 8-27-24.pdf
Date and Time Comment Was Submitted	2024-08-27 11:41:19

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August 27, 2024

Chair Liane Randolph & Members of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Via electronic submission

Re: Proposed 15-Day Changes to the Proposed Regulation Order

Dear Chair Randolph and Members of the California Air Resources Board,

On behalf of the Biodiesel Coalition of Missouri (BCM), thank you for the opportunity to comment on the proposed 15-day changes to the Low Carbon Fuel Standard (LCFS) program. BCM represents the biodiesel industry in the state of Missouri, and we are dedicated to the commercial success of biodiesel in the marketplace.

Missouri is home to five biodiesel plants with a production capacity of 247 million gallons.

Over 70% of California's diesel pool now consists of biomass-based diesel fuels like biodiesel. In Q1 of 2024, that number reached 73%. Biomass-based diesel is the most successful fuel in meeting LCFS reductions. At 45% of the carbon reductions from the LCFS program, Biomass-based diesel has contributed more reductions than electric vehicles, hydrogen and renewable natural gas COMBINED.

Because of this, we were surprised to see CARB's 15-Day Changes to revise the LCFS based off what was included in the Initial Statement of Reasons (ISOR). Of top concern for biodiesel producers across our state and the rest of the nation is a proposal that would cap the use of soybean oil as feedstocks for biofuels at 20 percent by company.

These reductions in particulates and toxic air pollution are improving local air quality today, particularly in environmental justice communities. Utilization of biodiesel now diminishes the impacts of carbon emissions into the future. For every five years of delay, 13 times more emissions reductions would be required to have the same environmental impact. Biomass-based diesel fuels, like biodiesel, are the leaders in helping California meet their emissions reductions goals NOW.

In the Notice, CARB asserts that these modifications are intended to encourage zero-emission technologies and ensure that only waste oils are used to replace fossil diesel, yet they do not provide any scientific evidence to support these claims. The Notice also neglects to pinpoint any specific issues within the current LCFS or ISOR, nor does it explain how the proposed changes would effectively address such problems.

This cap does not align with the historical direction of the LCFS and their fuel/technology neutral approach to decarbonization. The cap could jeopardize the momentum towards 100% displacement of petroleum diesel in the heavy-duty sector, leading to backfilling of petroleum diesel. The unintended consequences could further delay California's path to decarbonization.

077.2 Placing an artificial limit on the market, combined with the inclusion of sustainability guardrails, as proposed, will fail to reduce emissions and will only increase costs. Our
077.3 biodiesel plants and the farmers and feedstock suppliers we work with remain frustrated that CARB insists on using data and methods that are over two decades old to set carbon intensity (CI) scores for soy, while refusing to consider new economic data.

077.1 cont Our biodiesel plants rely on soybean oil for their feedstock. Over 85% of our biodiesel production utilizes soybean oil. Soybeans are the number one crop in Missouri. The cap on vegetable oils would undermine innovation and economic viability, essentially shutting down a key market for biodiesel to our members.

077.1 cont As CARB seeks to finalize updates to the LCFS program in the coming months, we strongly encourage the agency to ensure these updates are based on science. The determination to make such drastic changes to previous CARB proposals so late in the game was shocking to the biofuels industries. For CARB to move from arguing that, based on the modeling, a vegetable oil feedstock cap was detrimental to the goals of the LCFS at the April public workshop, to now recommending a wildly stringent cap on those feedstocks without data or science, is quite difficult to comprehend. CARB's own April 10th analysis showed that a feedstock cap would increase greenhouse gas (GHG) emissions in California.

077.4 BCM was surprised to find that not only was a feedstock cap in the 15-Day Changes, but the sustainability guardrails were also retained. Soybean farmers continue to lower the CI of soybeans through innovative conservation and climate smart practices, such as no-till, cover crops, nutrient management, enhanced efficiency fertilizers, and buffer strips, among others

BCM encourages CARB to reconsider its proposed sustainability requirements to allow soybean growers the opportunity to participate in the California biofuels market through innovative and climate smart agriculture practices.

077.3 cont For the last several years, biofuel producers have urged CARB to consider updating its scoring methodology for crop-based biofuels. A comprehensive update to the Global Trade Analysis Project model for biofuels (GTAP-BIO) is needed. Current data indicates a much lower CI score for soybeans, as growers continue to improve soil practices, limit water use, lower on-farm emissions and more.

CARB has indicated plans to update all major models for lifecycle emissions calculations except for GTAP-BIO in the updated LCFS rulemaking. The soy industry has made vast

improvements in sustainability and efficiency over the past two decades, with even greater improvement goals ahead. At the same time, CARB continues to rely on a 2014 model that uses data from 2004. The Indirect Land Use Change (ILUC) score accounts for half or more of the CI score for soy-based biofuels. CARB's current modeling assigns soy biomass-based diesel with an ILUC impact of 29.1g CO₂e/MJ whereas updated results from the model used to calculate ILUC scores indicate a value of between 9 and 10 gCO₂e/MJ for soybeans. The benefits of the LCFS can only be achieved if CI values are accurately captured.

Biodiesel Coalition of Missouri is encouraged by the continued successes of programs that support the development of cleaner, low-carbon fuels. However, it is critical that CARB finalizes updates in a way that does not arbitrarily exclude agricultural feedstocks through policies that are not science-based and run afoul of CARB's mandate, including capping vegetable oil feedstocks and applying onerous sustainability guardrails that add cost without rewarding farming practices that lower CI.

Biodiesel producers, feedstock suppliers and farmers across Missouri remain eager to continue working with CARB to support the biodiesel industry's role in diversifying the fuel supply while reducing GHGs and increasing clean air in California and beyond. On behalf of our members, we appreciate the opportunity to comment and look forward to collaborating with CARB and other relevant stakeholders on implementation of policies that expand the use of soy-based biofuels.

Sincerely,

A handwritten signature in black ink, reading "Matthew Amick". The signature is fluid and cursive, with the first name "Matthew" and last name "Amick" clearly distinguishable.

Matthew Amick

Executive Director

Biodiesel Coalition of Missouri

Comment Log Display

Here is the comment you selected to display.

Comment 78 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Darin
Last Name	Johnson
Email Address	drew@mnsoybean.com
Affiliation	Minnesota Soybean Growers Association
Subject	Comments on California's Low Carbon Fuel Standard
Comment	<div></div>
Attachment	www.arb.ca.gov/lists/com-attach/7404-lcfs2024-WjdWlwNIVGYGX1R5.pdf
Original File Name	MSGA - CARB Comments Aug. 2024.pdf
Date and Time Comment Was Submitted	2024-08-27 11:46:20

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

August 27, 2024
Chair Liane Randolph & Members of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Via electronic submission

Re: Proposed 15-Day Changes to the Proposed Regulation Order

Dear Chair Randolph and Members of the California Air Resources Board,

On behalf of the Minnesota Soybean Growers Association, thank you for the opportunity to comment on the proposed 15-day changes (15-Day Changes) to the Low Carbon Fuel Standard (LCFS) program. The Minnesota Soybean Growers Association (MSGA) represents our members and the nearly 26,000 soybean farmers across Minnesota on public policy issues important to the soybean industry. Growers across Minnesota have long been committed to producing the world's food, feed, fuel, fiber, and thousands of bioproducts in an environmentally and economically sustainable way.

CARB's 15-Day Changes to revise the LCFS was quite surprising, as the final package diverged significantly from what was included in the Initial Statement of Reasons (ISOR) and the April 10 public workshop. Of top concern for farmers Minnesota and the rest of the nation is a proposal that would cap the use of soybean oil and canola oil as feedstocks for biofuels at 20 percent by company.

Placing an artificial limit on the market, combined with the inclusion of sustainability guardrails, as proposed will fail to reduce emissions and will only increase costs. Minnesota farmers, who successfully advocate for the nation's first biodiesel mandate more than years ago, remain frustrated that CARB insists on using data and methods that are over two decades old to set carbon intensity (CI) scores for soy, while refusing to consider new economic data and failing to consider the potential indirect emission impacts their expanding preference for waste is having.

MSGA opposes the proposed discretionary authority provided to the Executive Officer to stop accepting new pathways for biomass-based diesel. In addition to discriminating against the lipid-based fuel platform, we are concerned this could have unintended impacts for non-lipid pathways which could produce biomass-based diesel as a co-product. We are also concerned that the aggressive step-down of CI benchmarks, which partially result from the removal the proposed regulation of fossil jet fuel, combined with other changes, will reward importers of waste feedstocks while penalizing farmers across Minnesota and the broader United States.

As CARB seeks to finalize updates to the LCFS program in the coming months, we strongly encourage the agency to ensure these updates are based on science as required by AB-32. The determination to make such drastic changes to previous CARB proposals so late in the game was shocking to the soybean and biofuels industries. For CARB to move from arguing that, based on the modeling, a vegetable oil feedstock cap was detrimental to the goals of the LCFS at the April public workshop, to now recommending a wildly stringent cap on those feedstocks without data or science, is quite difficult to comprehend. CARB's own April 10th analysis showed that a feedstock cap would increase greenhouse gas (GHG) emissions in California, which is contrary to requirements in AB-32.

Vegetable Oil Feedstock Cap

The inclusion of a virgin vegetable oil feedstock cap in the 15-Day Changes was alarming to farmers and the entire biofuels value chain, as reflected in market activity. You may understand our surprise based on the April 10 workshop in which CARB noted that liquid fuels would continue to be needed in the transportation sector in California for at least the next decade. In that same workshop, CARB also argued that the imposition of a virgin vegetable oil feedstock cap would increase the utilization of petroleum diesel in the transportation sector. In the staff's own presentation on April 10, staff noted that nearly eighty percent of vehicles on the road in California to still use combustion engines by 2030. Further, they noted that such a stringent cap on virgin vegetable oils may result in 2.8 billion gallons of fossil diesel utilization in 2030, versus 1.9 billion gallons using a scenario that does not impose the cap proposed by the Environmental Justice Advisory Committee.

In a full reversal of staff's prior analysis, which is only four months ago, staff is now essentially recommending to the board that more fossil diesel be sold into the market in 2030. This recommendation appears to not only go against the goals of AB-32, but also science. This recommendation seems to flatly disagree with the Intergovernmental Panel on Climate Change, which notes in its sixth assessment report that using existing low carbon technologies is a crucial component to avoiding catastrophic temperature increases, stating that "biodiesel and renewable diesel fuels...could offer important near-term reductions" for several technologies, including buses, rail, and long-haul trucking.¹

In our current interpretation, the cap may lock out of the market producers of the lowest cost, lowest carbon intensity soybean oil-based biofuel (soy methyl esters). Most soy methyl esters are produced at biodiesel plants adjacent to soybean processing plants. Often, the companies which own operate these soybean processing are not involved in the procurement and processing of non-crop-based oils, such as UCO and tallow. They

¹ Jaramillo, P., S. Kahn Ribeiro, P. Newman, S. Dhar, O.E. Diemuodeke, T. Kajino, D.S. Lee, S.B. Nugroho, X. Ou, A. Hammer Strømman, J. Whitehead, 2022: Transport. In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_Chapter10.pdf

exclusively make biofuels out of soy oil or canola oil. The current language limits crediting of soy and canola to 20 percent of reported gallons. This leaves integrated agriprocessing/biofuel producers two choices: 1) exit the market entirely, or 2) be denied a government benefit on 80 percent of their fuel. If this is the current interpretation of the proposed provision, it would significantly and arbitrarily disadvantage the sustainable oilseed biodiesel community.

We echo the concern of the American Soybean Association that new requirement appears to contradict the statutory guidance laid out in AB-32 to minimize costs.

Sustainability Guardrails

078.2

MSGA was surprised to find that not only was a feedstock cap in the 15-Day Changes, but the sustainability guardrails were also retained. The cap, sustainability guardrails and Indirect Land Use Change score all additively, and redundantly, address land use change. This has the equivalent effect of giving soy and canola a much higher CI score increasing the compliance cost associated with delivering the product, despite the lack of direct evidence.

078.3

Broadly, we are concerned that the requirement proposed by CARB is unneeded given the longstanding, excessively high ILUC figure (relative to more recent modeling efforts). Furthermore, we are extremely disheartened that CARB has not followed the example of governments across North America, where farmers who submit data for compliance are also given the opportunity to be incentivized for conservation efforts. This additional cost without benefit contradicts language authorizing the LCFS. Section 38562 (b)(7) of AB-32 directs CARB to, “Minimize the administrative burden of implementing and complying with these regulations.” Adding supply chain traceability to a bulk delivery system adds significant administrative burden without changing the GHG emissions of the pathway.

CARB’s efforts could be improved and enhanced by outreach to U.S. Department of Agriculture (USDA) personnel who have engaged in activity regarding climate-smart farming practices. USDA recently closed a comment period on its Request for Information on Procedures for Quantification, Reporting, and Verification of Greenhouse Gas Emissions Associated with the Production of Domestic Agricultural Commodities Used as Biofuel Feedstocks. With the information received, USDA seeks to quantify and qualify the benefits of climate smart agriculture practices for biofuel programs at the state, national, and international level. Communication between CARB and USDA could be enlightening regarding ongoing agricultural sustainability practices.

Through the current sustainable aviation fuel (SAF) federal tax credit (40B), the CI of soy-based biofuels can improve through no-till and cover cropping on the field that the soybeans were produced. Other farming practices like low-till, nutrient management, enhanced efficiency fertilizers, buffers, wetland and grassland management, tree planting on working lands, planting for higher carbon sequestration, and soil amendments all can

and should be accounted to assign a lower CI score to an agricultural feedstock. USDA already tracks all these practices through several of their managed conservation programs. In addition, there are a variety of other practices that scientifically lower the CI score of soybean feedstocks for biofuels, and USDA is actively working to develop mechanisms to account for those.

Given the work being undertaken by USDA and EPA as part of the implementation of the Inflation Reduction Act, MSGA urges CARB to reconsider its proposed sustainability requirements to allow soybean growers the opportunity to participate in the California biofuels market through innovative and climate smart agriculture practices.

Outdated Scoring

078.4

For the last several years, state soybean associations, national associations, and biofuel producers have urged CARB to consider updating its scoring methodology for crop-based biofuels. CARB has refused to even consider the request.

We remain deeply concerned that without a comprehensive update to the Global Trade Analysis Project model for biofuels (GTAP-BIO) that CARB utilizes, soy-based feedstocks will be phased out of the LCFS even without the additional limitations being proposed in the 15-Day Changes. Current data indicates a much lower CI score for soybeans, as growers continue to improve soil practices, limit water use, lower on-farm emissions and more. On the one hand, CARB is recommending stringent sustainability guardrails for U.S. soy, but on the other hand is still on track to likely phase-out soy-based biofuels from credit generation by approximately 2035 or sooner.

CARB has indicated plans to update all major models for lifecycle emissions calculations except for GTAP-BIO in the updated LCFS rulemaking. The soy industry has made vast improvements in sustainability and efficiency over the past two decades, with even greater improvement goals ahead. At the same time, CARB continues to rely on a 2014 model that uses data from 2004. The ILUC score accounts for half or more of the CI score for soy-based biofuels. CARB's current modeling assigns soy biomass-based diesel with an ILUC impact of 29.1g CO₂e/MJ whereas updated results from the model used to calculate ILUC scores indicate a value of between 9 and 10 gCO₂e/MJ for soybeans². The recently released 40BSAF-GREET 2024 model has an ILUC score of 12.2 for soy-based sustainable aviation fuel in federal programs.

The benefits of the LCFS can only be achieved if CI values are accurately captured. If land use change concerns are large enough to justify sustainability guardrails and capping virgin vegetable oil feedstocks, then the modeling should also be updated to reflect current land use change data.

² Taheripour, F., Karmai, O., and Sajedinia, E. (2023). *Biodiesel Induced Land Use Changes: An Assessment Using GTAP-BIO 2014 Data Base*. Purdue University

078.5 **Entities Eligible to Apply for Fuel Pathways**

We are concerned about CARB's 15-Day Changes to give the Executive Officer discretion to stop accepting new pathways for biomass-based diesel starting in 2031. We do not understand what provision of AB-32 statute is served, or justifies, this arbitrary and highly selective change. CARB must under statute minimize costs and maximize GHG reductions. It is unclear how this is served by rejecting new pathways. In fact, the requirements of current law are met by allowing the most available pathways. If these pathways cannot achieve cost-effective GHG savings, they will not be utilized by the market in the LCFS. In essence, an increase in pathways can only serve to improve GHG benefits in California. Singling out a single fuel for prejudicial treatment is baffling given the goals of the LCFS and the authority that establishes it. Executive Order S-01-07 establishing the LCFS specifically cites diversity of fuels as a motivation for the program, and this proposal contradicts one of the stated purposes of the program. In addition, this provision if implemented could also significantly disadvantage other biofuel production processes which may produce biomass-based diesel as a co-product, for example in system where SAF is a main product.

Conclusion

MSGA is encouraged by the continued successes of programs that support the development of cleaner, low-carbon fuels. However, it is critical that CARB finalizes updates in a way that does not arbitrarily exclude agricultural feedstocks through policies that are not science-based and run afoul of CARB's mandate, including capping vegetable oil feedstocks and applying onerous sustainability guardrails that add cost without rewarding farming practices that lower CI.

Unfairly adding demands on U.S. soybean farmers and eliminating them from these programs will drive incentives for other bad actors to continue to pass off deforested soy oil or palm oils as used cooking oil. These practices could and would actually do more damage to the climate and make it harder to meet climate goals.

CARB's 15-Day Changes, released in August 2024, is deeply concerning. CARB has singled out soybean and canola oil for adverse, prejudicial treatment. No scientific evidence is ever given for this treatment. In fact, CARB has refused to update the science as required by law for these feedstocks. This alone calls into question the integrity of a performance-based LCFS. On top of this, CARB is now proposing feedstock caps, traceability requirements and authority to reject applications for these fuels produced from them. Again, CARB has not shown any scientific justification. In fact, the LCFS is already over penalizing soy for any land use change requirements.

Farmers across Minnesota remain eager to continue working with CARB to support the role of agriculture in diversifying the fuel supply while reducing GHGs and increasing clean air in California and beyond. On behalf of Minnesota's soybean farmers, we appreciate the

opportunity to comment and look forward to collaborating with CARB and other relevant stakeholders on implementation of policies that expand the use of soy-based biofuels and market opportunities for soybean farmers.

Sincerely,

Darin Johnson
President, Minnesota Soybean Growers Association

Comment Log Display

Here is the comment you selected to display.

Comment 79 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Marc
Last Name	Ventura
Email Address	marc.v.ventura@p66.com
Affiliation	Phillips 66 Company
Subject	2024 LCFS Amendments - Comments to first "15-day" package
Comment	Please see letter attached.
Attachment	www.arb.ca.gov/lists/com-attach/7405-lcfs2024-VydUZAM0VVIXMIAx.pdf
Original File Name	P66_CA_LCFS_Comments_2024_08_27.pdf
Date and Time Comment Was Submitted	2024-08-27 11:56:06

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)



Marc Ventura
Fuel Issues Advisor
Fuels, Sustainability & Regulatory Affairs

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California LCFS 2024 Rulemaking
Page 1 of 4

August 27, 2024

To California Air Resources Board Staff

Submitted Electronically via On-Line Public Comment Form

California LCFS Rulemaking – Comment on August 12, 2024, “15-Day” Package

Dear CARB,

Phillips 66 Company (Phillips 66) appreciates the opportunity to comment on the proposed amendments to the LCFS regulation.

Phillips 66 has invested over a billion dollars at its Rodeo Renewable Energy Complex in Contra Costa County, California, to transform the facility into a world scale renewable fuels facility. The facility no longer processes crude oil. The facility currently produces renewable diesel, renewable naphtha and is gearing toward the production of sustainable aviation fuel. Phillips 66 also operates a petroleum refinery in Los Angeles. Both facilities in Rodeo and Los Angeles are operated by union labor.

Phillips 66 operates several fuel terminals and markets products under the 76[®] brand in California. Most 76[®] sites that previously dispensed petroleum diesel are now offering renewable diesel. Phillips 66 believes that renewable fuels are an important part of the transitioning energy market. With our significant investments and development of sustainable aviation fuel (SAF) production, Phillips 66 has demonstrated its support of sustainable programs that promote renewable fuel development and consider these proposed amendments in context of promoting SAF production and placement in California.

New Carbon Intensity (CI) Benchmarks – Section 95484

079.1

First, Phillips 66 supports a sustainable LCFS regulation, which allows compliance options and supports operation, expansion, and new project development of renewable fuel production and other transport decarbonization. While we recognize that the strong LCFS bank may stifle further investments in low carbon transport energy sources, we are concerned that the magnitude of the front-loaded reduction may serve to create instability in the program. Phillips 66 supports a step down of the program to allow the oversupply of credits to moderate. We caution against moving too much too quickly. Although the California LCFS credit bank has grown significantly in the last few years, with much more stringent standards ahead and only a small portion of diesel pool left for substitution with biofuels, the program may face challenges if the electrification of the vehicle parc does not occur at the pace anticipated by CARB. Under the proposed amendments, the LCFS now includes a mechanism to auto-advance the standards which we support. However,



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California LCFS 2024 Rulemaking
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there is no provision to soften the standards if not enough credits are available to balance deficits. As such, Phillips 66 recommends that CARB reinstates a formal annual program review to evaluate the LCFS performance. CARB should consider adopting a similar process to the ones in place in Oregon and Washington under their LCFS programs. These processes require an annual fuel forecast and a mechanism to reevaluate the CI standards if credits are in a shortfall position.

Furthermore, the state has emphasized its desire to keep fuel costs affordable, which requires a balanced approach for the establishment of the CI benchmarks.

079.2 Renewable Feedstocks – Section 95482 (i)

Phillips 66 urges CARB to remove the twenty percent restriction on soybean oil and canola oil that is proposed under 95482 (i). Phillips 66 believes that CARB should allow relative CI scores of the renewable fuels to dictate the most efficient mechanism to decarbonize fuels. Additional arbitrary restrictions should not be used to limit renewable feedstocks and/or renewable products in the LCFS. Restricting feedstocks will increase the cost and availability of low carbon fuels, which will hurt California residents, and goes against the efforts of Senate Bill SB X1-2. If CARB decides to implement the 20% limit, the phase-in in 2028 should clearly be based on company fuel production, and imported product and purchases from third parties should be excluded from the 20% trigger.

Hydrogen Production – Section 95482 (h)

079.3

As mentioned above, CARB should not arbitrarily exclude feedstocks for the production of low carbon fuels. Restricting natural gas to produce hydrogen will reduce the availability of hydrogen at the time when CARB is trying to incentivize the development of hydrogen fuel cell vehicles. Once again, the fuel LCFS crediting should be based on its CI score, not on an arbitrary limit, such as the “color” of the fuel. CARB would preempt future technologies that may enable low CI hydrogen from natural gas coupled with carbon capture, for example, or other technologies not yet available or economical.

Furthermore, hydrogen is also used in renewable fuel production. Natural gas greenhouse gas emissions used in the production of hydrogen are accounted for in the life cycle emissions and the CI of renewable fuels. CARB should allow instead more flexibility for enabling book-and-claim options to lower the CI of hydrogen used in renewable fuel production.

Fuel Pathways – Section 95488 (d)

079.4

Phillips 66 recommends that CARB continues to allow new biomass-based diesel fuel pathways after 2031. Maintaining a fuel neutral approach will ensure that the lowest cost, lowest carbon intensity, most efficient projects can continue to be developed for all fuels used in California. The



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California LCFS 2024 Rulemaking
Page 3 of 4

CI score will efficiently drive the market to supply the fuels best suited to meet the lowering standard.

Alternative jet fuel production is typically accompanied with renewable diesel at renewable fuel facilities. Preempting new diesel fuel pathway applications may shut the door to the development of sustainable aviation fuel beyond 2030, as fuel pathway applications typically cover all products at a given facility. Prohibiting new fuel pathway applications would be in contradiction with the goals of California and the Federal Government to increase the production of sustainable aviation fuels.

CARB should not close the doors today to future opportunities that may arise as technology evolves.

079.5 **Indirect Land Use Change – Section 95488.3 (d)**

CARB should undertake a separate rulemaking to revisit the indirect land use change (LUC) values. The values in Table 6 date back from the CARB 2015 LUC study. New research papers have showed evidence for lower LUC values, and lower LUC values have been adopted by other programs, including the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).

Until new LUC values are established through rulemaking, if CARB wants to allow adjustments to the LUC values, not only factors that contribute to higher LUC values should be considered, but also factors that contribute to lower LUC values should be recognized.

079.6 **Sustainability Requirements for Biomass – Section 95488.9 (g)**

Phillips 66 encourages CARB not to develop new processes for sustainability tracking, but rather allow the use of existing protocols currently in place in the LCFS, the EPA Renewable Fuel Standard and other organizations such as the International Sustainability and Carbon Certification (ISCC).

079.7 **CI Exceedance - Section 95486.1 (g)**

Although not a change from the “45-day” package published in January 2024, Phillips 66 requests that CARB removes the four times penalty when the CI is verified above the operational CI. This penalty defeats the purpose of auto-adjustments of fuel CI. CARB should instead reset the CI score to the verified CI and true-up the credits and deficits, without adding an unjustified penalty of four times the incremental credit generation.



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California LCFS 2024 Rulemaking
Page 4 of 4

This substantial penalty will force obligated parties to set overestimated CI scores, well above the actual pathway CI score to reduce the risk of a penalty. The LCFS program could not capture the full benefit of greenhouse gas reductions, while the CI standards become ever more stringent, and the benefit of this provision will be muted.

Jet Fuel – Section 95489

Phillips 66 supports CARB's latest proposal to keep petroleum jet fuel exempt from the LCFS and continue to allow alternative jet fuel to opt-in the LCFS based on CI scores. This will avoid higher costs for jet fuel.

Please reach out if you would like to discuss these items.

Thank you for your consideration.

Sincerely,

Marc Ventura

Fuel Issues Advisor
Fuels, Sustainability & Regulatory Affairs
Phillips 66 Company

079.8

Comment Log Display

Here is the comment you selected to display.

Comment 80 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Dan
Last Name	Bowerson
Email Address	Dbowerson@autosinnovate.org
Affiliation	
Subject	Auto Innovators Comments on LCFS 15-Day Notice
Comment	Please find the attached comments from the Alliance for Automotive Innovation (Auto Innovators).
Attachment	www.arb.ca.gov/lists/com-attach/7406-lcfs2024-AWBQI1AIWWVRCAIg.pdf
Original File Name	Auto Innovators_CARB LCFS 15-Day Notice_V2 (8-27-2024) - 7397.pdf

**Date and Time Comment Was
Submitted**

2024-08-27 11:55:10

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 27, 2024

SUBMITTED ELECTRONICALLY <https://ww2.arb.ca.gov/applications/public-comments>

Clerks' Office
California Air Resources Board
1001 I Street
Sacramento, California 95814

Subject: Low Carbon Fuel Standard – 15-Day Notice Comments

The Alliance for Automotive Innovation (Auto Innovators) and our members appreciate the opportunity to comment on the proposed 15-Day changes to the Low Carbon Fuel Standard (LCFS).¹ We support the proposed changes for crediting ZEV fueling infrastructure and for allowing the California Air Resources Board (CARB) Executive Officer (EO) to direct up to 45 percent of the base credits generated by light-duty (LD) electric vehicle (EV) residential charging to the automakers (aka, "OEMs") producing those vehicles.

No sector is investing more than OEMs to develop the EV market. By 2030, the auto industry is expected to invest more than \$1.2 trillion globally² in everything from critical minerals and critical mineral processing to battery cell and pack production, to vehicle development, certification, and production, to charging stations and consumer education. It makes sense for OEMs to receive a portion of the base residential EV charging credits to allow them to continue to make the necessary investments in the electric transportation transition.

Not only does no other sector have as much at stake, but also, no other sector has comprehensive knowledge of the auto-buying consumer market. The focus of CARB and the auto industry is a robust, vibrant, and sustainable EV market that serves the needs of every community from every economic sector and every part of the state and globe. Thus, if the goal is to use LCFS revenue to grow the EV market across all sectors and communities, automakers, more than any other sector, are uniquely positioned to do that in all communities including environmental justice (EJ) communities.

¹ California Air Resources Board. (2024, August 12). *Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information Proposed Low Carbon Fuel Standard Amendments*. Retrieved August 15, 2024, from https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_notice.pdf

² <https://www.reuters.com/technology/exclusive-automakers-double-spending-evs-batteries-12-trillion-by-2030-2022-10-21/>

In fact, the regulations allow OEM base credit projects that include “multilingual marketing, education, and outreach... designed to increase awareness and adoption of EVs.” Projects like this might be combined with other EJ projects, such as EJ projects identified in the Advanced Clean Cars II regulations, Clean Cars for All (CC4A) program, or the Sustainable Transportation Equity Project (STEP). Moreover, the regulations allow OEMs to develop and implement other projects with approval from the Executive Officer. These projects may also include EJ outreach and engagement.

As we have noted in the past, the transition to zero emission vehicles (ZEVs)³ for light-duty vehicles (LDVs) is far from complete. California’s ZEV market share climbed to over 25% in 2023 but has since stalled in the first half of 2024. While this stall might be temporary, substantial progress is still needed to meet the Advanced Clean Cars (ACC) II requirements of 51% ZEV in 2028, 68% ZEV in 2030, and 100% ZEV in 2035. To ensure the full transition to ZEVs, funding generated by residential plug-in electric vehicle (PEV) charging should be used exclusively to develop the LDV EV market through infrastructure, vehicle incentives, and public education.

To strengthen the approach and increase the likelihood for success, we recommend the following revisions.

080.1

First, as noted above, revenue from LDV PEV residential charging should be directed to LDV PEV market expansion. This applies equally to past revenue that was collected for the LDV Clean Fuel Reward Program and future funding generated by residential charging. Consequently, we recommend adding the following definition in 17 CCR §95481:

“Light-Duty Vehicle California Clean Fuel Reward (CCFR)” is a statewide program to provide a reduction in price on new light-duty electric vehicle purchases or leases in California, including light-duty and medium-duty electric vehicles with a gross vehicle weight rating of 10,000 pounds or less and sold or leased on an individual basis to non-fleet customers. The California Clean Fuel Reward is funded exclusively through LCFS proceeds generated from electricity used for residential charging of electric vehicles up to 10,000 pounds gross vehicle weight rating.

The proposed definition of “California Clean Fuel Reward” should be revised to “Medium- and Heavy-Duty California Clean Fuel Reward (CCFR).”

³ In this letter, “ZEVs” include battery, plug-in hybrid, and fuel cell electric vehicles (BEV, PHEV, and FCEV, respectively). “PEVs” include BEV and PHEV only.

080.2

The regulation allows that the “Executive Officer may direct up to 45% of base credits to eligible OEMs,” but there is no definition of “eligible OEMs.” Presumably this includes all OEMs producing and selling light-duty plug-in electric vehicles in California, but clarification would be helpful.

080.3

The regulation appears to allow the EO to direct anywhere from 0 percent to 45 percent of the base credits to eligible OEMs, but there is no indication of the criteria that might be used to determine the portion directed to OEMs. Clarifying the criteria would make the regulation more transparent.

The regulation is also not clear if the portion assigned to OEMs is fixed or could change year-to-year. Presumably the portion cannot change since OEMs and utilities need long-term stable funding to efficiently administer EV market support programs.

080.4

The regulation appears to eliminate the California Clean Fuel Reward (CCFR) as soon as any portion of the base credit is directed to OEMs. Since the EO could direct anywhere from 0 percent to 45 percent of the base credits to eligible OEMs, it seems the CCFR could be eliminated even though only a small portion (e.g., 1 percent) of the base credits are directed to the OEMs. We agree the light-duty vehicle CCFR is unnecessary if 45 percent of the base credits are directed to the OEMs. However, if only a small portion is directed to automakers, the utilities should continue to administer the light-duty vehicle CCFR. We recommend modifying §95483(c)(1)(A)2 and 3 to read “unless 45 percent of the base credits are allocated to the OEMs pursuant to section 95483(c)(1)(B)...” and §95483(c)(1)(B) to read “If the Executive Officer directs 45 percent of the base credits to eligible OEMs, the requirements of section 95483(c)(1)(A)2. do not apply.”

We estimate the utilities have collected over \$400 million⁴ for the CCFR program. However, they eliminated the reward beginning September 1, 2022. CARB should direct the utilities to

⁴ Estimation:

- 10,705,332 MT of base credits generated between 2019 and 2023
 - Source: <https://ww2.arb.ca.gov/resources/documents/low-carbon-fuel-standard-reporting-tool-quarterly-summaries>
- \$128.23 /MT weighted average price over that period
 - Source: <https://ww2.arb.ca.gov/resources/documents/lcfs-credit-transfer-activity-reports>
- = \$1,372,737,229 worth of base credit value generated
- 67% should have gone to CFR rewards
 - Source: page 32 of regulations: https://ww2.arb.ca.gov/sites/default/files/2020-07/2020_lcfs_fro_oal-approved_unofficial_06302020.pdf
- = \$919,733,944 should have gone to CFR rewards
- \$450,540,222 were the reported total program expenses (\$416.8 million in CFR rewards + \$33.7 million in administrative expenses)
 - Source: <https://cleanfuelreward.com/reporting#mark-equity>
- = **\$469,193,722 in missing money** through the end of 2023

reestablish the light-duty vehicle CCFR until those funds are exhausted, or have those funds allocated to the OEMs to use in their own rebate programs.

080.5

The regulation also states that any entity is eligible to generate incremental credits for improvements in carbon intensity of electricity used for residential EV charging, which would seem to include OEMs. If this is in fact the case, we recommend modifying section 95483(c)(1)(E)(3) to read “For non-metered residential EV charging, an EDU or OEM is eligible to generate incremental credits for supplying low-CI electricity ~~to the EVs in its service territory~~.”

080.6

Finally, section 95500(c)(1)(E)(1) lists EV charging as requiring verification of Quarterly Fuel Transaction Reports including site visits. This is not practical or feasible for metered electricity using telematics data or home charging. CARB should work with industry stakeholders to determine an appropriate verification process for telematics data, while reducing any potential double-counting.

Again, we support changes in the 15-Day Notice with the clarifications indicated above and sincerely appreciate the hard work and collaboration by CARB staff on proposed changes. Please don’t hesitate to contact me if you have any questions or need additional information.

Sincerely,



Dan Bowerson
Vice President, Energy & Environment
dbowerson@autosinnovate.org

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Comment 81 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	David
Last Name	Edwards
Email Address	david.edwards@airliquide.com
Affiliation	Air Liquide
Subject	Comments on Proposed LCFS Amendments, August 12, 2024 15-Day Notice
Comment	Please see attached letter
Attachment	www.arb.ca.gov/lists/com-attach/7407-lcfs2024-VmRVY1xvB2BSeVNj.pdf
Original File Name	2024-08-27 LCFS AL Letter.pdf
Date and Time Comment Was Submitted	2024-08-27 12:04:36

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 27, 2024

Chair Liane M. Randolph and Members of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95812

Re: Comments on Proposed LCFS Amendments, August 12, 2024 15-Day Notice

Dear California Air Resources Board Members;

Air Liquide Hydrogen Energy U.S. LLC ("Air Liquide") submits this letter to comment on the proposed amendments to the Low Carbon Fuel Standard ("LCFS") Regulation, published in the 15-day notice dated August 12, 2024 (the "15-Day Notice"). Specifically, Air Liquide urges CARB to treat hydrogen produced with fossil feedstock in the same manner as other fuels, and to allow book-and-claim accounting for process energy. As members of the California Hydrogen Coalition, we are also supportive of the positions outlined in its comment letter regarding the impacts of the proposed amendments on LCFS credit market values, changes to the HRI program for light-, medium-, and heavy-duty vehicles, and the call for an additional 15-day review.

Air Liquide and its affiliated companies operate 128 facilities and employ nearly 2,000 people in California. Air Liquide's parent and affiliated companies are the world's leaders in industrial and medical gases. In California, Air Liquide is one of the largest producers of hydrogen for fuel-cell electric vehicles.

The proposed modifications to the LCFS regulations regarding hydrogen production:

- are inconsistent with the requirements of CARB's December 2022 Scoping Plan[1];
- Are not aligned with the LCFS's long-standing principle of encouraging carbon reduction by all means possible;
- Will constrict supply and increase costs in the California hydrogen sector; and
- Will negatively impact investment in the state, because project decisions are strongly influenced by the need for a stable investment landscape without arbitrary rule changes that run counter to the state's own climate plans.

Adoption of the modifications proposed in the 15-Day Notice risks suppressing California's nascent low-carbon hydrogen industry, stranding existing assets and projects, and increasing the overall cost of low-carbon hydrogen for California consumers.

1. Eligibility of Hydrogen Produced From Fossil Feedstocks to Generate LCFS Credits

081.1

The foundation of the LCFS is that every fuel is evaluated on the basis of the carbon emissions that result from its production and use. The emissions associated with each gallon or kilogram of fuel are quantified, in grams of carbon-dioxide-equivalent emissions per megajoule of energy, from "well to wheels," or from whatever the source of the fuel to the end use of the fuel for transportation purposes. In this sense, the LCFS is technology neutral. The state does not pick winners and losers, and does not

dictate to industry the means of producing the lowest carbon fuel. Instead, the state allows fuel producers to reduce emissions in the most efficient manner possible to produce fuels that will generate LCFS credits.

This is one of the primary virtues of the LCFS. The LCFS's science-based, quantitative approach is efficient and produces the maximum possible climate benefit, because it rewards producers of low-carbon fuels only in proportion to their ability to reduce climate-warming emissions. It does not reward fuels that may in some sense be "renewable" but do not reduce emissions, and it rewards most highly those fuels that have the greatest impact on the climate and the planet.

081.2 The draft amendments in the 15-Day Notice depart from this quantitative, science-based approach with respect to hydrogen. The proposed amendments include a new Section 95482(h) that assigns a carbon intensity to hydrogen unrelated to the emissions associated with its production and use:

Effective January 1, 2031, hydrogen produced using fossil gas as a feedstock is ineligible for LCFS credit generation unless biomethane attributes are matched to the hydrogen production as described in Section 95488.8(i)(2). Any volumes of hydrogen produced using fossil gas as a feedstock must be assigned the ULSD carbon intensity found in Table 7-1 of the LCFS regulation, as well as an EER of 1.

Under this section, hydrogen produced with fossil feedstock is assigned the carbon intensity of diesel fuel unless the fuel producer uses book-and-claim accounting to match environmental attributes to the feedstock used for the production of the hydrogen. Under the proposed amendment, the actual emissions associated with the production and use of the hydrogen fuel are not quantified. The proposed amendment does not allow any credit for the reduction in emissions that may result from production with carbon capture and sequestration ("CCS").

Hydrogen produced with fossil fuel feedstocks should not be treated differently than other fuels under the LCFS. Although hydrogen produced from fossil fuel feedstocks may not generate any credits under the LCFS as the benchmarks for gasoline and diesel fuels decline over time, it nevertheless has the potential to contribute to reduced emissions in two ways. First, hydrogen produced with fossil fuels may have a very low carbon intensity if the emissions from its production are captured and sequestered with CCS. The 2022 Scoping Plan Update specifically recognizes an important role for hydrogen produced with CCS: "If steam methane reformation is paired with CCS, the hydrogen produced could potentially be low carbon. ... Steam methane reformation paired with CCS can thus ensure a rapid transition to hydrogen and increase hydrogen availability until such time as electrolysis with renewables can meet the ongoing need"[1] The Scoping Plan Update sets a target of 100 million tons of carbon dioxide removed with CCS by 2045. Discouraging production of hydrogen with CCS is directly contrary to CARB's climate plans as set forth in the Scoping Plan Update.

081.3 Second, fossil hydrogen is often blended with low-carbon hydrogen to produce the carbon intensity demanded by the market. Hydrogen fuel retailers are currently demanding hydrogen with a zero carbon intensity. To provide that hydrogen, hydrogen producers purchase environmental attributes to apply, with book-and-claim accounting, to the fuel sold. Those attributes, however, often have negative carbon intensity. For example, dairy digester feedstock may have a carbon intensity of negative 300 gCO₂e/MJ, and to obtain a zero CI for the hydrogen produced it may not be necessary to purchase environmental attributes for all of the hydrogen produced. Some fossil hydrogen may be blended with very low carbon hydrogen to produce a CI of zero.

If CARB were to adopt the amendments as proposed, hydrogen producers and sellers of environmental attributes would adapt by using multiple feedstocks to obtain the zero CI demanded by the market. But requiring these actors to, in effect, “game the system” would be inefficient. It would result in higher prices for environmental attributes, potentially reduce production or sales of hydrogen, and create market friction where CARB should be seeking the opposite result.

081.4 The policy rationale that CARB provides for this proposed change is not persuasive. CARB states, in the 15-Day Notice, that CARB “is proposing to remove LCFS crediting eligibility for hydrogen produced from fossil fuels at the end of 2030 to align with the current operational timeline for projects funded under the hydrogen hubs grants, which will expand the supply of renewable hydrogen in California.” In other words, CARB is assuming that the ARCHES hydrogen hub projects will be sufficient to produce enough electrolytic hydrogen, in just six years, to meet the state’s needs. But whether the hydrogen hub projects will produce a vast new supply of renewable hydrogen is unknown. Those projects are in their infancy, and the degree to which they will succeed cannot be predicted with any certainty today. CARB’s reliance on these projects is a quintessential example of counting one’s chickens before they hatch. CARB should be using every available means to reduce carbon emissions, not assuming that some projects, which have not even started yet, much less succeeded, will be sufficient to satisfy the state’s demand for low-carbon hydrogen.

Assigning a carbon intensity to hydrogen that does not reflect its actual carbon intensity is an unnecessary and counterproductive change to the LCFS. It is not justified by the reasons that CARB has provided and will make it less likely that the state will meet its climate change goals.

Moreover, adopting such disruptive changes sends the wrong signal to investors who are considering whether to support low-CI hydrogen projects. The 15-Day Notice represents an unexpected and surprising proposal and will negatively impact the investment and lending communities and ultimately risks provoking a retreat from investment in all low-carbon fuels because of fears of arbitrary and last-minute regulatory changes. CARB must refocus its efforts on sending clear regulatory support for all types of low-CI hydrogen projects.

Recommendation: Do not adopt the 15-day proposed changes regarding the restricted eligibility of fossil-produced hydrogen in the credit generating market.

2. Book-and-Claim Accounting for Process Energy Used to Produce Hydrogen

When hydrogen is produced, its carbon intensity is a product of emissions associated with both the feedstock (which may be gas, if the hydrogen is produced with steam methane reformation, or electricity, if it is produced by electrolysis) and “process energy.” Process energy is the energy that is used to compress, liquefy, and distribute the fuel. The LCFS currently does not allow the use of book-and-claim accounting to reduce the CI of process energy.

CARB’s proposed amendments to the LCFS published in the 45-day notice in December 2023 would have allowed the use of book-and-claim accounting for process energy used in the production of hydrogen.[2] The 15-Day Notice, however, limits the use of book-and-claim accounting to electrolytic hydrogen. (For electrolytic hydrogen, most of the process energy is used to liquefy the hydrogen.)

CARB has never provided a meritorious rationale for limiting the application of book-and-claim accounting under the LCFS. Book-and-claim accounting is efficient, because it allows fuel producers to use renewable feedstocks and energy wherever they may be found to produce the lowest possible

carbon-intensity fuels. With the use of book-and-claim accounting, a fuel producer can obtain renewable power and feedstocks in a single location, without having to build the infrastructure to transport solar, wind or hydroelectric power, or biomethane, to the production facility. The benefits of broad application of book-and-claim accounting would be enormous, and the risks, if any, would be insignificant. CARB has never published any information suggesting that book-and-claim accounting has been or would be abused if it were more widely available. The LCFS's requirements for third-party verification, which are already applied to book-and-claim accounting, assure that any abuse would be rare, and that it would be detected.

CARB should, at a minimum, reverse the changes made in the 15-Day Notice to Section 95488.8(i)(1)(C) and allow the use of book-and-claim accounting for process energy used in the production and distribution of hydrogen. Air Liquide also supports the use of book-and-claim accounting more widely, for all fuels, consistent with Air Liquide's belief that the LCFS should provide a level playing field and create a fair marketplace for all fuels.

Recommendation: Allow the use of book-and-claim accounting for process energy for all LCFS pathway evaluations regardless of the hydrogen production methods or energy sources. This would include electricity used in compression, refrigeration, liquefaction, storage, and distribution and all other energy sources used for process heat and distribution.

3. Effects on LCFS Credit Value and Changes to HRI Credit Program

081.6

As a founding member of the California Hydrogen Coalition (CHC), Air Liquide supports the comments made in the CHC's letter to CARB regarding the proposed amendments. In particular, the CHC letter has extensive comments on the potential effects of the proposed changes on the LCFS credit value and on changes in the light-duty HRI credits and the expansion of HRI to the heavy-duty vehicle market.

Air Liquide appreciates CARB's willingness to consider input from all stakeholders, and looks forward to working with CARB on amendments to the LCFS. We would also be happy to meet with CARB staff to discuss Air Liquide's comments.

Best Regards

David P. Edwards, PhD

Corporate Fellow

Air Liquide Hydrogen Energy, US LLC

david.edwards@airliquide.com

(612) 747 7636

[1] California Air Resources Board, 2022 Scoping Plan for Achieving Carbon Neutrality, at 88 (Nov. 16, 2022).

[2] See proposed amendments to Section 95488.8(i).

Comment Log Display

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Comment 82 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	William
Last Name	Barksdale
Email Address	william_barksdale@cargill.com
Affiliation	
Subject	Comments on 15-day changes
Comment	<div>Cargill thanks CARB staff for the opportunity to comment, and for consideration of the attached.</div>
Attachment	www.arb.ca.gov/lists/com-attach/7408-lcfs2024-UjEAZwZ1ADRXOAll.pdf
Original File Name	Cargill LCFS Comments 15-day.pdf
Date and Time Comment Was Submitted	2024-08-27 12:06:58

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 27, 2024

Chair Liane Randolph and Members of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Dear Chair Randolph and Members of the Board,

Cargill appreciates the opportunity to provide comments on the California Air Resources Board's (CARB) proposed 15-Day Changes to the Proposed Amendments to the Low Carbon Fuel Standard (LCFS) Regulation (15-day package), and we thank staff for consideration of our points below.

Cargill is a Minnesota-based global agribusiness company that has worked closely with small- and large-scale growers since our founding 159 years ago. We partner with farmers, food companies, retailers, and fuel producers to make, process, and move food and fuel feedstocks around the world. Cargill businesses originate, process, and convert these feedstocks into renewable fuels including biodiesel and ethanol, while working closely with our farmer partners. Our work starts at the farm level, where we are undertaking comprehensive, large-scale efforts to [reduce emissions](#) across our global supply chains – working hand in hand with farmers to scale regenerative farming practices, protect and restore vital landscapes and empower producer communities.

Cargill is taking climate action – the global food system depends on it.

Climate change has a direct and growing impact on the food and agriculture industries. With a global footprint and presence in major supply chains worldwide, Cargill has a responsibility to make the food system even more sustainable and resilient. Cargill appreciates CARB's commitment to decarbonize the State's transportation sectors. A more sustainable food system must consider how food and other vital goods move around the world from origin to destination. Incentivized markets, such as California's LCFS program, are instrumental in creating demand for these lower-carbon transportation solutions.

Near-Term Stringency Increase

Cargill welcomes CARB's proposal of a near-term increase in stringency to a 9% CI reduction in 2025 as a way to stabilize LCFS prices, but we believe there is room for a more impactful step-down given the build in the LCFS credit bank as the industry responds to the demand of lower carbon liquid transportation fuels in California. The over-performance of the program is a testament to its success, and we believe the proposed adjustment will be supportive to higher credit prices and continued investment in the state's transition to cleaner energy.

20% Cap on Soybean Oil and Canola Oil Feedstocks

Cargill's priority will always be nourishing the world. We believe North American agriculture still has an important role to play in the transition to cleaner energy and more sustainable food systems, and that the industry is uniquely positioned to feed the world and meet the growing global demand for low carbon biofuels. North American farmers are integral to the decarbonization of our food and energy sectors and continue to use innovative technologies and cropping systems to support carbon sequestration, sustainability, and emissions reductions throughout the supply chain.

082.2 As such, Cargill does not support the proposed cap on soybean and canola oils. Any deviation from the current policy must be nimble, non-arbitrary, and designed to effectively respond to near-term acute needs without driving longer-term unintended consequences. While we believe that innovation in agronomics and technology will lead to greater opportunities for emissions reductions for traditional feedstocks like soybeans and canola, we also acknowledge CARB's desire to send a clear market signal so that participants can make decisions that affect the long-term performance of their businesses.

Agriculture has been serving food and fuel markets for decades and will continue to support both markets with an unwavering commitment to sustainability as the energy transition evolves. As we invest and modernize assets to support near-term demand, we see a shared benefit for long-term food production supported by more advanced infrastructure.

082.3 A key driver for the long-term success of the industry will be the continued reduction in the carbon intensity of crop-based feedstocks. The growing adoption of sustainable farming practices results in the production and availability of lower carbon-intensity feedstocks for bioenergy. Farmers are increasingly adopting these practices to further reduce and sequester carbon, in addition to seeing clear economic and productivity gains. Recognizing the opportunity and imperative of regenerative agriculture, Cargill is supporting and incentivizing these sustainable practices among growers in our supply chain. We encourage CARB to promote the adoption of these reduction mechanisms by making available pathways which incorporate regenerative agriculture practices.

082.2 cont
CARB's proposed cap on soybean and canola oil feedstocks disadvantages the North American grower who is integral to the decarbonization of our global food systems. In the years ahead, the global food system will be subjected to the indirect consequence of reducing the available production of soybean and canola oil – which is to reduce contingency supplies available to the food system. In essence, CARB's proposed policy guidance calls for greater decarbonization without its most flexible and scalable feedstock supply. We believe this undermines the critical imperative to provide food and to decarbonize the global transportation supply chain.

The proposed cap on soybean and canola oils for biomass-based diesel represents a material policy change to the program. CARB's 15-day package presents the first opportunity for a broad stakeholder group to review these impactful changes. Given the potential implications of this policy change, Cargill asks CARB to provide stakeholders with additional time to properly vet the intent, impact, and implications of the proposed requirements. While we expect additional question to be raised over time, we request that CARB respond to the following as soon as possible:

- Current participation % of soybean and canola oils as biomass-based diesel feedstocks – Cargill requests that CARB provide stakeholders with the composition of the "Other" feedstock type category used for data modeling in Table 6 of the LCFS Data Dashboard.

- Assessment of the 20% cap – Is the cap assessed on the volume of biomass-based diesel imported into California’s LCFS program, or is the cap assessed on the total volume of production by producer? Cargill requests that staff make available a formula or illustrative example of how staff intends to assess this cap at the producer level.
- Definition of the term “company” – Cargill requests that staff provide a clear definition of this term so stakeholders can better analyze how the cap might affect current business operations.
- Reporting and verification – Cargill requests that staff provide more details for stakeholders related to reporting and verification processes relative to the proposed cap and its implementation.

Sustainability Certification for Biomass

082.4 Cargill supports and promotes sustainable approaches to agriculture that are demonstrated through traceability back to our growers. We recognize the importance of traceability throughout the supply chain, not just for renewable biomass from crops, but for waste-based feedstocks as well. Adequate mechanisms must be in place to ensure that all feedstocks are correctly identified and that their environmental benefits match the material being used for credit-generating fuel.

Growth in waste-based feedstocks to feed our domestic market increasingly comes from foreign locations. Feedstocks sourced from outside North America are oftentimes challenging to trace back to origin. This challenge is compounded by the smaller volumes of waste that must be aggregated from hundreds of sourcing locations, and sometimes across multiple regions. Cargill believes that all feedstocks require effective compliance processes. We encourage CARB to engage with industry and relevant authorities to develop and adopt such processes and procedures.

To this end, Cargill is actively exploring the application of lipid profile analytical testing methods which would serve as support to the identification and verification of feedstocks such as used cooking oil (UCO). Developing and incorporating such testing methods would be a strong step towards ensuring rigorous compliance requirements for all feedstocks within the program.

We request that CARB align the sustainability certification requirements between biomass and waste feedstocks to ensure that all eligible feedstock for the program is subject to the same requirements, and that advantages for waste-based feedstocks are not derived from less rigorous compliance requirements.

Conclusion

Cargill respectfully requests that CARB remove the proposed cap from the rulemaking package. We recognize that crop-based feedstocks must be allocated for fuel use in a thoughtful and balanced manner. Cargill’s participation in global agriculture supply chains gives us confidence in the market’s ability to serve both food and fuel.

North American farmers continue to grow their use of climate-smart agricultural practices in support of soil health, resource conservation, and soil carbon sequestration. We know that continued reductions within the industry are essential to meeting our decarbonization goals and that farmers are leading the way to a more sustainable future for our agricultural supply chains and global food systems.

We also believe that the strong demand signal for foreign-sourced waste-based feedstocks without appropriate traceability requirements presents opportunities for ineligible material to make its way into the LCFS.

We look forward to continued collaboration with CARB as we support the role of agriculture in the decarbonization of our transportation sectors and food systems. Thank you for this opportunity to submit comments.

Sincerely,

A handwritten signature in dark ink, reading "William A. Barksdale", followed by a horizontal line.

William Barksdale
Managing Director
Cargill, Inc.

cc: Rajinder Sahota

Comment Log Display

Here is the comment you selected to display.

Comment 83 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Renee
Last Name	Sharp
Email Address	rsharp@nrdc.org
Affiliation	NRDC
Subject	LCFS comments from 29 organizations: waste incineration
Comment	<div>The Natural Resources Defense Council and 28 signatory organizations submit the attached comments both in support of a critical change made to the latest draft of the proposed Low Carbon Fuel Standard (LCFS) regulations, as well as to urge the California Air Resources Board (CARB) to make further changes to the LCFS program to prevent harm to vulnerable communities related to waste incineration.</div>

Attachment	www.arb.ca.gov/lists/com-attach/7409-lcfs2024-BWkGYwRjAilEXQJh.pdf
Original File Name	LCFS comments August 2024 FINAL.pdf
Date and Time Comment Was Submitted	2024-08-27 12:05:27

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 27, 2024

Chair Randolph and Honorable Members of the Board
California Air Resources Board
1001 I Street Sacramento, California 95814

Re: Recommendations for the Low-Carbon Fuel Standard Program

The Natural Resources Defense Council and the undersigned 28 organizations submit the following comments both in support of a critical change made to the latest draft of the proposed Low Carbon Fuel Standard (LCFS) regulations, as well as to urge the California Air Resources Board (CARB) to make further changes to the LCFS program to prevent harm to vulnerable communities related to waste incineration.

083.1

The previous draft LCFS regulations, released in January 2024, included a definition of “petroleum product” which included a highly problematic clause that explicitly stated that this term did

“not include plastic or plastic products.” This clause was both inaccurate and confusing given that more than 99% of plastic is made from fossil fuels.¹ We therefore support the following proposed change to the LCFS regulations in the draft released on August 12, 2024:

“Petroleum Product” means all refined and semi-refined products that are produced at a refinery by processing crude oil and other petroleum-based feedstocks, including petroleum products derived from co-processing biomass and petroleum feedstock together. ~~“Petroleum product” does not include plastics or plastic products.~~

Given the LCFS program’s focus on climate mitigation, it is worth noting that a recent study by the U.S. federal government found that global plastic production is a major driver of climate change.² The study, which was conducted by scientists at the Lawrence Berkeley National Lab, estimates that by 2050 plastic production could account for between 21% to 31% of the global carbon emission budget required to limit global temperature increase to just 1.5 degrees Celsius. Currently, the industry is responsible for four times more greenhouse gas emissions than the airline industry, or about 600 coal-fired power plants.³ It is important, therefore, that the LCFS program does not incentivize the production of plastic or plastic waste in any way, or suggest that plastic is not a petroleum product.

083.2 In addition, we wish to express our deep concern with and opposition to the numerous ways that the LCFS will incentivize the conversion of municipal solid waste (MSW) into fuel, particularly MSW containing plastic. Data show that the two most common technologies used for such conversion will be pyrolysis and gasification⁴, both of which are regulated as incineration under federal law.⁵ While the emissions from pyrolysis and gasification are concerning no matter what the feedstock, they are particularly toxic when the feedstocks include plastic—either directly or as a component of MSW. According to the Environmental Protection Agency’s most recent data (2018), plastics typically comprise over 12 percent of municipal solid waste.⁶

¹ National Academies of Sciences, Engineering, and Medicine, *Reckoning with the U.S. Role in Global Ocean Plastic Waste*, The National Academies Press, 2022, <https://doi.org/10.17226/26132>

² Karali, Nihan, Nina Khanna, and Nihar Shah, *Climate Impact of Primary Plastic Production*, Lawrence Berkeley National Laboratory, 2024, <https://escholarship.org/uc/item/12s624vf>

³ Elbein, S, “Plastics industry heats world 4 times as much as air travel, report finds,” *The Hill*, April 18, 2024, <https://thehill.com/policy/energy-environment/4601309-plastics-industry-heats-world-four-times-as-much-as-air-travel-report-finds/>

⁴ Rauch, Reinhard, Yohannes Kiros, Klas Engvall, Efthymios Kantarelis, Paulo Brito, Catarina Nobre, Santa Margarida Santos, and Philipp A. Graefe. “Hydrogen from Waste Gasification.” *Hydrogen* 5, no. 1 (2024): 70-101; Oil and Gas Watch Database; Oil and Gas Watch Database, “Spotlighting the Environmental Impact of Oil, Gas, and Petrochemical Expansion,” accessed August 19, 2024, <https://oilandgaswatch.org/>

⁵ WasteDive, “EPA withdraws proposal to drop pyrolysis from regulation following criticism,” June 6, 2023, <https://www.wastedive.com/news/epa-pyrolysis-emissions-clean-air-act-decision/652153/>

⁶ Environmental Protection Agency, “National Overview: Facts and Figures on Materials, Wastes and Recycling,” accessed August 19, 2024, <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials>

Pyrolysis and gasification emit hazardous air pollutants including benzene, toluene, styrene, formaldehyde, ethyl benzene, and dioxans/furans when they incinerate plastic.⁷ Pyrolysis and gasification facilities also generate large amounts of hazardous waste; one pyrolysis facility alone generated 484,000 pounds of hazardous waste in 2019.⁸

Pyrolysis and gasification facilities tend to be located in communities that are disproportionately low income, people of color, or both.⁹ If the LCFS is incentivizing the building of new pyrolysis and gasification incinerators in California (and/or elsewhere), they will most likely be sited in environmental justice communities. These communities will bear the brunt of the toxic impacts of the hazardous air pollutants and waste that is generated.

In summary, to protect the health of California communities and prevent the building of large numbers of new incinerators, we urge CARB to (1) finalize the strike-out of the previously proposed language that explicitly and inappropriately excluded plastics from the definition of petroleum products in the LCFS; and (2) remove incentives for the conversion of municipal solid waste to fuel, especially when this conversion involves pyrolysis or gasification.

Thank you for considering our views.

Sincerely,

Renee Sharp
Director of Plastics and Petrochemical Advocacy
Natural Resources Defense Council

Pamela Miller
Executive Director
Alaska Community Action on Toxics

Faraz Rizvi
Policy and Campaign Manager
Asian Pacific Environmental Network

Peggy Ann Berry
Executive Director
Between the Waters

Judith Enck
President
Beyond Plastics

⁷ Veena Singla, NRDC, Recycling Lies: “Chemical Recycling” of Plastic is Just Greenwashing Incineration Issue Brief,” September 2022, <https://www.nrdc.org/resources/recycling-lies-chemical-recycling-plastic-just-greenwashing-incineration>

⁸ *Ibid.*

⁹ *Ibid.*

KT Morelli
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Krystal Raynes
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Jane Williams
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Lisa DePaoli
Communications Director
Center for Coalfield Justice

Marven Norman
Policy Coordinator
Center for Community Action and Environmental Justice

Andria Ventura
Legislative and Policy Director
Clean Water Action

Andy Hattala
Policy Co-Lead
The Climate Reality Project: California Coalition

Maya Rommwatt
Director of Campaigns and Programs
Defend Our Health

Michael Garfield
Executive Director
Ecology Center, Michigan

Maureen McCarthy
Founder
FoCo Trash Mob

Lea Harper
Managing Director
FreshWater Accountability Project

Jessica Roff
U.S. Plastics & Petrochemicals Program Manager
Global Alliance for Incinerator Alternatives

Arlene Blum, PhD
Executive Director
Green Science Policy Institute

Tamela Trussell
Founder
Move Past Plastic

Brooke Helmick
Director of Policy
New Jersey Environmental Justice Alliance

Kristen McDonald
Senior Plastic Program Director
Pacific Environment

Martha Dina Arguello
Executive Director
Physicians for Social Responsibility – Los Angeles

Dianna Cohen
Co-Founder and CEO
Plastic Pollution Coalition

Patricia Popple
Editor
Project Outreach: The Frac Sand Sentinel

Sarah Doll
National Director
Safer States

Jakob Evans
Policy Strategist
Sierra Club California

Frankie Orona
Executive Director
Society of Native Nations

Thomas Helme
Co-Founder
Valley Improvement Projects

Leslie Tamminen
Director
7th Generation Advisors

Comment Log Display

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Comment 84 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Matt
Last Name	Bright
Email Address	mbright@carboncapture.com
Affiliation	CarbonCapture Inc.
Subject	Proposed Amendments to the LCFS Regulation for Direct Air Capture

Comment

Dear Air Resources Board,

The undersigned Direct Air Capture (DAC) Coalition and leading DAC companies are grateful for this opportunity to comment on the proposed book-and-claim accounting regulations for low-carbon intensity (CI) electricity for DAC.

Respectfully,

Direct Air Capture Coalition
CarbonCapture Inc.
Heirloom Carbon Technologies
Climeworks Corporation
1PointFive

Attachment

www.arb.ca.gov/lists/com-attach/7410-lcfs2024-UT1RNFQzBSUGXwNn.pdf

Original File Name

LCFS DAC Power Comment August 2024.pdf

Date and Time Comment Was Submitted

2024-08-27 12:10:59

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

August 27, 2024

Ms. Liane M. Randolph
Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Proposed Amendments to the Low Carbon Fuel Standard Regulation of August 12, 2024

Dear Chair Randolph,

The undersigned Direct Air Capture (DAC) Coalition and leading DAC companies thank you for the opportunity to comment on the additional proposed amendments to the Low Carbon Fuel Standard (LCFS) Regulation.

The LCFS is a vital program to lower California's carbon emissions, achieve air quality benefits, and accelerate technology deployment needed for California to achieve its carbon neutrality targets. As the world's first carbon compliance regulation to include DAC, LCFS helped launch the DAC industry and exemplifies California's global leadership in addressing climate change while highlighting the essential role of carbon dioxide removal for achieving net zero.

We commend the California Air Resources Board (CARB) for its dedication and diligent work to design, implement, and refine the LCFS to be an effective emissions reductions and innovation driver. We are specifically grateful for CARB's commitment to engaging with interested stakeholders in this process and for considering our feedback about LCFS regulations that will have profound implications for the DAC industry.

084.1 The latest proposed amendments to the LCFS Regulation Section 95488.8(i)(1)(C) issued on Monday, August 12th move in the right direction in allowing a longer temporal period in book-and-claim accounting for low-carbon intensity (CI) electricity for DAC (three quarters) as compared to the previous proposed amendments of January 2, 2024 (quarterly). **However, book-and-claim accounting spanning three quarters cannot accommodate DAC's continuous 24-7/365 operations given the seasonal fluctuations in wind and solar power production, and is therefore not fit for purpose nor achievable for DAC at this stage of the industry's development. Instead, annual book-and-claim accounting for DAC is necessary, appropriate, and consistent with the leading global standards today. Moreover, there is a lack of analytical evidence that emissions accounting accuracy or resource shuffling prevention would be enhanced by three-quarter accounting compared with annual.**

The need for annual book-and-claim matching for DAC is driven by underlying physical and technological constraints, as well as market realities. DAC is more nascent in technological

development and deployment than other technologies relevant to LCFS. For example, the first commercial DAC plus storage facility commenced operation in 2021, while advancements in hydrogen electrolysis are building on over 100 years of commercial operational experience.

DAC technologies need to operate constantly with limited ability to ramp up and down load because they often contain equipment components and chemical and physical processes that cannot be rapidly fluctuated or turned on and off. Currently, the vast majority of low-CI electricity generation capacity being added to the US grid is intermittent renewable electricity sources like solar and wind. Book-and-claim accounting to match intermittent renewable supply with a constant DAC load over an annual period within the same grid is a challenge that requires detailed modeling and risk management to account for annual variability in renewable output. Limiting the accounting period to three quarters significantly exacerbates the challenge, since the electricity production from these intermittent renewable resources is seasonal and a quarter of the annual cycle would be missed.

Any temporal matching period spanning less than a full year would present a severe barrier for DAC deployment given the current state of technology's needs for continuous, additional and local low-emissions electricity supply, and the lack of market and technological systems to support more granular temporal matching. For example, one commercial DAC project currently under development in the United States estimated that three quarter book-and-claim matching could require the the procurement an additional 10-15% low-CI power under a three quarter book-and-claim accounting period compared with an annual period, increase electricity price risk and the risk of power matching shortfalls, and could make economics infeasible.

Recognizing these constraints, leading global standards bodies and registries provide for annual book-and-claim for DAC, with an eye to re-evaluate in the future as DAC and electricity sector technologies, markets, and policies evolve. These standards include Verra, Puro.earth, and Isometric¹. Our DAC facilities under development will sell credits to voluntary market customers using the carbon registries' methodologies with annual matching. **Importantly, we cannot generate credits with different matching periods from the same facility, since we cannot effectively operate under two different sets of energy procurement and operating patterns at the same facility. The LCFS market can help accelerate DAC facilities and add to demand to justify new facilities, but only if generating LCFS credits is compatible with the global DAC standards and market.**

Over time as DAC matures with technology advancements, economies of scale, market and supply chain development, and as firm dispatchable low-carbon electricity becomes more available, increasingly granular book-and-claim accounting may become more achievable and could be considered under LCFS. We would like to highlight our suggestion for CARB to convene a dialogue with key stakeholders to consider how electricity book-and-claim accounting for DAC should evolve alongside DAC industry maturation. Such a dialogue

¹ Isometric standard currently allows annual book-and-claim for projects under 10 MW

would provide a venue for collecting valuable input to ensure that LCFS requirements mitigate resource shuffling and maximize long-term climate benefits.

We reaffirm our support for the LCFS and gratitude for CARB's important work, and we look forward to further engagement to help ensure the LCFS is a practically workable market that can help drive DAC technology deployment.

Signed:

Direct Air Capture Coalition
CarbonCapture Inc.
Heirloom Carbon Technologies
Climeworks Corporation
1PointFive

Comment Log Display

Here is the comment you selected to display.

Comment 85 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Tom
Last Name	Hance
Email Address	thance@gordley.com
Affiliation	U.S. Canola Association
Subject	Low Carbon Fuel Standard Proposed Amendments
Comment	Attached are comments from the U.S. Canola Association.
Attachment	www.arb.ca.gov/lists/com-attach/7411-lcfs2024-VyJcKVc1UmAEXVV4.pdf
Original File Name	USCA - CARB - LCFS Proposed Amendments - Comments - 2024 Aug.pdf
Date and Time Comment Was Submitted	2024-08-27 12:16:19

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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*U.S. Canola Association
600 Pennsylvania Ave., SE, Suite 300
Washington, DC 20003
Phone (202) 969-8113*

August 27, 2024

California Air Resources Board
1001 "I" Street
Sacramento, CA 95814

Submitted via: [Submit Public Comments to CARB | California Air Resources Board](#)

Re: Proposed Amendments to the Low Carbon Fuel Standard Regulation

California Air Resources Board:

The U.S. Canola Association (USCA) appreciates the opportunity to comment on the California Air Resources Board's (CARB) Proposed Amendments to the Low Carbon Fuel Standard Regulation issued on August 12, 2024.

The USCA is a non-profit commodity organization whose mission is to increase domestic canola production and promote the establishment and maintenance of conditions favorable to growing, marketing, processing and utilization of U.S. canola. Canola has multiple uses and markets and is a renewable, plant-based feedstock used to produce clean burning biomass-based diesel.

The BBD market provides a valuable outlet for surplus canola oil not utilized for food production. Consistent with the intent of the LCFS, biomass-based diesel from canola provides significant environmental benefits as well as contributing to national energy security and the economy. Canola biomass-based diesel contributes to the expansion and diversification of U.S. fuel and energy production, reduces emissions and improves air quality, and provides jobs and additional economic benefits, especially in rural communities. The canola and biomass-based diesel industries have provided these benefits without significant disruption or adverse impacts to consumers.

Currently, U.S. canola production is primarily in the Northern Plains and Pacific Northwest regions of the country. It is predominantly a spring-planted crop harvested in the fall and grown as part of a beneficial crop rotation on diversified farms that grow five or more different crops. Canola production has grown modestly, but steadily over the past few decades. There is potential for continued expansion of canola production on existing cropland in the U.S., including winter canola, in the Pacific Northwest, Great Plains, and Southeast regions. The winter canola with a double crop option in the Southeast provides additional vegetable oil feedstocks from otherwise fallow land.

085.1 **Proposed amendment to limit biomass-based diesel produced from soybean oil and canola oil to twenty percent of total biomass-based diesel annual production**

The 20 percent cap on biofuels made from canola and soybean oils proposed by CARB is arbitrary, unnecessary and unwise. There is no science or data-based justification provided by CARB for the proposed cap. Limiting the use of renewable, plant-based biofuels made from crops grown on existing cropland in North America will result in greater reliance on foreign feedstocks of less certain origin and inhibit the ability to reach emission reduction goals.

CARB's own findings presented at the April 2024 workshop indicated that renewable diesel and biodiesel have a positive impact on both consumers and the environment. CARB's "Staff Report: Initial Statement of Reasons" (ISOR) specifically modeled an alternative (Alternative 1) which "includes several policy mechanisms that have the effect on limiting the number of credits created from existing low-CI pathways" including "a limit on total credits from diesel fuels or sustainable aviation fuel produced from virgin oil feedstocks." The report found that a cap on vegetable oil feedstocks would result in more fossil diesel use.

- 085.2 Canola and other crop-based biofuels are already subject to Induced Land Use Change (ILUC) and indirect emissions analysis, making a cap redundant and unnecessary. Moreover, capping renewable, plant-based feedstocks without any scientific basis sends a signal to markets that California's LCFS program is arbitrary and unpredictable. This will undercut existing investments and potentially eliminate future innovation in plant-based biofuels, which have been the most commercially viable source of emission-reducing fuels.

California reached its previous emissions reduction targets thanks mostly to biomass-based diesel. As a result of that success, it is ramping up future emission reduction targets and plant-based biofuels, especially biodiesel and renewable diesel from soy and canola, providing a low-cost way to reach emissions goals.

- 085.3 Capping canola and soy biomass-based diesel will require California to rely on more imported feedstocks such as used cooking oil (UCO) from China. There has already been a significant increase in UCO imports from China in the past year for renewable diesel in California. It is harder to guarantee or be certain of the origin of UCO or other imported feedstocks, compared to those derived in North America. For example, there is concern that some of the flood of UCO imports in the past year could include palm oil from southeast Asia, which is the subject of significant concerns due to the environmental profile of its production and the concerns over deforestation. There is no deforestation in North America from canola and soybean production and any "indirect" impacts are already accounted for in the overly conservative life-cycle analysis and carbon intensity scores that have been developed for canola and soy biofuels.

- 085.4 The availability of alternative markets for surplus canola production allows farmers to include canola as a sustainable rotational crop on existing farmland. History shows that the agricultural and biofuel industries can respond to demand quickly with sustainable expansion and innovation. Canola acreage and yields in the primary growing state of North Dakota and in the Pacific Northwest continue to grow prudently and efforts are underway to significantly expand winter canola in the Southeast and Great Plains. Oilseed processing capacity is also expanding in tandem.

U.S. canola production has grown modestly, but steadily over the past few decades. There is potential for continued domestic expansion, including winter canola with a double crop option,

in newer growing regions. Winter canola crops, grown on land that would otherwise remain fallow, provides environmental and agronomic benefits. The benefits of winter cover crops are well-documented and ways are being sought to incentivize this practice, which has a cost to farmers. As a winter crop, canola provides ground cover and promotes soil health with more living roots in the soil. This naturally increases the beneficial soil carbon cycle and decreases the need for carbon-based fertilizer and chemicals. Having viable commercial markets for winter crops offsets the cost to growers and provides renewable, plant-based feedstock for biofuels production. Double-cropping soybean with winter canola provides additional vegetable oil feedstocks on existing cropland and fallow land. However, these innovative winter and double-cropping practices will not get established with farmers if biofuel policies and markets are subject to arbitrary actions such as CARB's proposed cap.

Phase out of new Biomass-Based Diesel pathways

085.5

The proposal to phase out new biomass-based diesel pathways in 2031 is also concerning and unwarranted. CARB has a stated goal to achieve 100 percent renewable diesel utilization and the proposed phase out of new biomass-based diesel pathways is unnecessary and counterproductive. If the market becomes saturated, new pathways would no longer be needed and applications for new pathways will stop on their own. If the market has not yet achieved 100 percent saturation, then additional pathways could help achieve the emission reduction goals of the LCFS.

Crop-Based Biofuels Sustainability Criteria

085.6

The CARB proposal to require pathway holders to track North American feedstocks to their point of origin and require independent feedstock certification are unnecessary. There is no evidence to suggest that deforestation or land use change is occurring in the U.S. due to land being converted to agricultural production. Increased agricultural productivity in North America is occurring through yield increases, improved agronomic practices, double cropping and use of previously fallow land that benefits environmentally from having "cover" crops.

085.7

CARB's proposal would further disadvantage plant-based feedstock production in the U.S. and Canada, which are regions with zero or low-risk of deforestation that are already subject to multiple compliance programs. Instead, CARB's proposal would favor feedstocks produced in regions with a significantly higher risk of fraud or deforestation. Despite a large surge in imported waste feedstocks, CARB did not include any measures to address potential fraud in sourcing waste feedstocks. Implementing a targeted, risk-based approach to the proposal's sustainability criteria offers several advantages. It allows CARB to prioritize resources and regulatory efforts where they are most needed, ensures that sustainability criteria are effectively applied without imposing unnecessary burdens on low-risk regions or established sustainability programs, and ensures sufficient supplies of low-carbon fuels for the California market.

085.8

Regions identified as having the lowest risks of deforestation associated with crop-based feedstocks, such as the United States and Canada, should be deemed to be in compliance with CARB's proposed sustainability criteria. If additional measures are imposed, CARB should use an aggregate approach and utilize existing programs and data sources, such as the federal Renewable Fuel Standard (RFS) and USDA crop production data and statistics, to certify that feedstocks grown in North America that are used in the production of biomass-based diesel are produced sustainably and meet CARB's proposed criteria.

The federal RFS already includes protections against land conversion to cropland for biofuel feedstock production. In fact, crop-based biofuels are the only energy sources subject to analysis of indirect emissions and land use change impacts. To be eligible for the RFS, feedstocks have to come from land that was non-forested and in production prior to December 19, 2007. EPA set a national baseline for eligible cropland in 2007 of 402 million acres. If cropland in subsequent years exceeds that baseline, biofuel producers would be required to track and trace where its feedstocks were grown. There is also a threshold of 397 million acres which, if exceeded, would trigger investigation and reassessment of the aggregate compliance program. Neither of these thresholds have been exceeded since 2007. We would also note that the most recent Census of Agriculture data released by USDA on February 13, 2024 shows a 2% decline of total farmland in the United States since 2017. We believe CARB could utilize the existing federal protections and monitoring of land conversion instead of imposing additional, unnecessary compliance burdens. The approach used for the RFS has proven to address sustainability concerns while limiting regulatory burden on market participants.

The USCA urges you to recognize that fuels produced and certified under the federal RFS meet CARB's proposed sustainability criteria. Additional requirements would place an unnecessary burden on the fuel and feedstock providers as well as on CARB's staff and resources for LCFS implementation and enforcement. This additional burden would increase costs without providing any additional environmental benefit.

085.9

We would also point out that, as noted in the proposed amendments issued by CARB in December, the California LCFS already accounts for land use change emissions in its life cycle methodologies. Additional certification requirements would be redundant and create unnecessary burdens and expenses that could increase costs and reduce the amount of renewable fuel available to achieve the LCFS targets.

We hope CARB will make sound decisions based on fact and science, rather than emotion and politics, and recognize the beneficial role that plant-based renewable fuels have made to the emissions reductions achieved over the past decade and the necessary and beneficial role they will play in meeting California's future emissions reduction goals. Again, the USCA appreciates the opportunity to comment on the proposed amendments to the LCFS Regulation and looks forward to continue to contribute toward your efforts to implement an effective program.

Sincerely,



Tim Mickelson
President
c/o U.S. Canola Association
600 Pennsylvania Ave., SE
Suite 300
Washington, DC 20003
202-969-8113
info@uscanola.com

Comment Log Display

Here is the comment you selected to display.

Comment 86 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	R
Last Name	Huggins
Email Address	rhuggins@pinespire.com
Affiliation	PineSpire
Subject	Comments on Lift Trucks in LCFS proposal
Comment	Please see attached comments
Attachment	www.arb.ca.gov/lists/com-attach/7412-lcfs2024-UyNQPwRrUGZXlgV1.pdf
Original File Name	PineSpire_LCFS Rulemaking comments Aug 2024.pdf
Date and Time Comment Was Submitted	2024-08-27 12:15:15

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)



August 27, 2024

California Air Resources Board
Low Carbon Fuel Standard Program

Re: Comments on Proposed Amendments to LCFS Regulation

086.1 PineSpire supports the strength of the proposed amendments to the regulation, including the strengthened CI standards, Auto-Acceleration mechanism, and overall efforts to improve the integrity of credit generation. We continue to support starting the auto-acceleration method sooner, in order to ensure the changes made in this rulemaking are meaningful in the near term as well as long term.

PineSpire offers the following specific comments on the proposed changes to how e-forklifts participate in the program:

Forklift Energy Economy Ratio (EER)

086.2 CARB's updated proposal to modify the EER of forklifts is an improvement and provides a more consistent methodology. However, forklift capacity is not the best indicator of what forklifts were electrified prior to the baseline year of the regulation. The capacity of a forklift overlaps significantly across Class I, II, III, IV and V forklifts. PineSpire continues to recommend that rather than adjusting the Energy Economy Ratio, CARB phase out eligibility of Class III (pallet jack) forklifts, which were the primary electrified class prior to the baseline year. By phasing out Class III lifts, there is a reconciliation with the pre-regulation baseline while maintaining full incentives for electrification of the significant population of internal combustion forklifts still in California. Using forklift class is also an easier metric to report and to verify than forklift capacity. Alternatively, if CARB feels capacity is the best tool for defining EER adjustments, then PineSpire would recommend the capacity for the full EER is set at 3,000 lbs in order to continue to encourage conversion of all internal combustion forklifts in California.

Phase In of e-Forklift Metering Requirements

086.3 We support the move to metering of forklifts and the newly proposed phase-in is a meaningful step towards feasibility. We appreciate CARBs receiving input from the industry in considering this issue. PineSpire does still recommend CARB extend the phase in period to mid 2026 or even 2027, due to the very significant number of meters that must be deployed throughout the state to meet this requirement. The tens of thousands of forklifts in California will require significant manufacturing, customer education, and resources for deployment. Based on experience in Oregon, a realistic timeline for achieving deployment at this scale is 18 to 24 months from when the regulation is passed.

Thank you for your consideration of our comments.
Sincerely

Ryan Huggins, Partner
PINESPIRE

Comment Log Display

Here is the comment you selected to display.

Comment 87 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Michael
Last Name	Harrison
Email Address	Michael.Harrison@valero.com
Affiliation	
Subject	Valero Renewable Fuels Company, LLC Comments on 15-Day Low Carbon Fuel Standard Amendments
Comment	<div></div>
Attachment	www.arb.ca.gov/lists/com-attach/7414-lcfs2024-UScBZlwxWG5Wlgdo.pdf
Original File Name	Valero Renewable Fuels LCFS Comments with attachments-Final8.27.24.pdf
Date and Time Comment Was Submitted	2024-08-27 12:16:35

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 27, 2024

Ms. Rajinder Sahota
Deputy Executive Officer – Climate Change and Research
California Air Resources Board
1001 I Street
Sacramento, CA 95814
VIA Electronic submittal through CARB portal

Re: Valero Renewable Fuels Company, LLC Comments on 15-Day Low Carbon Fuel Standard Amendments Package

Dear Ms. Sahota:

Valero Renewable Fuels Company, LLC ("VRF") appreciates the opportunity to provide comments on the proposed on the California Air Resources Board ("CARB") 15-Day Low Carbon Fuel Standard ("LCFS") Amendments Package (the "Amendments"). VRF is the owner and operator of 12 ethanol plants in the United States with an annual production capacity of approximately 1.6 billion gallons of ethanol. VRF sells its ethanol into California, as well as other low carbon markets in the U.S. and around the world. As one of the nation's largest producers of ethanol, and with its experience both in California and globally, VRF offers the following comments for the California Air Resources Board's consideration.

Approved Certification Systems

087.1 The Amendments propose to allow CARB to approve pathway certification systems that have been recognized by the European Commission for the European Union Renewable Energy Directive ("EU RED") 2018/2001 as of December 31, 2025. VRF supports CARB in using global standards, but would encourage CARB to allow other international low carbon sustainability standards such as the Canadian Fuel Regulations.

Land Use Change

087.2 The Amendments propose a modification of CARB's conservative land use change carbon intensity ("CI") values. The proposed Amendments would allow the Executive Director to further modify already conservative land use change CI values based on region. VRF has a concern surrounding the tremendous amount of discretion provided to the Executive Officer in changing established land use change CI values in a manner that circumvents the rulemaking process and excludes stakeholder input. VRF also has a concern that though CARB's indirect land use values ("ILUC") for corn ethanol are not consistent or appropriate. CARB is using an extremely conservative ILUC value for U.S. corn ethanol while providing a lower ILUC value for Brazilian sugarcane ethanol even though such Brazilian ethanol may be coming from potentially new deforested land.¹ In addition,

087.3

¹ Using the Tier 1 Simplified Calculator, the ILUC for corn-based ethanol is 19.8 gCO₂e/MJ, whereas Brazilian sugarcane ethanol receives an ILUC value of 11.8 gCO₂e/MJ.

ILUC penalties are not extended to the installation of solar arrays, wind turbines, or the extraction of minerals to support EV batteries, despite their potential for significant direct and induced land use changes. For instance, the Department of Energy projects that 10.4 million acres of solar arrays will be needed to help decarbonize the nation's power grid – as much as 83% of that acreage will likely be farmland², which will need to be replaced. VRF urges CARB to adopt a policy that eliminates inconsistencies in its ILUC emissions calculations.

087.4 Given that this Amendment proposal is new and was not included or contemplated in CARB's January 2024 proposal, VRF supports removing this particular proposal from the current Amendments and re-issuing this proposal under a separate rulemaking that allows for full and complete industry contribution.

BEV Lifecycle Emissions

087.5 In its new round of amendments, CARB has once again failed to accurately account for the full lifecycle emissions of battery electric vehicles (BEVs). In stark comparison to CARB's abrupt and dramatic treatment of biofuels to ensure indirect emissions with biofuels are accounted for and subjecting such fuels to a cap, CARB has turned a blind-eye to the analogous indirect emissions associated with BEV and battery production and the mining necessary for the vehicles to function. CARB should abandon this unequal treatment of fuels and vehicle technologies within the LCFS and adopt a full lifecycle emissions analysis for BEVs, including indirect emissions, consistent with CARB's treatment of biofuels and traditional fuels.

Sustainability Requirements for Biomass

087.6 The Amendments propose new sustainability requirements for fuel pathways effective 2026. Unfortunately, this timeframe does not allow for a realistic phase-in of these new requirements. Assuming that CARB adopts these new requirements in November 2024, and the Office of Administrative Law approves them in early 2025, the 2026 requirement for tracking would begin at harvest in Fall 2025. Unfortunately, this also means that the new farmer sustainability requirements for the harvest must occur during planting of the crop in Spring of 2025, or mere weeks after final approval of the Amendments. This does not allow time for farmer implementation of these practices, which in turn could significantly impede the flow of low carbon ethanol into California.

In VRF's experience, only a small subset of farmers currently engage in audited sustainability programs, which means that there is a small amount of qualifying U.S. corn ethanol available to California as well as other international low-carbon programs. VRF urges CARB to extend the 2026 deadline to allow time for farmer outreach and additional farmer participation to increase the volume of ethanol available for the California market.

Crop Cap

087.7 CARB's newly proposed biofuel crop cap is unnecessary; undermines program stability, investment, and low carbon fuel supply; and increases costs for California consumers. Throughout the

² Heller, Marc, "Fight grows over converting farmland to solar fields," GREENWIRE, June 3, 2024.

course of the LCFS program, including during this rulemaking, CARB has maintained that crop-based biofuels play an important role in lowering the carbon intensity of transportation fuels and that the program's stringency in combination with the sustainability guardrails proposed in the 45-day package "reduce the risk that rapid expansion of biofuel production and biofuel feedstock demand could result in deforestation or adverse land use change."³ In fact, as recently as the April 10, 2024 workshop, CARB's Staff presentation continued to support the 45-day package position that they do not believe a crop cap is necessary⁴.

- Slide 40, "Credit Generation for Virgin Oil Feedstocks Naturally Phases Out," which specifically highlights that virgin oil feedstocks become *deficit generating* in 2033 unless the AAM is triggered twice at which point, they generate deficits in 2030.
- Slide 57, CARB states that, "Based on current and future understanding of market conditions, it is uncertain if substantial increases in virgin oil fuel use in California will occur over long-term."
- Slide 58, CARB presents a portfolio of guardrail mechanisms that are already adopted in the LCFS or under evaluation – crop caps are noticeably absent.

While CARB has previously and continuously indicated it does not believe a crop cap is necessary, in its abrupt position change—at this late stage of rulemaking—it has failed to provide any empirical data to support such a position change. In fact, in the 15-Day Changes package "Notice", CARB does not identify any concerns with Land Use Change (LUC) or even mention emissions related to the use of soybean oil or canola oil to produce low-carbon fuels related to the proposed biofuels crop cap. Instead, CARB attempts to justify its position based on a self-identified new responsibility that CARB "must ensure that other regions are able to also access increasing volumes of low-carbon alternative fuels."⁵ However, CARB is not tasked with developing an LCFS that ensures the availability of low-carbon fuels to other markets, and certainly not one which is both arbitrary in its application and detrimental to LCFS program participants and California consumers alike. Indeed, CARB's own justification acknowledges that the fuels subject to the biofuels cap are low-carbon alternative fuels. Thus, CARB's newfound justification—ensuring other markets can access low-CI fuels—directly contradicts the entire purpose of the state's LCFS because it prevents fuels that could reduce the carbon intensity of the transportation fuel pool from ever reaching the market.

CARB's late stage position reversal and newly proposed crop cap risk undermining innovation in the Biomass-based diesel markets, including those who have begun to explore potential opportunities in the production of sustainable aviation fuel (SAF), another of CARB's key areas of concern. Moreover, investors and producers may view such unsupported position changes as a potential slippery slope under which CARB may simply decide to extend such limits to broader categories of feedstocks (e.g. all lipids or all crops) or even all liquid pathways, limiting investor confidence and forestalling future low-carbon investments and innovation. Policy makers in other states may also find that such arbitrary actions by CARB limit the exportability of the California LCFS to new markets and may well result in an unintentional regional crop cap program, should Oregon and Washington adopt CARB's updates to the program.

³ CARB, LCFS 2023 Amendments, Initial Statement of Reasons (ISOR), December 19, 2023 at 32, <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>.

⁴ <https://ww2.arb.ca.gov/sites/default/files/2024-04/LCFS%20April%20Workshop%20Slides.pdf>

⁵ CARB, Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information August 12, 2024 at 4, https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_notice.pdf

In addition, CARB has not provided any analysis as to the projected effect of the proposed crop caps on the supply of Biomass-based diesel to the California markets, including the potential for physical supply shortages, impacts to market liquidity, the potential for low-carbon Biomass-based diesel to be displaced by CARBULSD (given CARB's proposal to apply the same CI to both fuels, if produced above the cap) thus potentially increasing emissions, and the increased program compliance costs borne by California consumers.

Finally, CARB's proposed crop cap conflicts with the intent of the federal Renewable Fuel Standard (RFS) by artificially limiting the domestic markets available to Biomass-based diesel. CARB should refrain from implementing the proposed crop cap unless and until there is sufficient analysis of the impacts to domestic Biomass-based diesel production, imports, and exports, and the resulting ability to achieve RFS obligations.

We appreciate your consideration of our comments. If you have any questions or would like to discuss any of the points discussed in this letter, please do not hesitate to contact us.

Sincerely,

A handwritten signature in blue ink, appearing to read "Michael Harrison", with a stylized flourish at the end.

Michael Harrison

Attachments

FOOTNOTE 2
ATTACHMENT

Fight grows over converting farmland to solar fields

By Marc Heller

06/03/2024 01:19 PM EDT

A fight to stop the conversion of farmland to solar energy production is bumping into efforts to make farming and energy production work together.

The emerging practice of “agrovoltatics,” or using land both for solar energy and food production, could be a casualty of a conflict that’s playing out among policymakers, industry groups and lawmakers as the 2024 farm bill takes shape.

The pressure is almost certain to grow.

The American Farmland Trust estimated that several million acres of farmland — much of it highly productive for crops — could end up as solar farms in the coming years as the U.S. seeks to reduce greenhouse gas emissions, unless federal agencies or Congress step in to guide decisions.

The Department of Energy projects that 10.4 million acres of solar arrays would be needed to help decarbonize the nation’s power grid. But that may be an underestimation, said Samantha Levy, conservation and climate policy manager at the AFT.

As much as 83 percent of that acreage would likely be on farmland, Levy said. And half of the farmland could otherwise be productive for agriculture, she said, citing the organization’s own analysis.

Farmland is appealing, Levy said, because it’s flat, has already been cleared of trees and often is near electric transmission lines.

Levy and other analysts at the AFT projected in 2022 that one county in New York’s Mohawk Valley could lose almost 35 percent of its active farmland, or 4,000 acres, to proposed solar projects.

Between federal and various state incentives, the AFT said in a report, “this huge boost to solar energy makes the outcomes envisioned by solar modeling scenarios that lead to net-zero [greenhouse gas] emissions in the energy sector much more likely.”

The report continued, “These scenarios anticipate a much larger demand for solar, significantly increasing the amount of land needed to host solar projects.”

The federal government supports solar energy development on farms through initiatives such as the Rural Energy for America Program, which provides loan guarantees and grants to energy efficiency projects in rural areas. Every year, the program funds hundreds of small farm-based solar energy projects that fill on-farm energy needs and provide electricity to a handful of homes, for instance.

“Solar done right like on rooftops and smart agrivoltatics (as well as other distributed renewables) is simply put a massive opportunity for farmers across America,” said Lloyd Ritter, director of Green Capitol and executive director of the Agriculture Energy Coalition, in an email. “We need more, not less, distributed renewables in farm country to help keep farmers farming and on the land.”

Combining farming and solar energy still faces hurdles. In Gainesville, Texas, the solar development company Adapture Renewables produces electricity for 14,000 homes on a farm where 400 sheep graze around the panels. The animals keep the grass from growing tall enough to shade the panels, the company said.

But most of Adapture's 36 projects around the country aren't agrovoltaic, and combining solar energy with cattle grazing or crop production adds expenses or practical challenges — like raising the panels more than the 3 feet provided for sheep — that the company hasn't tried to tackle, said Elora Arana, project development manager.

"Everything comes down to economics," Arana said.

Adapture is also looking into combining solar production with pollinator habitat, Arana said.

Whether such projects count as farming is open to interpretation. Growing plants for bees and butterflies around solar panels, or bringing in sheep to graze only on occasion to trim the grass, may be "dual use" but don't meet the AFT's definition of agrovoltaics.

"For AFT, all agrovoltaics are dual-use, but not all dual-use is agrovoltaic," the organization said in comments submitted to the Department of Agriculture at a clean energy siting listening session.

Farm bill debate

The conflict over solar projects played out in deliberations on the 2024 farm bill in the House Agriculture Committee on May 23.

Rep. Chellie Pingree (D-Maine) criticized a provision in the bill that would block the USDA from funding solar energy projects on productive farmland.

Pingree said she, too, worries about land being taken out of food production to support solar arrays. But the bill was written in a way that could discourage or possibly block agrovoltaic projects, she said.

The bill, which passed in committee and is awaiting House action, would prohibit the USDA from funding solar projects that result in conversion of more than 5 acres of farmland, or more than 50 acres if most of the energy produced goes to off-farm use. Exceptions would apply if a project is approved by local counties and municipalities.

Pingree said farmers in Maine raise sheep and grow blueberries among solar panels and in one town provide solar power to local schools. Federal funding that has helped farmers launch such projects could dry up, she warned.

"There's a variety of things going on, and that would be prohibited under this," Pingree said.

Among other ventures, the University of Maine Cooperative Extension service [is researching combining solar energy and wild blueberry production](#).

Pingree said the bill's provision is "overly broad, vague and could cause a lot of confusion for farmers who are using solar power," although committee Chair Glenn Thompson (R-Pa.) said it allows for dual-use solar production.

Thompson based the provision on a bill by Rep. Mike Bost (R-Ill.). A spokesperson for Bost, Kadin Asbery, said farmers could still receive USDA funding for solar energy projects if the land meets state-level requirements for agricultural production.

The National Rural Electric Cooperative Association worries that limiting solar development on farms could hamper efforts to diversify energy sources in areas its members serve, said Stephen Bell, senior director of media and public relations.

"Electric cooperatives are locally owned and governed organizations," Bell said. "We are concerned this proposal limits a co-op's ability to make the best decisions to preserve affordability and reliability for the unique communities they serve."

In 2023, the AFT launched a "smart solar" project to spotlight how farming and solar energy production can co-exist.

While solar production should be focused on rooftops and land that's not suitable for crops or livestock, agrovoltaics should be expanded across the country through state and federal incentives, the AFT said. In comments submitted to the Biden administration in January, the organization said the USDA should adopt a clear definition of the practice and encourage it throughout agriculture programs.

“America needs both renewable energy and productive, resilient farms and ranches,” the AFT said. “Having both will take intentional federal, state and local action.”

FOOTNOTE 3
ATTACHMENT

Public Hearing to Consider the Proposed Amendments to the Low Carbon Fuel Standard

Staff Report: Initial Statement of Reasons

Date of Release: December 19, 2023
Scheduled for Consideration:
March 21, 2024

This report has been reviewed by the staff of the California Air Resources Board and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the California Air Resources Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

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List of Acronyms and Abbreviations

2022 Scoping Plan Update	2022 Scoping Plan for Achieving Carbon Neutrality
AAM	Automatic Acceleration Mechanism
AB	Assembly Bill
ACC II	Advanced Clean Cars II
ACF	Advanced Clean Fleets
ACT	Advanced Clean Trucks
AFP	Alternative Fuels Portal
AFPR	Annual Fuel Pathway Report
AJF	Alternative Jet Fuel
Btu	British Thermal Units
CA-GREET	California Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation
CARB or Board	California Air Resources Board
CARBOB	California Reformulated Gasoline Blendstocks for Oxygenate Blending
CATS	California Transportation Supply Model
CCM	Credit Clearance Market
CCS	Carbon Capture and Sequestration
CEQA	California Environmental Quality Act
CHC	Commercial Harbor Craft
CI	Carbon Intensity
CH ₄	Methane
CNG	Compressed Natural Gas
CO ₂	Carbon Dioxide
Court	State of California Court of Appeal, Fifth Appellate District
DAC	Direct Air Capture
DC	Direct Current
EIA	Environmental Impact Analysis
EER	Energy Economy Ratio
eCHE	Electric Cargo Handling Equipment
ED	Emergency Department
EJ	Environmental Justice
EJAC	Environmental Justice Advisory Committee
eGRID	Emissions & Generation Resource Integrated Database
EMFAC	Emissions FACtor Model
eOGV	Electric Power for Ocean-going Vessel
eTRU	Electric Transport Refrigeration Units
EV	Electric Vehicle
FCI	Fast Charging Infrastructure
FCV	Fuel Cell Vehicle
FSE	Fuel Supply Equipment
gCO ₂ e/MJ	Grams of CO ₂ equivalent per megajoule
GHG	Greenhouse Gas
HEFA	Hydroprocessed Ester and Fatty Acid
HRI	Hydrogen Refueling Infrastructure
HyCAP	Hydrogen Capacity Model

HySCapE	Hydrogen Station Capacity Evaluation Model
ICT	Innovative Clean Transit
IRA	Inflation Reduction Act
ISOR	Initial Statement of Reasons
IWG	Interagency Working Group on the Social Cost of Greenhouse Gases
kW	Kilowatt
LCA	Life Cycle Analysis
LCFS	Low Carbon Fuel Standard
LC/LEU	Low-Complexity/Low-Energy-Use
L-CNG	Liquefied Compressed Natural Gas
LD	Light-Duty
LDV	Light-Duty Vehicle
LRT-CBTS	LCFS Reporting Tool and Credit Bank & Transfer System
LUT	Lookup Table
MFR	Multi-Family Residence
MHD	Medium- and Heavy-Duty
MHDV	Medium- and Heavy-Duty Vehicle
MW	Megawatt
MTCO _{2e}	Metric tons in carbon dioxide equivalent
NEVI	National Electric Vehicle Infrastructure Formula Program
N ₂ O	Nitrous Oxide
NO _x	Oxides of Nitrogen
NREL	National Renewable Energy Laboratory
OPGEE	Oil Production Greenhouse Gas Emission Estimator
PM _{2.5}	Fine Particulate Matter
RFS	Renewable Fuel Standard
RNG	Renewable Natural Gas
RPS	Renewable Portfolio Standard
SAF	Sustainable Aviation Fuel
SB	Senate Bill
SC-CO ₂	Social Cost of Carbon
SFAP	Sustainable Freight Action Plan
SLCP	Short-Lived Climate Pollutant
ULSD	Ultra Low Sulfur Diesel
U.S. EPA	United State Environmental Protection Agency
VMT	Vehicle Miles Traveled
ZEV	Zero-Emission Vehicle

Executive Summary

California is the midst of a rapid transition to cleaner fuels and carbon neutrality, with just over 20 years to transition from today's significant fossil fuel usage to a future of clean fuels and technology. In 2022, the California Air Resources Board (CARB) approved the 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan Update), which charted a path to achieving carbon neutrality by 2045 and reducing greenhouse gas emissions 85% below 1990 levels by 2045. Meeting this goal will require the deployment of greenhouse gas (GHG) emission reduction strategies at an unprecedented scale and pace.

Many of the strategies identified in the 2022 Scoping Plan Update to address climate change and achieve carbon neutrality are the same strategies needed to drastically improve air quality. As transportation emissions, primarily from the use of fossil fuels, are California's single biggest source of greenhouse gas emissions and contributor to poor air quality, the State is working to rapidly increase the numbers of zero-emission vehicles on the road and deploy cleaner fuels to power them. If California is successful in meeting the clean fuel and vehicle goals identified in the 2022 Scoping Plan Update, we will reduce fossil fuel demand by 94% by 2045. CARB has already taken significant steps to reducing transportation emissions by adopting regulations such as Advanced Clean Cars II, Advanced Clean Fleets, Advanced Clean Trucks, Innovative Clean Transit, and other rules that promote and accelerate the deployment of low and zero-emission technologies.

The Low Carbon Fuel Standard (LCFS) is a key part of California's transportation decarbonization strategy and a successful one thus far. The LCFS provides the economic incentives to produce cleaner fuels like electricity, hydrogen and biofuels that are needed to displace fossil fuels and reduce transportation sector emissions. The LCFS has supported the displacement of billions of gallons of petroleum fuels with lower carbon alternatives, and without these alternative fuels the State risks returning to higher levels of fossil fuel use and fewer climate and air quality benefits. With clear scientific consensus on the need to rapidly decarbonize and achieve carbon neutrality by mid-century, the significant health and economic benefits of phasing down fossil fuel use, and the introduction of federal funding for alternative fuels and clean energy, now is the time to update and strengthen the LCFS regulation. This regulatory update proposal, which is described in detail in this staff report, is focused on the following key concepts:

- Increasing the stringency of the program to reduce emissions and decarbonize the transportation fuel sector, which will also aggressively reduce our dependence on fossil fuels;
- Strengthening the program's equity provisions to promote investment in disadvantaged, low-income and rural communities;
- Supporting electric and hydrogen truck refueling;
- Incentivizing more production of clean fuels needed in the future, such as low-carbon hydrogen;
- Supporting methane emissions reductions and deploying biomethane for best uses across transportation; and
- Strengthening guardrails on crop-based fuels to prevent deforestation or other potential adverse impacts.

These proposed changes, if adopted, would result in significant GHG reductions as well as air quality, health, and economic benefits across the State. These benefits include:

GHG Reductions

- 90% reduction in carbon intensity of California's transportation fuels by 2045.
- 558 million metric tons of life cycle CO_{2e} reductions from the amendments.

Health Benefits

- Almost \$5 billion in total avoided health costs resulting from nearly 4,300 tons of PM_{2.5} reduction and more than 25,000 tons of NO_x reductions.

Economic Benefits

- \$128 billion in revenue estimated accruing to California businesses from credit generation/sales.
- Job growth in the electricity and biofuel sectors as demand for these fuels grows.
- Increases the diversity and competitiveness of transportation fueling options for California consumers, transitioning supply from just ten fossil fuel refiners to hundreds of individual biofuel, electricity, and hydrogen producers.

The changes would also help support implementation of California's world-leading zero-emission vehicle policies, align with the 2022 Scoping Plan Update, and provide a model for other jurisdictions looking to deploy clean fuel and climate policies. And finally, as Californians transition away from less-efficient fossil fuels and into more energy efficient zero-emission vehicles (ZEVs) and lower-carbon fuel alternatives, the fuel costs Californians pay to travel would also decrease, providing Californians billions of dollars in savings. CARB staff estimates the amount of money Californians spend on fueling costs across all vehicle class could be up to 42% lower in 2045 than compared to fuel costs in 2021. This translates into an annual savings of over \$20 billion in fuel expenditures in 2045 alone.

I. Introduction and Background

In this chapter, the California Air Resources Board (CARB or Board) staff provides a brief overview of the Low Carbon Fuel Standard (LCFS) regulation (California Code of Regulations, title 17, sections 95480-95503), information on the history and status of the LCFS program, and an overview of the proposed revisions to the program.

The purpose of the LCFS regulation is to reduce the carbon intensity (CI) of transportation fuels used in California, thereby reducing GHG emissions, and to incentivize the production of low-carbon and renewable alternatives, such as low-CI electricity and renewable hydrogen, and biofuels to displace fossil fuels and allow more energy security in the transportation sector. It is the most direct tool being deployed to reduce dependence on fossil fuels in the transportation sector.

The Board approved the LCFS regulation in 2009 as a discrete early action measure under the California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32, Núñez and Pavley, Chapter 488, Statutes of 2006; Healthy and Safety Code sections 38500 et seq.). Since the passage of AB 32, California has developed bold, creative, and durable policy solutions to protect our environment and public health. In fact, California met the target established in AB 32—a return of GHG emissions to 1990 levels by 2020—six years ahead of schedule.

Recognizing California's early successes in achieving GHG emissions reductions and the need to accelerate climate mitigation efforts, California has continued to enact ambitious goals and take concrete steps to achieve them. There have been several major new climate statutes enacted and executive orders issued since the last major LCFS rulemaking in 2018. In 2022, Governor Gavin Newsom signed several climate bills, including AB 1279 (Muratsuchi, Chapter 337, Statutes of 2022), Senate Bill (SB) 905 (Caballero, Chapter 359, Statutes of 2022), and SB 1020 (Laird, Chapter 361, Statutes of 2022). AB 1279 requires an 85% reduction in anthropogenic GHG emissions below 1990 levels by 2045. SB 905 requires CARB to adopt regulations creating a framework for the development of carbon capture, removal, and storage projects by 2025. And SB 1020 includes new benchmarks of 90% clean electricity by 2035 and 95% by 2040 ahead of the 100% goal by 2045. A particular focus on the transportation sector was established through Executive Order N-79-20.¹ Signed in 2020, Executive Order N-79-20 established a State goal that sales of all new passenger vehicles be zero emission by 2035 and that 100% of medium- and heavy-duty vehicles in the State be zero emission by 2045 for all operations where feasible and by 2035 for drayage trucks. The 2022 Scoping Plan Update,² approved by the Board in December 2022, lays out a cost-effective and technologically feasible path to achieve these targets and achieve carbon neutrality by 2045.

The 2022 Scoping Plan Update signals the need for an aggressive reduction of fossil fuel use, building on and accelerating greenhouse gas reduction programs that have been in place for a decade and a half, including the LCFS program. This means rapidly moving to zero-emission

¹ State of California Executive Department, Executive Order N-79-20. September 23, 2020. <https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf>

² California Air Resources Board, 2022 *Scoping Plan for Achieving Carbon Neutrality*. November 16, 2022. https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp_1.pdf

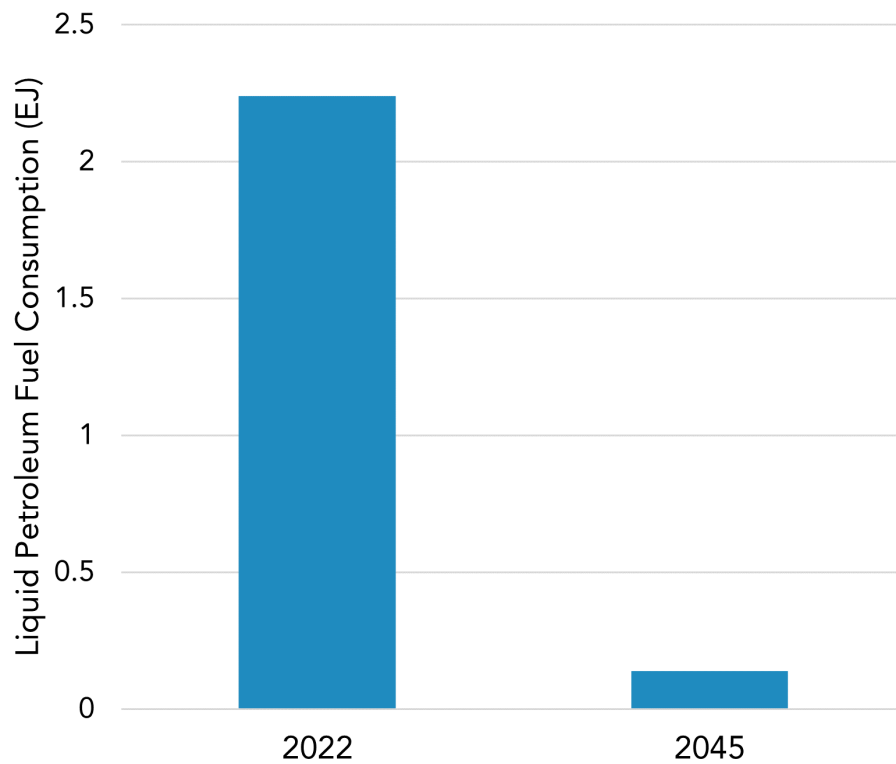
transportation; transitioning the cars, buses, trains, and trucks that now constitute California's single largest source of planet-warming pollution to zero-emission technology. In the transportation sector, the transition to complete zero-emission vehicle (ZEV) technology will not happen overnight.

Achieving GHG emissions of 85% below 1990 levels by 2045 will require significant investment and use of lower carbon opportunities while zero-emission technologies gain market penetration and achieve interim climate goals. Conventional internal combustion engine vehicles from legacy fleets will remain on the road for some time, even after all new vehicle sales have transitioned to ZEV technology. Therefore, it is necessary to ensure there are reliable and adequate low-carbon fuel supplies available and continue expansion of low-carbon fuel production in ways that use existing infrastructure where possible, such as transitioning refineries to clean fuel production.³

Meeting this demand requires building out significant new low-carbon energy supply capacity, which the LCFS incentivizes in the transportation sector. Specifically, a greater demand for electricity and renewable hydrogen is expected, necessitating the expansion of renewable electricity and hydrogen production; the transition of low-carbon liquid biofuels from end-uses from on-road vehicles with many zero-emission options into sectors that are more difficult to decarbonize like aviation, marine, and other off-road uses; and transition of biomethane used as compressed natural gas (CNG) in vehicles to a feedstock for hydrogen or an energy source to decarbonize the broader natural gas system. Successful implementation of the technology and fuel switching called for in the 2022 Scoping Plan Update results in a 94% reduction in liquid petroleum demand by 2045 compared to 2022, as shown in Figure 1. For these outcomes to happen, California must accelerate the pace of clean energy and technology deployment. Private investments, policy signals such as a more stringent LCFS, and federal incentives will all need to be leveraged to realize the outcomes in the 2022 Scoping Plan Update.

³ State of California Executive Department, *Executive Order N-79-20*. September 23, 2020. <https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf>

Figure 1: Fossil Fuel Demand Projections in 2045 relative to 2022 (from 2022 Scoping Plan Update)

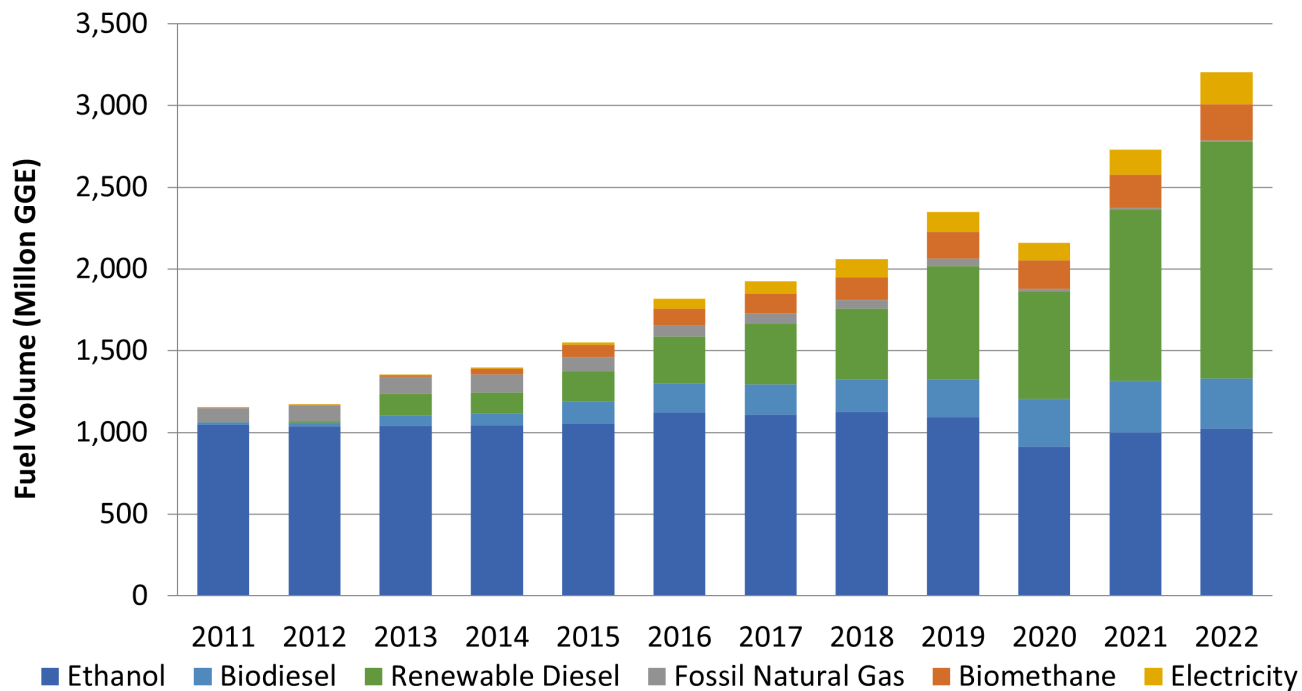


The LCFS also supports other existing State GHG reduction efforts; notably, the Short-Lived Climate Pollutant (SLCP) Reduction Strategy, Advanced Clean Cars II (ACC II) regulations, Advanced Clean Fleets (ACF) regulation, Clean Truck Partnership, Advanced Clean Trucks (ACT) regulation, 2020 Mobile Source Strategy, Sustainable Freight Action Plan (SFAP), Commercial Harbor Craft (CHC) regulation, In-Use Locomotive regulation, Innovative Clean Transit (ICT) regulation, and Renewable Portfolio Standard (RPS). SB 1383 (Lara, Chapter 395, Statutes of 2016) requires a 40% reduction in California’s methane emissions by 2030 and the LCFS facilitates significant private investment in technologies that provide the methane reductions from dairy, livestock manure, organic waste, and landfill management operations called for by SB 1383. On the vehicle side, ACC II serves as the primary mechanism to help deploy ZEVs in the light-duty vehicle (LDV) sector. The LCFS supports ACC II implementation by incentivizing electricity and hydrogen infrastructure through the ZEV infrastructure crediting provisions, providing credits for the delivery of low-CI electricity and hydrogen to vehicles, and through rebate and other transportation electrification support from the proceeds from LCFS credit sales earned by electric utilities. Similarly, the opportunity to generate LCFS credits helps to reduce the up-front costs for fleets to purchase new zero-emission trucks, locomotives, and buses and equipment to achieve the SFAP, ACF, ICT, In-Use Locomotive, and ACT goals. By recognizing the carbon intensity of renewable electricity used to produce transportation fuels, the LCFS rewards fuel providers across the supply chain for the displacement of fossil fuel consumption by biomethane, wind, solar, and other lower carbon technologies, as well as the use of renewable power for vehicle charging. Several of these regulations also require the use of renewable fuels during the transition to zero-emission technology. The ICT regulation requires large transit agencies to use renewable fuel in remaining combustion-powered buses, and the ICT and In-Use Locomotive regulations

support the use of hydrogen as well. The ACF regulation requires fleet turnovers beginning in 2024; however, this transition is contingent upon the availability of refueling infrastructure, which this LCFS proposal would incentivize.

The LCFS provides the necessary price signals and incentives to leverage private investment and scale the low-carbon fuel production needed to displace fossil fuels. This is borne out in the program's history. As shown in Figure 2, California has doubled the volume of the State's low-carbon fuel consumption in just 10 years and diversified the fuel mix considerably, due in large part to the LCFS program.

Figure 2: Alternative Fuel Volumes in California between 2011-2022



The 2022 Scoping Plan Update directly identifies that the stringency of the LCFS CI benchmarks should be increased, both pre- and post-2030, which is the key change staff is proposing for this rulemaking. The objective is to send clear, long-term market signals to support investment in low-carbon fuel production and technologies that are needed to achieve deep emissions reductions in the transportation sector while supporting the broader portfolio of zero-emission vehicle regulations and climate statutes. Another goal is to align the crediting opportunities in the LCFS with the fuel and technology pathways identified in the 2022 Scoping Plan Update. To encourage additional GHG reductions in key areas where decarbonization will be important to meet long-term climate goals, staff proposes to eliminate the current exemption for intrastate fossil jet fuel starting in 2028 and expand ZEV infrastructure crediting to the medium- and heavy-duty vehicle sector under the program. Given the need to quickly scale low-carbon fuel production in this decade and staff's experience implementing the program for over a decade, staff also proposes to update and streamline several quantification methods and analysis tools so that the program does not unnecessarily slow down the investment or availability of low-carbon fuels and so other jurisdictions can establish similar programs without significant administrative needs. As a means of increasing the flexibility of the program to be

able to respond to rapid and unanticipated shifts in the market, such as significant overperformance of ACC II or ACF implementation, staff also proposes a mechanism that would automatically accelerate the carbon intensity benchmarks under certain conditions. Finally, in response to the near-term over-performance, staff has included a step down in the carbon intensity beginning in 2025.

A. Overview of the Low Carbon Fuel Standard

Transportation plays a key role in California's economy and lifestyle. The production and use of traditional petroleum-derived transportation fuels—such as gasoline and diesel—are responsible for almost 50% of statewide GHG emissions, the largest source of GHG emissions in 2020.⁴ The LCFS is part of the State's set of policies to meet California's ambitious climate goals, which are described in the 2022 Scoping Plan Update. The 2022 Scoping Plan Update demonstrates that significant increases in low-carbon fuel and technologies are needed in a faster timeframe than we have historically seen.

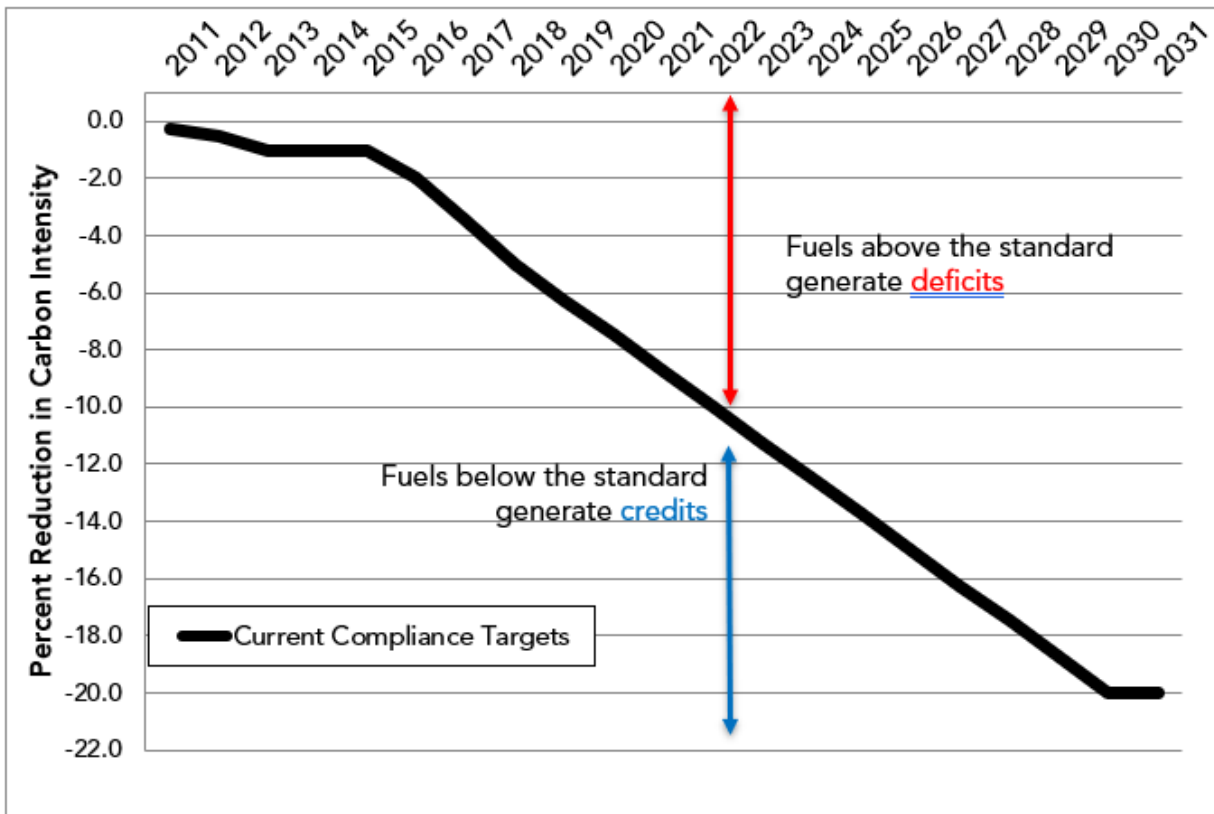
The LCFS is designed to decrease the carbon intensity of California's transportation fuel pool and provide an increasing range of low-carbon and renewable alternatives, which reduce petroleum dependency and achieve air quality benefits.⁵

Providers of transportation fuels must cumulatively demonstrate that the mix of fuels they supply for use in California meets the LCFS carbon intensity standards, or benchmarks, for each annual compliance period. Regulated entities required to report fuels provided may demonstrate compliance through a system of credits and deficits. Credits are generated by supplying fuels with lower carbon intensity than the benchmark. Deficits result from supplying fuels with higher carbon intensity than the benchmark. This concept is illustrated in Figure 3. A deficit generator meets its compliance obligation by retiring credits it earns or otherwise acquires from another party equal to the deficits it has incurred. Credits and deficits are generally determined based on the quantity of fuel sold, the carbon intensity of the fuel, and the efficiency by which a vehicle converts the fuel into usable energy.

⁴ California Air Resources Board, *California Greenhouse Gas Emissions for 2000 to 2020, Trends of Emissions and Other Indicators*. Pages 10-14. 2022. https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/2000-2020_ghg_inventory_trends.pdf. This includes upstream oil extraction and refining emissions.

⁵ Carbon Intensity (CI) is a measure of the GHG emissions associated with the various production, distribution, and consumption steps in the "life cycle" of a transportation fuel, denoted in units of gCO₂e/MJ.

Figure 3: Illustration of LCFS Mechanics – How Credits and Deficits are Calculated



There are three ways to generate credits in the LCFS: fuel pathways, projects, and capacity-based crediting. Under fuel pathway-based crediting, all transportation fuels need a CARB-certified carbon intensity score to participate in the LCFS, and the fuel type dictates which process is used to determine that CI. Additionally, there are CARB-approved LCFS project-based actions that may generate credits, such as by demonstrating carbon capture and sequestration, using solar-generated steam at oil and gas extraction sites, and investing in refinery improvements that reduce GHG emissions. Finally, the 2018 amendments added capacity-based crediting to support the deployment of ZEV refueling infrastructure. Crediting for ZEV infrastructure is based on the capacity of the hydrogen station or fast charging site minus the actual fuel dispensed. Credits and deficits are denoted in metric tons of GHG emissions. Credits may be banked and traded within the LCFS market to meet compliance obligations.

The LCFS carbon intensity benchmarks are an annually declining standard, which is defined in the LCFS regulation as a percentage reduction from the historical average carbon intensity of gasoline and diesel fuel in the year 2010. To determine the carbon intensity value of a particular fuel, the GHG emissions from the fuel's life cycle are summed and divided by the fuel's energy content (in megajoules). GHG emissions from each step can include carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O), which are adjusted by the Intergovernmental Panel on Climate Change global warming potentials to their CO₂ equivalent. Thus, carbon intensity is expressed in terms of grams of CO₂ equivalent per megajoule (gCO₂e/MJ).

The LCFS is based on the principle that each fuel has life cycle GHG emissions. This life cycle assessment (LCA) examines the GHG emissions associated with the production, transportation, and use of a given fuel. The LCA includes direct emissions from the energy and material inputs for the production, transport, and use of the fuels, as well as significant GHG emissions from market-driven changes, such as changes in land use for some crop-derived biofuels, and emissions that may result from market displacement effects (e.g., when a material is diverted from its historic use in order to produce a fuel, causing increased demand for another material to substitute the fuel for feedstock). The system of declining benchmarks that is used to calculate credits and deficits, and the obligation of deficit-generating fuels to be canceled out by credits, result in a decrease in the total life cycle GHG emissions from the transportation fuel pool in California.

A more complete description of how the LCFS regulation is designed to work, as well as its underlying scientific and economic principles, can be found in the initial and final statements of reasons for the original 2009 rulemaking,⁶ and the 2011,⁷ 2015,⁸ 2018,⁹ and 2019 LCFS rulemakings.¹⁰

⁶ California Air Resources Board, *Proposed Regulation to Implement the Low Carbon Fuel Standard Volume I Staff Report: Initial Statement of Reasons*. March 5, 2009.

<https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2009/lcfs09/lcfsisor1.pdf>

California Air Resources Board, *Proposed Regulation to Implement the Low Carbon Fuel Standard Volume II Appendices*, March 5, 2009. <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2009/lcfs09/lcfsisor2.pdf>

California Air Resources Board, *Final Statement of Reasons for Rulemaking*. December 2009.

<https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2009/lcfs09/lcfsisor.pdf>

⁷ California Air Resources Board, *Staff Report: Initial Statement of Reasons for Rulemaking: Proposed Amendments to the Low Carbon Fuel Standard*. October 26, 2011.

<https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2011/lcfs2011/lcfsisor.pdf>

California Air Resources Board, *Final Statement of Reasons: Amendments to the Low Carbon Fuel Standard Regulation*. October 2012. <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2011/lcfs2011/lcfsisor.pdf>

⁸ California Air Resources Board, *Staff Report: Initial Statement of Reasons for Rulemaking. Proposed Re-Adoption of the Low Carbon Fuel Standard Regulation*. December 31, 2014.

<https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2015/lcfs2015/lcfs15isor.pdf>

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<https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2015/lcfs2015/fsorlcfs.pdf>

⁹ California Air Resources Board, *Public Hearing to Consider Proposed Amendments to the Low Carbon fuel Standard Regulation and to the Regulation on Commercialization of Alternative Diesel Fuels. Staff Report: Initial Statement of Reasons*. March 6, 2018.

https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/lcfs18/isor.pdf?_ga=2.233093594.551189306.1692641515-1059366641.1629756188

California Air Resources Board, *Addendum to the Final Statement of Reasons for Rulemaking: Amendments to the Low Carbon Fuel Standard Regulation and to the Regulation on Commercialization of Alternative Diesel Fuels. Final Statement of Reasons*. January 3, 2019.

https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/lcfs18/lcfsaddendum.pdf?_ga=2.112540034.749536220.1693580753-1565224836.1601474474

¹⁰ California Air Resources Board, *Public Hearing to Consider Proposed Amendments to the Low Carbon Fuel Standard Regulation and to the Regulation on Commercialization of Alternative Diesel Fuels. Staff Report: Initial Statement of Reasons*. October 1, 2019.

<https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2019/lcfs2019/isor.pdf>

California Air Resources Board, *Amendments to the Low Carbon Fuel Standard Regulation, Final Statement of Reasons*. April 2020. <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2019/lcfs2019/fsor.pdf>

B. History and Current Status of the Low Carbon Fuel Standard

CARB initially approved the LCFS regulation in 2009 as an early action measure under AB 32 and began implementation in 2010. Throughout the 14 years since the Board's original adoption, the basic framework of the current LCFS—including the use of LCA, the LCFS credit market, and the electronic registry of fuel reporting—has worked well and continues to support growth in an increasingly diverse and low-carbon transportation fuel pool.

CARB approved revisions to the LCFS in December 2011, which became effective on November 26, 2012, and were implemented by CARB on January 1, 2013. On July 15, 2013, the State of California Court of Appeal, Fifth Appellate District (Court) issued its opinion in POET, LLC versus California Air Resources Board (2013) 218 Cal.App.4th 681, resulting in a stay of the LCFS. The Court held that the LCFS adopted in 2009 and implemented in 2010 (referred to as 2010 LCFS) would remain in effect and that CARB could continue to implement and enforce the 2013 regulatory standards while taking steps to remedy California Environmental Quality Act and Administrative Procedure Act issues as required in the ruling.

To address the court ruling, CARB brought a revised LCFS regulation to the Board for readoption in February 2015. The 2015 rulemaking included many amendments, updates, and improvements to the program, including a compliance schedule that maintained the 2009 LCFS regulation's target of a 10% reduction in average carbon intensity by 2020 from a 2010 baseline. On September 24, 2015, the Board approved that revised LCFS regulation, which became effective on January 1, 2016.

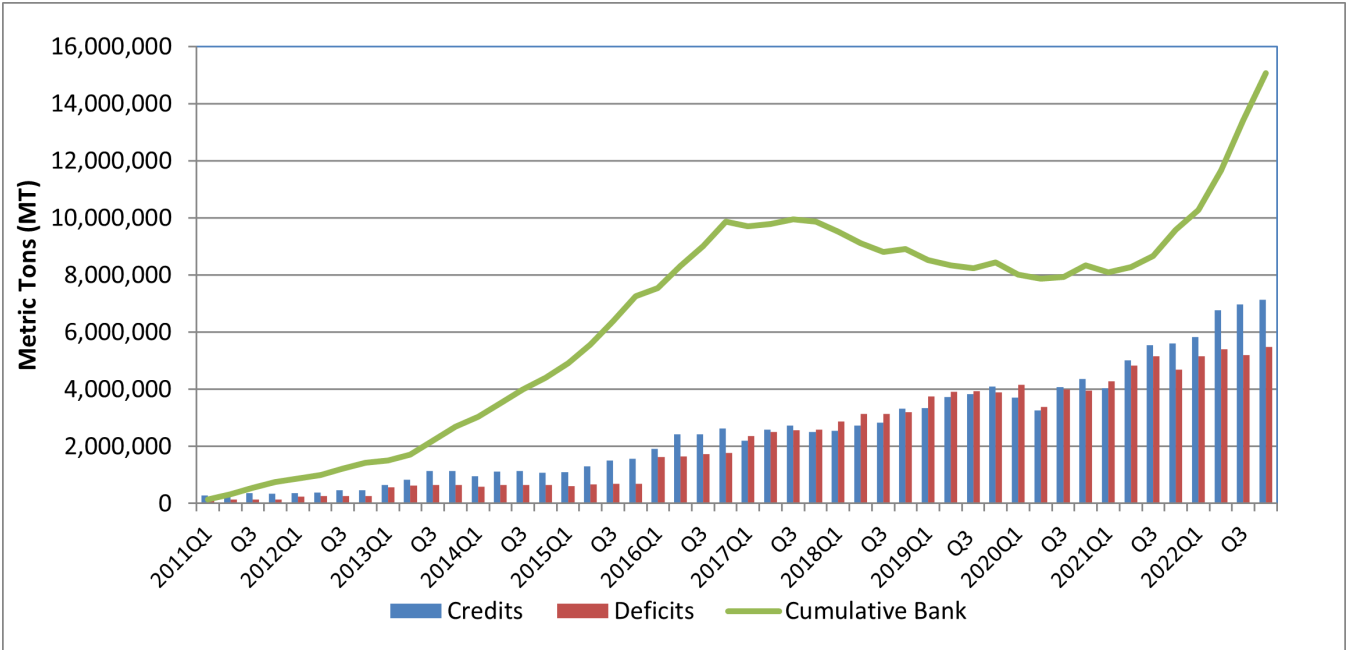
In September 2018, the Board approved amendments to the LCFS regulation, which became effective on January 4, 2019. The 2018 rulemaking included many amendments, updates, and improvements to the program, including strengthening the CI reduction benchmarks to a 20% reduction from a 2010 baseline by 2030, in line with the 2017 Scoping Plan Update and California's 2030 GHG target enacted through SB 32 (Pavley, Chapter 249, Statutes of 2016) and adding a third-party verification provision to enhance the integrity of the program.

As part of the hearings to adopt the amendments proposed in 2018, the Board directed the Executive Officer to monitor the cost containment provisions of the LCFS program, including the Credit Clearance Market, and to propose technical adjustments through future rulemaking to strengthen the cost containment provisions, if needed. The Board also directed the Executive Officer to work with stakeholders to establish an equity-based framework for the possible uses of base credit value from residential charging, consistent with legislative priorities. To address Board direction, CARB brought changes focusing on strengthening the cost containment provisions of the LCFS program and addressing equity in the use of LCFS credit value for electricity to the Board through a rulemaking in 2019. In April 2020, the Board approved the current LCFS regulation. The current regulation became effective on July 1, 2020.

California is receiving significant volumes of low-carbon fuels in response to the LCFS, including ethanol, biomass-based diesel, biomethane, and low-CI electricity. In addition to increased volumes, fuel producers have also been successfully reducing the carbon intensity of their fuels over the past years by using low-carbon feedstocks, improving production efficiency, and reducing fugitive emissions. The effect of both increasing volumes of low-carbon fuels and reduced carbon intensity of those fuels has meant that California's overall petroleum fuel use has declined by 1.3 billion gallons since 2019, the overall carbon intensity

of California’s transportation fuels has declined by 12.63% relative to 2010 levels, and the LCFS credit bank of excess credits has grown to its highest level to date with 15 million credits, as shown in Figure 7. The financial benefits are distributed among providers of various alternative fuels (as illustrated in Figure 3), geographically across California,¹¹ and across the participating credit generators.¹²

Figure 4: Quarterly Credits and Deficits for All Fuels Reported and Cumulative Credit Bank (Q1 2011 through Q4 2022)

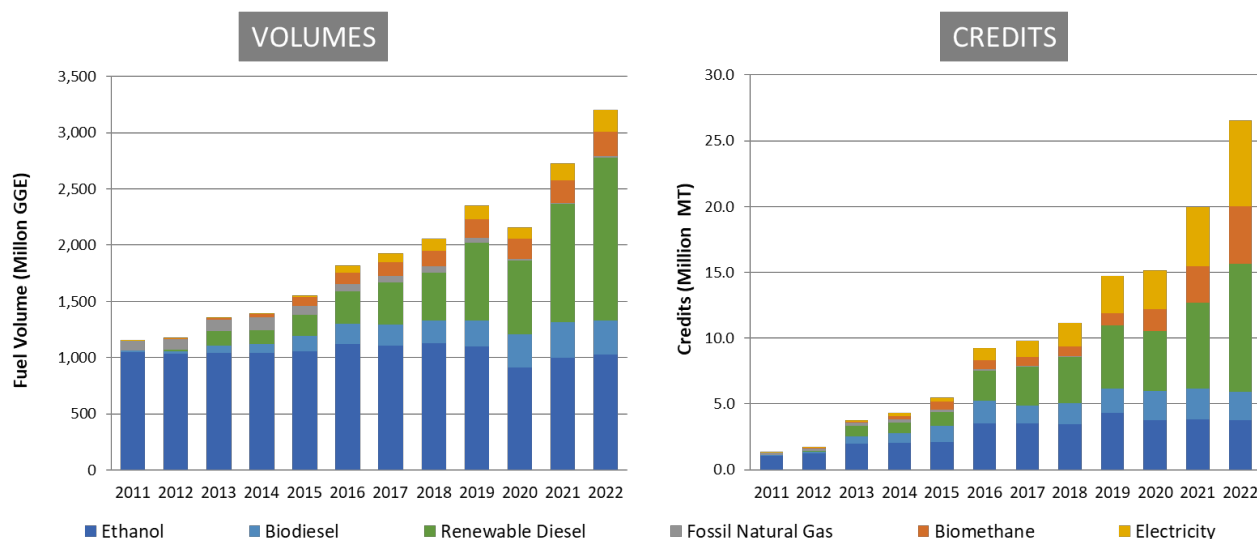


By decarbonizing the transportation fuel sector, the LCFS has resulted in increased diversification of transportation fuel options in California and less dependence on fossil fuels. Before the LCFS, the only alternative fuels with market share were natural gas and ethanol. Since the inception of the LCFS, California has doubled the volume of low-carbon fuel consumption and diversified the fuel mix considerably. Collectively, alternative fuels supported by the LCFS displaced over 3.9 billion gallons of petroleum fuel in 2022 in California. More recently, renewable diesel and electricity have taken on an increasingly larger share of the fuel pool, as shown in Figure 8. Electric vehicle (EV) charging has increased substantially in the last few years, and it is expected that electric vehicles will be an increasing portion of the market share, driven in part by California’s vehicle regulations, including ACC II, ICT, and ACF regulations in conjunction with recent federal incentives. Renewable diesel capacity also increased by over 500% between 2013 and 2020, and many U.S. fuel producers have made

¹¹ Beneficiaries include California municipal transit agencies, fueling facilities, equipment service providers, utilities, as well as fuel producers and project developers across the United States and abroad.
¹² California Air Resources Board, *LCFS Data Dashboard Figure 9: LCFS Credit Market Net Position Histogram*. (Updated on July 31, 2023). <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>

announcements for expanded production in the coming years. Nearly half of California's diesel pool was composed of alternative fuels in 2022.¹³

Figure 5: Annual Alternative Fuel Volumes and Credit Generation by Fuel Type



In addition to increases in renewable diesel and electricity, hydrogen and alternative jet fuel (AJF) quantities reported to the LCFS have increased as well. Since 2019, when AJF became eligible as an opt-in fuel in the LCFS, volumes have increased from about 1.8 million gallons in 2019 to about 11.6 million gallons in 2022, and those volumes continue to increase as momentum builds in the aviation sector and with new federal incentives. Hydrogen quantities, although still relatively small, nearly doubled from 2018 to 2019, and have more than quadrupled since 2018.¹⁴ The program is also supporting refueling infrastructure needed to refuel ZEVs. The 2018 LCFS amendments added the Hydrogen Refueling Infrastructure (HRI) and Direct Current (DC) Fast Charging Infrastructure (FCI) provisions. These provisions are designed to support the buildout of publicly-available ZEV refueling infrastructure for light-duty vehicles in California in the early years while refueling demand is low, with the expectation that vehicle demand will increase as refueling availability increases. Crediting is provided for eligible infrastructure based on the unused refueling capacity, and credit generation phases out naturally as fueling throughput increases and unused capacity decreases. The provisions limited infrastructure crediting to 5% of deficits and required applications to be submitted prior to 2026. To date, CARB has approved 75 hydrogen stations and over 3,200 DC fast chargers at 511 sites.¹⁵

Over 30 million LCFS credits were sold or traded in approximately 3,100 transactions in 2022, demonstrating an active credit market with an annual transactional value of nearly \$4 billion.

¹³ California Air Resources Board, *LCFS Quarterly Data Spreadsheet*. (Updated on July 31, 2023). <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>

¹⁴ Ibid.

¹⁵ California Air Resources Board, *LCFS ZEV Infrastructure Crediting webpage*. (Accessed on April 18, 2023). <https://ww2.arb.ca.gov/resources/documents/lcfs-zev-infrastructure-crediting>

Credits in 2022 were generated primarily from renewable diesel (36%), electricity (24%), biomethane (16%), and ethanol (14%). More than 522 active entities are registered for reporting in the LCFS Reporting Tool and Credit Bank & Transfer System (LRT-CBTS), and more than 1,300 individual alternative fuel pathways have been approved with carbon intensities below the current benchmarks.

The current LCFS targets a 20% reduction in fuel carbon intensity by 2030 and maintains that benchmark for all subsequent years. A primary objective of this rulemaking is to strengthen the carbon intensity benchmarks of the LCFS regulation both pre- and post-2030 so that the LCFS continues to serve as a key policy to reduce GHG emissions from the transportation sector. Achieving the GHG reduction goals of the 2022 Scoping Plan Update will require significant changes in every sector of the State's economy. California's transportation industry remains the largest contributing sector to the GHG Inventory,¹⁶ and transitioning to ZEVs and deploying low-carbon fuels is critical for achieving California's climate and air quality targets.

Federal policy support plays a role in the fuels and technologies that come to California through the LCFS. The U.S. Environmental Protection Agency (U.S. EPA) implements a Renewable Fuel Standard (RFS) program (Code of Federal Regulations, title 40, part 80, sections 1100 et. Seq.) that mandates the blending of specific volumes of renewable fuels into gasoline and diesel sold in the U.S. to achieve a specified ratio for each year. As defined, "renewable fuels" under the RFS resemble the list of transportation fuels subject to the LCFS. The two policies are complementary and support a reduction in fossil fuel consumption and diversification of the fuel pool. In addition to the RFS, the Inflation Reduction Act (IRA) of 2022¹⁷ provides tax incentives and financial support for biofuel and hydrogen production. The newly created Hydrogen Production Tax Credit (45V)¹⁸ incentivizes the domestic production of clean hydrogen, which will make this emerging low-carbon fuel source more cost-competitive and help the country meet the ambitious goals of the Hydrogen Shot¹⁹, an effort to accelerate breakthroughs in hydrogen technology and cut the cost of clean hydrogen by 80% to \$1 per kilogram in one decade. This federal support represents a once-in-a-generation investment in clean fuel production and infrastructure, and California is poised to leverage the existing LCFS mechanism to bring investment to California. The LCFS also supports use of carbon capture and sequestration (CCS) in connection with transportation fuel production, and direct air capture (DAC) with carbon sequestration projects. These capital-intensive projects are also supported by the federal government through the 45Q tax credit for CCS^{20,21} and research and

¹⁶ California Air Resources Board, *Current California GHG Emission Inventory Data (2022 Edition)*. <https://ww2.arb.ca.gov/ghg-inventory-data>

¹⁷ 117th Congress, *Inflation Reduction Act of 2022*. Pub.L. No. 117-169. August 16, 2022. <https://www.congress.gov/bill/117th-congress/house-bill/5376/text>

¹⁸ The White House, *Building a Clean Energy Economy: A Guidebook to the Inflation Reduction Act's Investments in Clean Energy and Climate Action*. 74-76. January 2023. <https://www.whitehouse.gov/wp-content/uploads/2022/12/Inflation-Reduction-Act-Guidebook.pdf>

¹⁹ United States Department of Energy Office of Energy Efficiency & Renewable Energy, *Hydrogen Shot: Overview*. (Accessed on December 13, 2023). <https://www.energy.gov/eere/fuelcells/hydrogen-shot>

²⁰ Congressional Research Service, *Carbon Storage Requirements in the 45Q Tax Credit*. IF11639. June 28, 2021. <https://crsreports.congress.gov/product/pdf/IF/IF11639>

²¹ The Inflation Reduction Act of August 2022 expands and enhances the 45Q credit for CCS. Pub.L. No. 117-169 (August 16, 2022).

deployment grants from federal agencies.^{22,23} Investments in California leveraging federal support will be key to achieving the deep emissions reductions called for in AB 1279 and the 2022 Scoping Plan Update.

Like so many of CARB's innovative programs, the success of California's LCFS program is inspiring other jurisdictions to adopt their own clean fuels programs. CARB works closely with other jurisdictions that have chosen to adopt similar programs, including Oregon, Washington, and British Columbia. CARB also collaborates closely with other states and is seeing growing interest from several jurisdictions. Other jurisdictions including Japan, New Zealand, Australia, and the European Commission also continue to seek information and technical experience on the LCFS. As interest in the LCFS grows and other jurisdictions consider their own programs, CARB continues to improve efficiency and maintain program integrity to ensure that the LCFS remains an exportable policy.

C. Overview of the Proposed Amendments

This section provides a broad overview of amendments staff is proposing for adoption. Chapter II provides a more in-depth description of the purpose of the rulemaking and the problems that the proposal is intended to address. Appendix E provides a summary, purpose, and rationale for each proposed regulatory modification.

The most significant change in this proposal is to strengthen the CI reduction benchmarks both pre- and post-2030 in support of California's goal for achieving carbon neutrality by 2045 and achieving an 85% reduction in GHG emissions by 2045, as called for by AB 1279 and the 2022 Scoping Plan Update. The 2022 Scoping Plan Update, which identifies the outcomes needed to achieve carbon neutrality by 2045, was approved by the Board in December 2022. The State must accelerate the pace of clean energy and technology development, and the LCFS is one of the primary mechanisms for transforming California's transportation fuel pool with low-carbon alternatives. The benchmarks provide the basis for calculating credits for low-carbon fuels and deficits for high carbon fuels.

If adopted, the proposed amendments would require a 30% reduction in fuel CI by 2030 and a 90% reduction in fuel CI by 2045 from a 2010 baseline, as shown in the proposed CI benchmark schedule for gasoline and gasoline substitutes listed in Table 1, below, and shown in Figure 6. To accommodate rapid advances in transportation fuel production and use, the proposed amendments also include a near-term step-down and an Automatic Acceleration Mechanism (AAM). The step-down is a one-time 5% reduction in the CI benchmark in 2025 that increases the stringency of the CI target. The AAM is another tool to increase the stringency of the CI benchmark, but is activated only when specific regulatory conditions are

²² United States Department of Energy, *U.S. Department of Energy Announces \$131 Million for CCUS Technologies*. April 24, 2020. <https://www.energy.gov/articles/us-department-energy-announces-131-million-ccus-technologies>

²³ United States Department of Energy, *Funding Opportunity Announcement 2515, Carbon Capture R&D for Natural Gas and Industrial Point Sources, and Front-End Engineering Design Studies for Carbon Capture Systems at Industrial Facilities and Natural Gas Plants*. October 6, 2021. <https://www.energy.gov/fecm/articles/funding-opportunity-announcement-2515-carbon-capture-rd-natural-gas-and-industrial>

met. These triggered reductions in the CI benchmark would help bolster market stability in the event that transportation fuel decarbonization is growing rapidly and outpacing deficit generation in the program.

Table 1: Proposed Carbon Intensity Benchmarks for Gasoline and Fuels Used as a Substitute for Gasoline²⁴

Year	Average Carbon Intensity (gCO ₂ e/MJ)
2010	Reporting Only
2011	95.61
2012	95.37
2013	97.96
2014	97.96
2015	97.96
2016	96.50
2017	95.02
2018	93.55
2019	93.23
2020	91.98
2021	90.74
2022	89.50
2023	88.25
2024^a	87.01
2025^b	80.73
2026	78.50
2027	76.26
2028	74.03 ^δ
2029	71.79 ^δ
2030	69.55 ^δ

²⁴ Benchmarks for years 2011, 2013, 2016, 2019, and 2024 reflect reductions from revised base year (2010) CI values for California Reformulated Gasoline that were calculated using the CI for crude oil supplied to California refineries. For more information, see Table 1 in Appendix A.

Year	Average Carbon Intensity (gCO ₂ e/MJ)
2031	65.08 ^δ
2032	60.61 ^δ
2033	56.14 ^δ
2034	51.67 ^δ
2035	47.20 ^δ
2036	42.73 ^δ
2037	38.26 ^δ
2038	33.78 ^δ
2039	29.31 ^δ
2040	24.84 ^δ
2041	21.86 ^δ
2042	18.88 ^δ
2043	15.90 ^δ
2044	12.92 ^δ
2045	9.94 ^δ

^a The benchmark for years 2024 through 2045 reflect reductions from revised base year (2010) CI Values for CaRFG (99.15).

^b The benchmark schedule in 2025 has been updated to include a 5% increase in stringency, achieving an 18.75% CI reduction compared to the 13.75% CI reduction specified in the 2018 adopted regulation.

^δ These CI targets may be accelerated by the Automatic Acceleration Mechanism based on the regulatory criteria specified in section 95484(b) in the proposed Regulation Order (Appendix A).

The process for determining the annual carbon intensity benchmarks is detailed in Chapter VIII and Appendix C-1. Other proposed changes are identified in Table 2 below and include eliminating the current LCFS exemption for intrastate fossil jet fuel starting in 2028, expanding ZEV infrastructure crediting to the medium- and heavy-duty (MHD) sector, and adding hydrogen-based and electricity-based transaction types to be included in the third-party verification program for data reported under LCFS.

Additionally, amendments are proposed to further streamline existing requirements of the LCFS regulation and to update program tools and data.

Table 2 provides a summary of the proposed changes to the regulation. Staff began conceptually discussing many of these items through public workshops initiated in October of 2020, hosting nine workshops and two community meetings through August 2023. The pre-rulemaking public process is detailed in Chapter XI.

Table 2: Summary of Proposed Regulatory Amendments to the LCFS Regulation

Topic	Proposed Regulatory Updates
General	<p>Minor updates for typographical errors and specifications that do not materially affect requirements</p> <p>Update terminology for Data Management System</p>
Compliance, Program Benchmarks, and Credit Generation	<p>Strengthen the carbon intensity benchmarks both pre- and post-2030</p> <p>Include a step-down of the CI benchmark in 2025 and a mechanism to automatically strengthen the carbon intensity benchmarks based on defined market conditions</p> <p>Eliminate exemption for intrastate fossil jet fuel, beginning in 2028</p> <p>Modify crediting potential for zero-emission forklifts with lift capacities less than 12,000 lbs</p> <p>Allow all fuels to be added to buffer account, instead of only liquid fuels</p>
Equity-Focused Improvements	<p>Focus and increase investment requirements of residential base credit proceeds in ways that provide benefits for disadvantaged, low-income, rural, and tribal communities</p> <p>Extend and focus ZEV infrastructure crediting for light-duty vehicles in disadvantaged, low-income communities, or rural communities</p> <p>Expand ZEV infrastructure crediting to the medium- and heavy-duty sector to support ZEV infrastructure needed for medium- and heavy-duty ZEVs operating in heavily-impacted freight corridors</p>
Entities and Eligibility	<p>Include Multi-Family residences as Non-Residential</p> <p>Modify definition of fuel supply equipment (FSE) for electric transport refrigeration units</p>
Fuel Pathway Applications and CI Determination	<p>Update LCA modeling tools and emission factors</p> <p>Include a Tier 1 Calculator for hydrogen</p> <p>For projects breaking ground after December 31, 2029, add deliverability requirement for pipeline-injected biomethane and phase out pathways for avoided methane crediting by 2040 for biomethane used for transportation and 2045 for biomethane used for hydrogen production</p> <p>Add provisions for indirect accounting of low-CI hydrogen injected into hydrogen pipelines</p> <p>Add sustainability requirements for crop- and forestry- based feedstocks</p>

Topic	Proposed Regulatory Updates
Petroleum and Project-Based Credits	<p>Update crude oil Lookup Table</p> <p>Update the Oil Production Greenhouse Gas Emission Estimator (OPGEE) Model and process for future updates</p> <p>Phase out petroleum project credit generation by 2040</p> <p>Specify that direct air capture projects must be located in the United States to generate LCFS credits</p>
Verification Program	<p>Add third-party verification for hydrogen and electricity data types and deferral threshold considerations</p> <p>Require third-party validation of all applications for project-based crediting.</p> <p>Update deferral eligibility requirements to clarify that joint applicants are not eligible to defer verification</p> <p>Include meter calibration requirements for project and pathway applications</p>

II. The Problem that the Proposal is Intended to Address

In order to implement the 2022 Scoping Plan Update, California needs to reduce emissions by driving down fossil fuel demand in transportation, transitioning to zero-emission technology wherever feasible, and increasing the supply of low-carbon alternative fuels as quickly as possible. In this chapter, staff provides a description of the purpose of this rulemaking and how the proposed amendments to the LCFS support the State's climate and air quality targets. A description, purpose, and rationale for each of the proposed updates and revisions are provided in Appendix E.

To implement these objectives, staff is proposing a suite of amendments to the regulation to:

- Improve California's long-term ability to support the production and use of increasingly lower-CI transportation fuels and to improve the program's overall effectiveness;
- Update the annual carbon intensity benchmarks through 2030 and establish more stringent post-2030 benchmarks in alignment with the 2022 Scoping Plan Update;
- Increase the flexibility of the program to adjust for potential future market overperformance by including a mechanism that would automatically accelerate the compliance targets under certain conditions;
- Include a step-down in the near-term CI target to further support ambition;
- Incentivize fuel production and refueling infrastructure buildout needed to meet California's long-term climate goals and reduce dependence on petroleum fuels, including opportunities to leverage federal funding for low-carbon hydrogen production and ZEV fueling, and support the transition of biomethane fuel pathways for combustion out of transportation;
- Update standard values in the regulation, including emission factors, as well as life cycle assessment (LCA) modeling tools to use more detailed or recent data;
- Streamline implementation of the program; and
- Make minor updates for typographical errors and clarifying specifications.

A. Strengthen the Annual Carbon Intensity Benchmarks Pre- and Post-2030

Staff last revisited the annual carbon intensity benchmarks in 2018, following the approval of the 2017 Scoping Plan Update, which focused on achieving the 2030 SB 32 GHG reduction target. Through the 2018 rulemaking, the Board extended the carbon intensity benchmarks from a 10% reduction in 2020 to a 20% reduction in 2030 to align with SB 32 and the 2017 Scoping Plan Update. The climate policy landscape has continued to evolve since the 2018 rulemaking. In 2022, the Governor signed AB 1279, which requires an 85% reduction in anthropogenic GHG emissions below 1990 levels by 2045. The 2022 Scoping Plan Update lays out a path to achieve these targets and achieve carbon neutrality by 2045. Staff is proposing to update the LCFS program in response to current legislative direction and the 2022 Scoping Plan Update. Along with this high-level policy direction and technology-forcing emission standards and other policies adopted by the Board, low-carbon technology uptake is accelerating. Renewable diesel capacity has grown substantially and far exceeds what was previously modeled in 2018 when the current CI benchmarks were established. Electricity and hydrogen used as vehicle fuels have increased over 50% between 2019 and 2022 and are far outpacing the projections staff used to establish the existing CI benchmarks during the

previous 2018 rulemaking. This trend is expected to continue, as California implements the ACC II, ACT, ACF, Innovative Clean Transit, Cargo Handling Equipment, Ocean Going Vessels at Berth, Clean Miles Standard, Transport Refrigeration Unit, and In-use Locomotive regulations.

There is also much progress in the liquid and gaseous alternative fuel spaces. Biofuel production capacity has increased substantially in recent years, with many announcements nationwide and in California for new or expanded capacity. Momentum for alternative fuels is growing at the national level, as well. Biomethane supplies have also increased as more methane capture projects are developed.

Taken together, these trends suggest that the market is outpacing previous fuels and crediting projections used for the 2018 LCFS benchmark modeling and that re-evaluation of near-term targets is needed to accelerate action and plan beyond 2030. Staff recommends strengthening the pre- and post-2030 carbon intensity benchmarks to accelerate GHG reductions in transportation fuel. As part of this overall strengthening of the benchmarks, staff also recommends a near-term step-down of the 2025 benchmark and an acceleration mechanism to adjust the CI benchmarks if market conditions warrant.

Achieving California's mid- and long-term GHG and air quality goals will require a portfolio of low-carbon transportation fuels in amounts well beyond the current amounts. The transportation sector remains the largest contributing source of GHG emissions in the State inventory. The LCFS has been an effective measure for increasing the use of low-carbon alternatives to fossil fuels in California by providing significant economic benefits to the credit-generating entities who participate in the program, including municipal transit agencies, alternative fueling facilities, equipment service providers, fuel producers, and project developers across the United States and abroad. For example, the 2020 California GHG Emissions Inventory²⁵ shows that California continues to stay below its 2020 target for emissions. The data shows a decline in emissions from transportation, supported by the LCFS, which is driving increasing use of alternative fuels in the transportation sector.

The proposed amendments are expected to reduce life cycle GHG emissions of transportation fuels consumed in California by about 558 million metric tons in carbon dioxide equivalent (MMTCO_{2e}) cumulatively from 2024 to 2046 as compared to business as usual (see Chapter IV of this Staff Report for additional discussion of the projected GHG benefits). Greater diversification of the State's fuel portfolio will also support California's ongoing efforts to improve ambient air quality by displacing demand for fossil fuels. Chapter V of this Staff Report summarizes the air quality and public health benefits of the proposed regulation.

The LCFS regulation defines a carbon intensity benchmark for each year. The current LCFS benchmark schedule was designed to help California achieve the statutory target of 40% GHG emissions reduction by 2030, in line with the 2017 Scoping Plan Update and SB 32. However, the 2022 Scoping Plan Update calls for an accelerated deployment of fuels and ZEVs in support of achieving a 48% reduction of GHGs by 2030 and 85% below 1990 levels by 2045.

²⁵ California Air Resource Board, *Latest GHG Inventory shows California remains below 2020 emissions target*. October 19, 2020. <https://ww2.arb.ca.gov/news/latest-ghg-inventory-shows-california-remains-below-2020-emissions-target>

Using market data and techno-economic models to evaluate a variety of transportation fuel pathways, staff conducted a scenario analysis that informed the pre- and post-2030 target and annual benchmarks for carbon intensity reduction through 2045. This analysis helps staff explore possible compliance outcomes and facilitates an improved understanding of LCFS economics and compliance feasibility for different policy choices in each scenario.

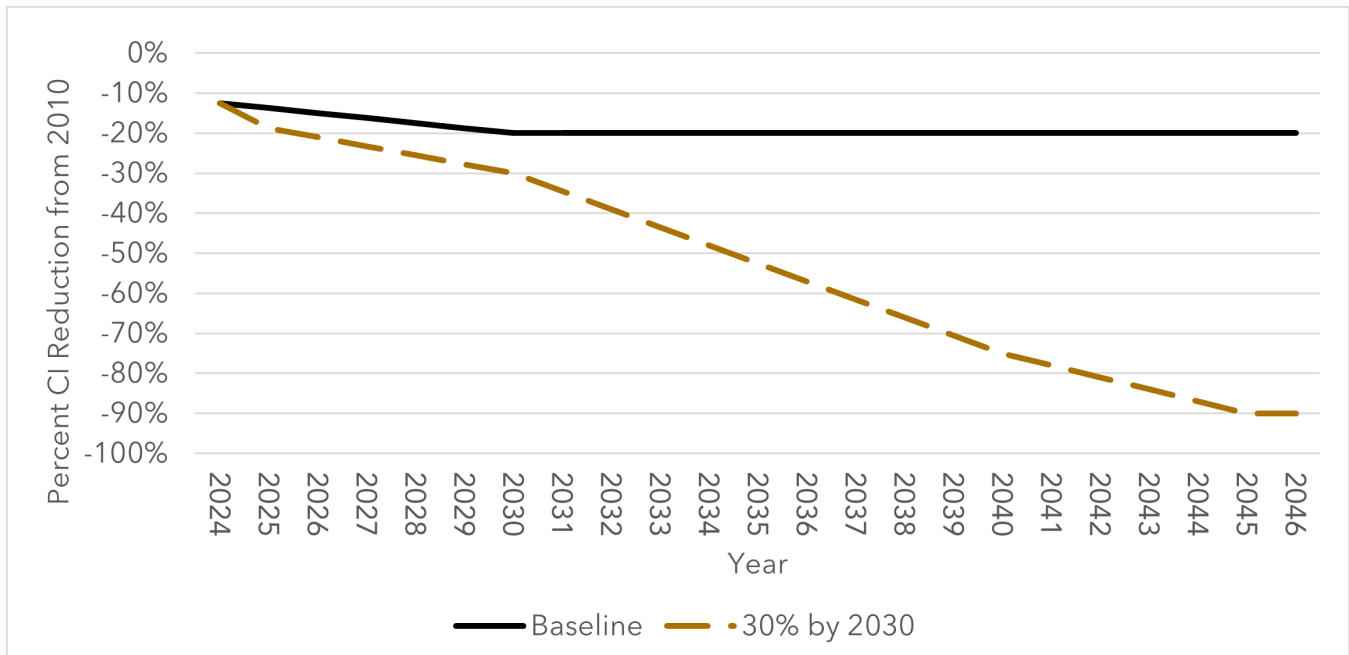
Staff developed the California Transportation Supply (CATS) model to evaluate the California fuel market and estimate an optimal fuel supply that may be delivered to California under various scenarios. Since CATS, and really no modeling tool, can fully capture all real-world conditions, the tool is primarily being used to compare results of different policy changes across the different scenarios. The CATS model is an optimization model that seeks to minimize the cost of supplying all defined fuel pools such that fuel demand constraints are met. The CATS model selects the fuel mixes likely available for California that minimize the cost of supplying all transport fuel demand in the State while meeting technology and policy constraints. The outputs from the CATS model do not constitute a forecast of credit prices, but rather how the market may evolve in response to different policy changes that may, or may not, be implemented.

The optimization model is constrained by a set of policies, technologies, and cost considerations that are intended to approximate current and future market conditions under different scenarios. Anticipated mobility demand each year is used to estimate energy demand by vehicle technology type (e.g., light-duty electric vehicle, gasoline vehicle, etc.), and the model then identifies a variety of fuel production pathways that could be optimally used to meet that demand given costs and policy considerations. Staff developed feedstock supply curves and feedstock to fuel conversion pathways for the model that are detailed in the California Transportation Supply (CATS) Model v0.2 – Technical Documentation.²⁶

Based on feedback received from stakeholders, staff evaluated a wide range of CI benchmark trajectories. Scenarios modeled both in-house by CARB and by external stakeholders indicate that a reduction of at least 30% by 2030 and 90% by 2045 is achievable and necessary to accelerate decarbonization of the transportation fuels sector and support the State's broader climate goals. Figure 6 shows staff's proposed benchmarks as compared to the benchmarks in the current regulation for the years 2024 through 2045. When considering the full period from 2024 through 2046, staff's proposal achieves 558 MMT more cumulative reductions relative to the current regulation. Chapter VIII and Appendix C-1 of this Staff Report provide additional details on the data sources and methodology that staff has relied on to evaluate feasible LCFS compliance scenarios.

²⁶ California Air Resources Board, *California Transportation Supply (CATS) Model v0.2 – Technical Documentation for August 2023 Example Scenario*. August 2023. https://ww2.arb.ca.gov/sites/default/files/2023-08/CATS%20Technical_1.pdf

Figure 6: Current and Proposed Annual Carbon Intensity Benchmarks



Additionally, the transportation fuels market is evolving quickly due to technological and economic breakthroughs, regulatory requirements, new federal incentives, and other jurisdictions implementing similar programs. This has resulted in rapid shifts in the market, particularly from rapidly growing ZEV market and conversion of fossil refineries to biofuel production, which have resulted in rapid and significant credit generation. To accommodate documented rapid advances in transportation fuel decarbonization that have already occurred, and which could occur again due to these rapid changes, the proposed amendments include both a near-term step-down in CI benchmark stringency in 2025, and an Automatic Acceleration Mechanism (AAM).

A step-down in stringency was strongly supported by feedback provided by stakeholders, particularly in response to February and May 2023 technical workshops. The step-down reflects the current effectiveness of the program, which suggests that the pace of CI reductions can be increased through the benchmarks.

Staff is proposing to include an AAM to increase the stringency of the CI benchmarks of the program when specific regulatory conditions are satisfied. Under the current staff proposal, the AAM would advance the upcoming year's CI benchmark, and all subsequent years by one year. The acceleration mechanism provides a clear signal regarding how and when the benchmarks would be adjusted. An AAM can support the deeper transportation sector decarbonization needed through mid-century by increasing regulatory clarity for the market, acting alongside existing provisions that also help to provide program certainty, such as the maximum credit price²⁷ and the Credit Clearance Market (CCM).²⁸

²⁷ Cal. Code Regs., tit. 17, § 95487(a)(2)(D).

²⁸ Cal. Code Regs., tit. 17, § 95485(c).

An AAM would operate to potentially increase program stringency, using regulatory criteria, to accommodate documented rapid advances in transportation fuel decarbonization. An AAM would operate in a way that is predictable and easy to understand, based on publicly available data, and would bolster market stability during periods where credit generation rapidly and consistently outpaces deficit generation. Similar to maximum price and CCM provisions, an AAM would play an important role in supporting LCFS implementation, deterring market manipulation, and providing the certainty necessary for the long-term investments required to meet the State's decarbonization goals.

Staff engaged extensively with stakeholders to develop an AAM, including holding a dedicated workshop for this topic in May 2023. An AAM would only be activated by specific market conditions defined in the LCFS regulations that result in a specified imbalance in the number of credits versus deficits over a certain time period. Under staff's proposal, the AAM would be triggered when the credit bank to average quarterly deficit ratio exceeds three and credit generation exceeds deficit generation based on the prior year's reporting. If triggered, the AAM would accelerate all subsequent CI benchmarks by one year.

B. Eliminate Exemption for Intrastate Fossil Jet Fuel

Staff is proposing to eliminate the exemption for intrastate fossil jet fuel from the LCFS regulation starting in 2028. The aviation sector has historically relied on jet fuel produced from fossil fuels, and fossil jet fuel is currently exempted from generating deficits in the LCFS program. However, to achieve the deep emissions reductions called for in AB 1279 and the 2022 Scoping Plan Update, California must reduce GHG emissions from aviation.

In California, intrastate jet fuel constitutes about 10% of total jet fuel consumption and is responsible for 2% of GHG emissions in the California transportation sector. As emissions from other vehicle types decline, this percentage is expected to increase. Alternative jet fuel (AJF) production has increased since it became an eligible LCFS opt-in fuel in 2019, and with 11.6 million gallons produced in 2022. This provision would be limited to flights that take off and land within the State of California.

Momentum is growing for AJF, an alternative liquid fuel that can displace fossil jet fuel without engine modifications, along with interest in zero-emission technologies for aviation. At the federal level, a tax credit of up to \$1.25 per gallon is available to sustainable aviation fuel (SAF) producers.²⁹ In alignment with the federal support available for SAF, Governor Newsom highlighted the need to transition to low-carbon alternatives in his July 2022 letter to the CARB Chair, in which he directed CARB to adopt a 20% clean fuels target for the aviation sector.³⁰ The 2022 Scoping Plan Update anticipates a major shift away from fossil jet fuel by 2045, including 20% zero-emission aviation.

²⁹ Internal Revenue Service. *Sustainable Aviation Fuel Credit webpage*. (Updated on January 31, 2023). <https://www.irs.gov/credits-deductions/businesses/sustainable-aviation-fuel-credit>

³⁰ California Office of the Governor, *Governor's Letter to Chair Randolph*. July 22, 2022. <https://www.gov.ca.gov/wp-content/uploads/2022/07/07.22.2022-Governors-Letter-to-CARB.pdf?emrc=1054d6>

Several airlines have also announced GHG emission reduction targets, as well as multi-year agreements to source SAF for their operations. For example, United Airlines,³¹ Southwest Airlines,³² and American Airlines³³ have released plans to achieve carbon neutrality by 2050. Additionally, Alaska Airlines set new climate goals that include net-zero carbon emissions by 2040.³⁴ Finally, Delta Airlines has a goal to replace 10% of its fossil jet fuel with SAF by the end of 2030.³⁵ Production is ramping up to meet the increasing demand for low-carbon incentives. For example, multiple refineries in California are transitioning their existing facilities to produce bio-based alternative fuels, including AJF. AJF is a viable low-carbon alternative that can further reduce aviation carbon dioxide emissions and currently generates credits in the LCFS program. Adding fossil jet fuel as a required fuel under the program will build on the momentum in the aviation industry.

C. Expand Zero Emission Vehicle Infrastructure Crediting

During the 2018 rulemaking, the Board adopted the HRI and FCI provisions. These two crediting opportunities were designed to incentivize zero-emission light-duty vehicle (LDV) refueling infrastructure ahead of anticipated ZEV demand. The intent of these provisions was to help remove the “chicken-and-egg” issue of vehicle demand waiting on refueling development, and refueling infrastructure waiting on vehicle demand, by incentivizing rapid buildout of public refueling infrastructure. Dispensed fuel receives crediting in the LCFS, and these provisions added crediting for unused capacity at approved stations. The provisions have supported the buildout of dozens of hydrogen stations and thousands of fast chargers in California and play a key role in supporting the overall transition to ZEV technology, driven in large part by the ACC II regulation. New applications for these crediting provisions sunset at the end of 2025.

Staff is proposing amendments to expand the current ZEV infrastructure crediting provisions by adding crediting for MHD infrastructure and extending the LD crediting. As the State transitions to widespread ZEV deployment, it is imperative that all individuals in the State have access to cleaner technologies. Therefore, staff is proposing to continue the HRI and FCI incentivization for light-duty vehicle refueling in low-income, rural, or disadvantaged communities. This focused eligibility requirement aligns with identified priorities in the Clean Transportation Incentives Funding Plan³⁶, which provides funding for ZEVs deployed in these regions. Staff is also proposing to allow new light-duty FCI (LD-FCI) applications be located

³¹ United Airlines, *Our sustainable aviation fuel program*. (Accessed on October 10, 2023).

<https://www.united.com/en/us/fly/company/responsibility/sustainable-aviation-fuel.html>

³² Southwest Airlines, *Environmentally Sustainable Goals*. (Accessed on October 10, 2023).

<https://www.southwest.com/citizenship/planet/>

³³ American Airlines, *Pathway to net zero*. (Accessed on October 10, 2023). <https://news.aa.com/esg/climate-change/pathway-to-net-zero/>

³⁴ Alaska Airlines, *Flying with Purpose: Alaska Sets New Climate Goals, Including Net-zero carbon Emission by 2040*. April 21, 2021. <https://news.alaskaair.com/sustainability/alaska-airlines-net-zero-carbon-goals/>

³⁵ Delta Airlines, *Committed to Sustainability*. (Accessed November 22, 2023). <https://www.delta.com/us/en/about-delta/sustainability>

³⁶ California Air Resources Board, *Proposed Fiscal Year 2023-24 Funding Plan for Clean Transportation Incentives*. 59-60. October 6, 2023. <https://ww2.arb.ca.gov/sites/default/files/2023-10/Proposed%20Funding%20Plan%20Fiscal%20Year%202023-24.pdf>

more than 10 miles away from the nearest fast charger to help fill refueling gaps in the State. These provisions are designed to accelerate deployment of ZEV infrastructure in regions that support equitable access to low-carbon technology. The provisions would be limited to 0.5% each of deficits from the prior quarter.

California's ZEV goals are not limited to LDVs. The Innovative Clean Transit,³⁷ Advanced Clean Truck,³⁸ and Advanced Clean Fleet³⁹ rules, which have all been adopted since 2018, along with the Clean Truck Partnership,⁴⁰ will drive a rapid transformation to ZEV technology in the MHD sector in the very near future. As noted earlier, transitioning to ZEVs is critical for achieving California's climate and air quality targets, and California's path is established in the ACT and ACF regulations and the Clean Truck Partnership. Incentivizing early build-out of ZEV infrastructure will support the transition to MHD ZEVs required by the ACF regulation. ACF fleet turnovers begin in 2024 and transition drayage fleets to ZEV technology the fastest of any vocation, but this transition is contingent upon availability of refueling infrastructure for successful operation of these vehicles. Staff expects that LCFS support for ZEV truck refueling infrastructure will help provide significant air quality improvements to communities adjacent to major ports, distribution centers, and freight corridors.

To achieve fleet turnovers within this timeframe, refueling infrastructure suitable for MHD trucks must be available to maintain operations and provide certainty of fueling availability to truck and fleet owners. Staff is, therefore, proposing to create a version of the HRI and FCI provisions that incentivize MHD ZEV refueling infrastructure during the early years when refueling demand is low. Similar to the light-duty (LD) provisions, the MHD provisions will provide LCFS credits for the unused refueling capacity at eligible stations and sites, which will naturally phase out as more vehicles become operational and vehicle refueling demand increases. LCFS ZEV fueling infrastructure credits for the MHD sector will play a key role in supporting California's ZEV goals, and in particular the technology transition under the ACF regulation. Staff is proposing that MHD-HRI and MHD-FCI infrastructure must be sited within one mile of a ready or pending Federal Highway Administration Alternative Fuel Corridor—for hydrogen or electricity, respectively—where the majority of truck refueling is expected to occur, or adjacent to existing truck parking, to accommodate overnight charging. Locating ZEV refueling stations within one mile of major freight corridors and at existing truck parking is

³⁷ California Air Resources Board, *Innovative Clean Transit*. (Accessed on October 10, 2023).

<https://ww2.arb.ca.gov/our-work/programs/innovative-clean-transit>

³⁸ California Air Resources Board, *Advanced Clean Trucks webpage*. (Accessed on October 10, 2023).

<https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks>

³⁹ California Air Resources Board, *Advanced Clean Fleet webpage*. (Accessed on October 10, 2023).

<https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets>

⁴⁰ California Air Resources Board, *CARB and truck and engine manufacturers announce unprecedented partnership to meet clean air goals*. July 6, 2023. <https://ww2.arb.ca.gov/news/carb-and-truck-and-engine-manufacturers-announce-unprecedented-partnership-meet-clean-air>

expected to bring cleaner air for communities living adjacent to these areas currently heavily impacted by diesel truck pollution.^{41,42}

Unlike the existing LD-HRI and LD-FCI provisions, which support only public infrastructure, staff is proposing to extend eligibility for the MHD-HRI and MHD-FCI provisions to private infrastructure as well. Staff focused on public infrastructure for the existing LD infrastructure crediting provisions because the LD market lacked a robust publicly available refueling network. The MHD sector is fundamentally different and needs significant support to meet the refueling needs of both trucks utilizing public refueling infrastructure and private fleet refueling. Truck fleets rely heavily on both public and private refueling based on the duty cycles and vocations of the vehicles. Stakeholders have expressed that private refueling should also receive an incentive from the MHD infrastructure crediting provisions to support the early capital costs of installing ZEV refueling infrastructure. Private infrastructure has the advantage of being designed for a known refueling demand and can be sized accordingly to minimize costs, but still faces steep initial costs associated with the initial buildout of the infrastructure. In addition, fleets may transition their vehicles to ZE technology over the course of several years and will likely need support during the interim years while their fleet ramps up to the full capacity the refueling infrastructure was designed for. Due to the different levels of support needed for private refueling infrastructure compared to the public infrastructure without a known refueling demand, staff is proposing to provide half as many credits for private refueling infrastructure as public per charger or station. As with the existing infrastructure crediting provisions, staff is proposing to limit total credits available to the charging and hydrogen refueling provisions to 2.5% of prior quarter deficits, to provide a sufficient incentive without inflating overall credit supply.

D. Biomethane Crediting

Methane is a harmful short-lived climate pollutant (SLCP) that has an outsized impact on climate change in the near term. The United Nations Environment Programme's Global Methane Assessment⁴³ advises that achieving the least-cost pathways to limit warming to 1.5°C requires global methane emission reductions of 40% to 45% by 2030 alongside substantial simultaneous reductions of all climate forcers, including CO₂ and SLCPs. Action to reduce these powerful emissions sources today will provide immediate benefits—both to human health locally and to reduce warming globally—as the effects of our policies to transition to low-carbon energy systems and achieve carbon neutrality further unfold.

Biomethane⁴⁴ has played a role in contributing to the overall decrease in carbon intensity of the transportation fuel pool. With support from the LCFS and Renewable Fuel Standard (RFS)

⁴¹ California Office of Environmental Health Hazard Assessment, *Impacts of Greenhouse Gas Emission Limits Within Disadvantaged Communities: Progress Toward Reducing Inequities*. February 2022.

<https://oehha.ca.gov/media/downloads/environmental-justice/impactsofghgpoliciesreport020322.pdf>

⁴² California Office of Environmental Health Hazard and Assessment, *CalEnviroScreen 4.0*. (Updated October 2021). <https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40>

⁴³ United Nations Environment Programme and Climate and Clean Air Coalition, *Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions. Summary for Policymakers*. 2021.

https://wedocs.unep.org/bitstream/handle/20.500.11822/35917/GMA_ES.pdf

⁴⁴ When methane is derived from biogas, it is referred to as biomethane.

programs, in 2022 compressed natural gas (CNG) represented 5% of total MHD fuel demand and renewable natural gas (RNG) was 97% of the CNG fueling in California.⁴⁵ However, CNG transportation fuel demand is only about 3% of overall natural gas demand in California, and achieving deep GHG reductions will have to include displacing fossil gas in sectors of the economy beyond transportation.⁴⁶ Capturing methane from California's methane sources (e.g., landfills, dairies, and wastewater) is critical for achieving California's climate targets, including the targets identified by SB 32, SB 1383, and AB 1279. The 2022 Scoping Plan Update reinforces the message that while there is clearly a role for biomethane in decarbonizing California's energy use in the long term (particularly as a feedstock for renewable hydrogen production), biomethane used as an end-use vehicle fuel will decline as ZEVs penetrate the market, and this resource should be transitioned to other sectors. Biomethane can play a key role in decarbonizing stationary sources or other energy applications, and the 2022 Scoping Plan Update identifies additional end uses in the industrial, commercial, and residential sectors; production of hydrogen; and electricity generation by displacing the need for fossil gas. For the fuel to transition to other sectors in the long term, the existing market signals will need to transition accordingly to avoid stranded assets and the closure of methane capture projects. With this background, staff is proposing changes for pathways related to biomethane as a transportation fuel under the LCFS program. These changes would continue to incentivize the methane reductions needed in the next decade, while aligning with the 2022 Scoping Plan Update to shift biomethane to the production of renewable hydrogen or for use in other sectors by 2045.

Phase Out of Pathways for Biomethane Combustion Crediting

For projects that break ground after December 31, 2029, staff is proposing to phase out pathways for crediting biomethane used in CNG vehicles after December 31, 2040. Pathways for biomethane used to produce renewable hydrogen would be eligible to receive credits until December 31, 2045. This concept aligns with the overall transition to non-combustion transportation technology highlighted in the 2022 Scoping Plan Update, as well as the shifting of biomethane resources to hydrogen production. In addition, staff is proposing two other mechanisms related to biomethane used as a transportation fuel, highlighted below.

Pathways for Avoided Methane Crediting

For projects that break ground after December 31, 2029, staff is proposing that pathways for avoided methane crediting be available through 2040 for biomethane used as a transportation fuel, and through 2045 for biomethane used to produce hydrogen.

Deliverability Requirements

Currently, the LCFS regulation allows for indirect accounting of biomethane when injected into the North American natural gas pipeline. In 2022, a total of about 153 MMBtu of RNG was

⁴⁵ California Air Resources Board, *LCFS Quarterly Data Spreadsheet*. (Updated on July 31, 2023). <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>

⁴⁶ California Air Resources Board, *Advanced Clean Fleets Resolution 23-13*. April 27, 2023. <https://ww2.arb.ca.gov/sites/default/files/barcu/board/res/2023/res23-13.pdf>

reported to the LCFS for credit generation, with the majority coming from RNG resources injected into the North American natural gas pipeline outside of California.

Adding a deliverability requirement would help to ensure that California is making progress on the State's methane reduction targets.⁴⁷ For projects that break ground after Dec 31, 2029, staff is proposing to require deliverability starting January 1, 2041 for pathways that include biomethane used in CNG vehicles or starting January 1, 2046 for biomethane used as an input to hydrogen production. In particular, staff proposes to align with the deliverability policy for biomethane in the California Energy Commission's Renewables Portfolio Standard (RPS) program (Public Utilities Code section 399.12.6) and the California Public Utilities Commission 1440 program. Specifically, the concept is to require demonstration that eligible biomethane is carried through common carrier pipelines that physically flow within California or toward end use in California. Such pipelines must flow toward California 50% of the time on an annual basis, as defined by the current RPS eligibility guidebook.^{48,49} This requirement encourages and rewards reducing methane emissions by injecting biomethane that displaces existing natural gas use in California, rather than rewarding biomethane outside of California that does not displace existing natural gas use in California or have any other connection to California. Biomethane fuel pathways that break ground before January 1, 2030 would not be subject to the deliverability requirements, which would encourage rapid buildout of biomethane capture projects this decade and supports the need to reduce methane emissions. The proposed deliverability requirements also would not apply to biomethane matched to hydrogen fuel pathways participating in the LCFS program.

E. Project-Based Crediting

The 2022 Scoping Plan Update identifies a general trend away from fossil fuel consumption in California and highlights the need to invest in low-carbon fuels to replace petroleum consumption in transportation. However, this transition will not happen overnight, and California must continue to reduce emissions from existing legacy fuel production facilities in the near term while fossil fuel demand persists. Staff is proposing changes to the project-based crediting provisions to align with the 2022 Scoping Plan Update to reduce GHG emissions across the economy while recognizing the broader trend away from fossil fuel production in tandem with demand.

Phase Out of Petroleum Project Crediting

Staff is proposing to phase out crediting of petroleum projects by 2040. The program currently supports projects for credit generation from crude using innovative methods, low-complexity/low-energy-use refineries, refinery investment, and renewable hydrogen refinery investment. Staff's proposal to phase out crediting of these projects by 2040 is consistent with projected reductions in demand for petroleum fuels, while also recognizing

⁴⁷ Only methane emissions occurring within California are included in the State's GHG inventory.

⁴⁸ California Energy Commission, *Renewables Portfolio Standard Eligibility Guidebook, Ninth Edition*. Publication Number: CEC-300-2016-006-ED9-CMF-REV. 9-10. January 2017.

<https://efiling.energy.ca.gov/getdocument.aspx?tn=217317>

⁴⁹ Staff is not proposing to include the requirement in the RPS eligibility guidebook to demonstrate direct environmental benefits to California as part of this amendment.

verifiable GHG reductions at existing fuel production facilities. Carbon capture and sequestration (CCS) projects are highlighted as an important strategy in the 2022 Scoping Plan Update for achieving the AB 1279 targets, and staff proposes to exclude them from this phase-out proposal.

Incorporate Location Requirements for Direct Air Capture Projects

Staff is proposing updates to the treatment of DAC with sequestration projects. In the 2018 rulemaking, the LCFS program made DAC with sequestration eligible for project-based CCS credits. DAC is an emerging technology that has the potential to remove large amounts of CO₂ already in the atmosphere and could aid in achieving California's long-term climate goals. It will continue to need support to be built to scale and to be deployed more broadly.

In an effort to align with federal incentives being provided for DAC projects, and to support the ongoing technology development needed to reduce future DAC deployment costs, staff is proposing to limit LCFS credit generation eligibility of DAC with sequestration projects to those located in the United States. This proposal better supports national efforts to deploy DAC projects and helps achieve national and State emission reduction goals. This limitation would not apply to DAC-to-fuel applications submitted as Tier 2 alternative fuel pathways, as the final fuels from these pathways must be supplied to California to be eligible for LCFS credits.

F. Crop-Based Biofuels Sustainability Criteria

In recognition that demand for crop-based biofuels can indirectly cause land use change globally, the LCFS regulation currently accounts for land use change emissions associated with crop-based biofuels assuming they are grown on pre-existing agricultural land. The LCFS regulation uses land use change emissions estimates by feedstock which were last assessed between 2013-2015 through an extensive expert workgroup. The existing regulatory provisions make fuel pathways from crop-based feedstocks more carbon intensive and disincentivizes sourcing biofuel feedstocks from crops with higher land-use change risks. The inclusion of land use change emissions in LCFS life cycle methodologies result in stronger incentives for waste-and-residue-based feedstocks, which are not associated with land use change impacts, relative to crops. As a result, the majority of biomass-based diesel in the LCFS has historically come from waste feedstocks like used cooking oil, animal fat and inedible distiller's corn oil. The same general trend holds true for sustainable aviation fuel, which utilizes the same feedstocks as biomass-based diesel. While the majority of biomass-based diesel is still derived from waste oil, the use of crop-derived, biomass-based diesel has increased in recent years. Additionally, the CI impact of direct land conversion is not currently assessed in LCFS pathways, commodity feedstocks are not tracked to their points of origin, and there is no prohibition on bringing new land into agricultural production in order to grow biofuel feedstocks. A rapid increase in oil crop demand for biofuel production could potentially add pressure to convert forested land or other land types into biofuel crop production.

To reduce the risk that rapid expansion of biofuel production and biofuel feedstock demand could result in deforestation or adverse land use change, CARB staff are proposing additional guardrails on the use of crop-based feedstocks for biofuel production. Specifically, CARB staff are proposing to require pathway holders to track crop-based and forestry-based feedstocks to their point of origin and require independent feedstock certification to ensure feedstocks are not contributing to impacts on other carbon stocks like forests. CARB staff are also proposing to remove palm-derived fuels from eligibility for credit generation, given palm oil has been

demonstrated to have the highest risk of being sourced from deforested areas.⁵⁰ Palm-derived fuel transactions have not been reported under the program or received any credits to-date.

G. Other Proposed Amendments

Additional proposed changes are summarized in Table 2 and detailed in Appendix E. Some of these changes serve to align with State goals and the 2022 Scoping Plan Update, namely modifying crediting potential for zero-emission forklifts and allowing indirect accounting for low-CI hydrogen injected into hydrogen pipelines. Other changes serve to simplify and streamline application and reporting requirements to encourage greater participation and improve administrative efficiency.

Electric Forklifts

As mentioned earlier, California is rapidly transitioning to ZEV technology in the transportation sector. In addition to on-road vehicles, this goal also applies to off-road equipment, including electric forklifts. The LCFS program has a role to play in implementing the ZEV turnover goals in Executive Order N-79-20. Given the scale of equipment turnover and technological transformation needed to achieve the State's goals, LCFS credits should be used in end-uses that need the most additional support to transition away from fossil fuel consumption. As part of this evaluation to understand where the transition is necessary for the forklift fleet, staff has re-evaluated the forklift baseline.

Battery-electric forklifts have been eligible for LCFS credit generation since the 2015 readoption. Much of the forklift inventory in the State has successfully transitioned to non-combustion technology, in line with State goals. This success story provides an opportunity for the LCFS program to re-evaluate the level of crediting appropriate for battery-electric forklifts. Accordingly, staff is revising the baseline for battery-electric forklifts by incorporating the 2010 status of forklift electrification into the baseline, and is proposing a 50% reduction in the Energy Economy Ratio for zero-emission forklifts with lift capacities less than 12,000 lbs. However, since larger forklifts were 100% fossil in the baseline, forklifts with lift capacities greater than 12,000 lbs. would remain at the established forklift Energy Economy Ratio.

Additionally, staff is proposing removing the estimation methodology used for reporting electricity for forklifts and requiring direct metering for all transactions. The requirement for

⁵⁰ European Commission, *Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the status of production expansion of relevant food and feed crops worldwide*. Brussels. March 13, 2019. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52019DC0142>

European Commission, *Annexes to the Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the status of production expansion of relevant food and feed crops worldwide*. Annexes 1 to 2. Brussels. March 13, 2019.

Searle, S., *Defining Low and High Indirect Land-Use Change Biofuels in European Union Policy*. The International Council on Clean Transportation. November 2018.

<https://theicct.org/sites/default/files/High%20low%20ILUC%20Fact%20Sheet%2020181113.pdf>

metering will improve data accuracy and enable transactions verification while also aligning forklift reporting with all other reported electricity crediting.

Allow Indirect Accounting for Low Carbon Intensity Hydrogen Injected into Hydrogen Pipelines physically connected to California and Expansion of Indirect Accounting for Low Carbon Intensity Electricity for Hydrogen Utilized as a Transportation Fuel.

The 2022 Scoping Plan Update calls for a significant increase in the production of low-carbon hydrogen to displace fossil fuels. The Scoping Plan scenario projects a significant growth of renewable and low-CI hydrogen production, particularly for its use as a transportation fuel and for hard-to-electrify end uses. Given the nascent market and federal incentives to scale production, staff is proposing book-and-claim of low-CI hydrogen to support the 2022 Scoping Plan Update energy transition goal by overcoming bottlenecks in hydrogen production and supply. Currently, low-CI hydrogen must be physically delivered to its end-use for purposes of LCFS accounting. This provision was included before the 2022 Scoping Plan Update was completed, which showed the need for significant increased demand for this fuel in the transportation sector and the additional infrastructure necessary to produce and deliver hydrogen fuel. This framework is impractical for large-scale production of low-CI hydrogen that is sent to several off-takers through shared hydrogen pipelines. Book-and-claim of pipeline-injected hydrogen increases the flexibility of the program by allowing matching of low-CI hydrogen to transportation end uses, including use as a vehicle fuel for hydrogen fuel cell electric vehicles, and hydrogen used in the production of low-carbon transportation fuels such as renewable diesel and AJF. Staff proposes to expand the existing book-and-claim provisions to include low-CI hydrogen injected into the pipeline network that is physically connected to California to be credited under the LCFS as a transportation fuel or to produce alternative fuel for transportation. Staff will evaluate the need to remove book-and-claim for hydrogen in future rulemakings as the renewable hydrogen market matures.

In order to leverage available federal incentives and ensure the program is supporting low-carbon hydrogen, staff is proposing to align book-and-claim eligibility with the hydrogen production incentive eligibility under the Inflation Reduction Act. Specifically, staff is proposing well-to-wheel CI thresholds of less than or equal to 55 g/MJ for gaseous hydrogen and less than or equal to 95 g/MJ for liquid hydrogen. Staff is proposing to exclude hydrogen derived from fossil gas from book-and-claim eligibility unless low CI hydrogen is produced using book and claim of biomethane or with CCS and used as a transportation fuel.

In further support for low CI hydrogen production, staff is proposing allowing for dedicated power purchase agreements (PPAs) for low CI electricity to be used to indirectly match to lower the emissions intensity for both process electricity as well as for hydrogen production. The use of PPAs for this purpose is limited to hydrogen utilized as a transportation fuel. The low CI electricity must be new or expanded capacity, must be delivered to the local balancing authority where the hydrogen is produced, and must be matched on a quarterly basis. These requirements will help ensure against resource shuffling where existing renewable electricity is potentially redirected to hydrogen production and backfilled with non-zero electricity.

Other Amendments

A number of amendments are proposed to simplify and streamline application and reporting requirements in order to encourage greater participation and improve administrative efficiency. For example, the LCFS currently incorporates by reference Tier 1 CI Calculators designed to

streamline the fuel pathway application review and validation process for pathway types for which CARB staff have extensive experience evaluating. These calculators have predefined input fields for entering site-specific data and well-defined CI calculations. Staff is proposing to update the existing Tier 1 calculators to make them more user-friendly by streamlining inputs, updating emission factors, and changing the layout of the calculators. Staff also proposes to create a new Tier 1 CI calculator for hydrogen. The LCFS regulation also contains Temporary and Lookup Table pathways with fixed carbon intensity values that streamline participation for certain fuels. Using data gained from certifying hundreds of fuel pathways since the 2018 rulemaking, staff proposes to make revisions to the list of temporary pathways contained in Table 8 of the regulation. Staff is proposing to update the Lookup Table CI values for the following fuel pathways:

- California Reformulated Gasoline Blendstocks for Oxygenate Blending (CARBOB),
- Ultra Low Sulfur Diesel (ULSD),
- Compressed Natural Gas,
- Propane, and
- California Grid Electricity.

Additionally, staff is proposing to allow hydrogen production facilities (including renewable hydrogen) not co-located with refineries but supplying hydrogen directly to the refineries to implement eligible GHG reduction projects. Staff is also proposing to streamline reporting requirements to allow quarterly or annual submission of project reports, as is currently permitted for Refinery Investment Projects and Renewable Hydrogen Refinery Credit Projects. In addition, staff is proposing to update the displacement emission factor for innovative crude projects using solar electricity to align with the updated Emissions & Generation Resource Integrated Database (eGRID) emission factor for California grid electricity, for consistency with the treatment of electricity as a process energy for other fuel pathways.

Successful greenhouse gas reduction programs require a system to monitor, report, and verify data to maintain the integrity of the reduction program. Currently, the LCFS supplements the existing work of CARB staff with a verification system that requires regulated entities of certain credit generating types to retain the services of independent third-party verifiers. Fuel pathways are currently validated by third-party verifiers prior to CARB approval, and staff is proposing to apply this requirement to project-based crediting applications as well to align and streamline the approach between the two provisions with the accompanying benefits of validation for project-based crediting applications. Additionally, staff is proposing to align the verification requirements for electricity crediting types with other verification provisions. With the expected expansion of electrification in the transportation sector, staff is proposing to add verification requirements, which would newly require entities to verify their annual reports for the following transaction types:

- EV Charging Transaction Types;
- Electric Transport Refrigeration Units (eTRU), Electric Cargo Handling Equipment (eCHE), and Electric Power for Ocean-going Vessel (eOGV) Fueling;
- Forklift Electricity/Hydrogen Fueling;
- Fixed Guideway Electricity Fueling; and
- Fuel Cell Vehicle (FCV) Fueling transaction types, not limited to hydrogen from book-and-claim biomethane.

The current regulation requires CARB to regularly update the OPGEE Model and the Crude Lookup Table. CARB held two workshops in 2021 and 2022 to request feedback on the updated OPGEE model to the public. The model was subsequently updated based on stakeholder feedback and staff recently finalized the OPGEE model update. Staff used the updated OPGEE model to update the 2010 baseline crude CI, as well as the Crude Lookup Table, and proposes to incorporate the latest OPGEE model by reference into the regulation.

Staff is also proposing changes to the allocation and uses of base credits representing non-metered residential EV charging. The scope of these changes include:

- Changing the scope of the statewide Clean Fuel Reward from a light-duty rebate to a medium and heavy-duty rebate;
- Altering the minimum base credit contribution required to fund the Clean Fuel Reward along with the specific utility requirements for funding the program;
- Expanding the proportion of credit proceeds required to be invested in disadvantaged, low-income, rural, and tribal communities (holdback equity credits); and
- Enhancing the pre-approved projects eligible for funding of holdback equity credits.

The Clean Fuel Reward will change from a universal new light-duty EV rebate to be focused on new and used rebates for medium- and heavy-duty trucks that are exempted from the Advanced Clean Fleets regulation. This rebate will jumpstart the transition for a harder to transition segment of the truck sector that is not otherwise covered by other CARB regulations. The proportion of residential base credits will change to reflect this change in rebate from 60% of total base credits to 40% with a corresponding increase in “holdback credits.” As a result of this increase in holdback credits, staff is proposing increasing the requirements for investments in equity communities for the IOUs to 75% (from 50%) to match the requirements set by the Public Utilities Commission. Staff is also proposing new pre-approved categories for investment of holdback equity proceeds.

III. The Specific Purpose and Rationale of Each Adoption, Amendment, or Repeal

California Government Code section 11346.2(b)(1) requires a description of the specific purpose for each proposed adoption, or amendment, the problem the agency intends to address with the proposed LCFS regulation, and the rationale for determining that each proposed adoption and amendment is reasonably necessary to both carry out the purposes of CARB staff's proposed LCFS regulation and to address the problems for which it is proposed.

The overarching purpose of the proposed LCFS regulation is to decarbonize transportation through increasing the supply of low-carbon alternative fuels. The problems that LCFS needs to address are described above in Chapter II. Appendix E: Purpose and Rationale for LCFS Amendments presents the summary of each proposed amendment and describes its purpose and rationale for its role in increasing low-carbon alternative fuel supply.

IV. Benefits Anticipated from the Regulatory Action, Including the Benefits or Goals Provided in the Authorizing Statute

CARB anticipates that the proposed amendments will have the following general benefits to California businesses and individuals:

- Reduced GHG emissions near and long-term. The LCFS is specifically designed to reduce GHG emissions in the transportation sector, which is responsible for nearly half of GHG emissions in California. This will contribute to California's efforts to address climate change.
- Increased use of lower CI fuels and alternative fueled vehicles including renewable diesel, biomethane, and lower CI electricity and hydrogen for ZEVs. In addition to reducing GHG emissions, this will in many cases lower levels of localized air pollutants, which are the cause of many deleterious health effects on California residents, especially in priority communities and communities of color.
- Greater opportunities for California businesses to invest in the production of low-CI fuels and other credit generating opportunities.
- Reduced dependence on fossil fuels through decarbonizing the transportation fuel sector and supporting a diversified transportation fuel pool.

In the following sections, staff describes the estimated benefits of the proposed amendments to California businesses, small businesses, and individuals.

A. Summary of Emission Benefits

1. Greenhouse Gases

Staff expects the proposed amendments to reduce GHG emissions relative to the baseline by 558 million metric tons in carbon dioxide equivalent (MMTCO₂e) from 2024 through 2046. It is important to note that because the LCFS calculates emission reductions on a full life cycle basis, the GHG emission reductions occur both in California and out-of-state.

These GHG reduction estimates are derived from CATS outputs of the fuel quantities and average annual CI associated with each fuel, as well as GHG reductions associated with oil and gas extraction emissions.

2. PM_{2.5} and NO_x

The proposed amendments would affect air quality through four main categories: 1) changes in tailpipe emissions for on-road and off-road vehicles, 2) changes in aircraft emissions at airports, 3) changes in emissions at stationary sources from fuel production, and 4) changes in upstream emissions associated with oil and gas extraction where quantified.

Cumulatively from 2024 to 2046, the proposed amendments achieve reductions of 4,281 tons of PM_{2.5} and 25,586 tons of NO_x as compared to the business-as-usual baseline.

Chapter V provides a detailed summary of the air quality benefits of the proposed amendments.

B. Greenhouse Gas Reduction Benefit - Social Cost of Carbon

The benefit of GHG reductions achieved by the proposed amendments can be estimated using the social cost of carbon (SC-CO₂), which provides a dollar valuation of the damages caused by one ton of carbon pollution and represents the monetary benefit today of reducing carbon emissions in the future.

The U.S. Council of Economic Advisors and the Office of Management and Budget convened an Interagency Working Group on the Social Cost of Greenhouse Gases (IWG) to develop a methodology for estimating the SC-CO₂. The methodology relies on a standardized range of assumptions and can be used consistently when estimating the benefits of regulations across agencies and around the world.⁵¹ Staff used the current IWG-supported SC-CO₂ values to consider the social costs of actions taken to reduce GHG emissions. This is consistent with the approach presented in the 2022 Scoping Plan Update, is in line with U.S. Government Executive Orders including 13990 and the Office of Management and Budget Circular A-4 of September 17, 2003.^{52,53}

The IWG describes the social cost of carbon as follows:

“The social cost of carbon (SC-CO₂) for a given year is an estimate, in dollars, of the present discounted value of the future damage caused by a 1-metric ton increase in carbon dioxide (CO₂) emissions into the atmosphere in that year, or equivalently, the benefits of reducing CO₂ emissions by the same amount in that year. The SC- CO₂ is intended to provide a comprehensive measure of the net damages – that is, the monetized value of the net impacts – from global climate change that result from an additional ton of CO₂.

These damages include, but are not limited to, changes in net agricultural productivity, energy use, human health, property damage from increased flood risk, as well as nonmarket damages, such as the services that natural ecosystems provide to society. Many of these damages from CO₂ emissions today will affect economic outcomes throughout the next several centuries.”⁵⁴

⁵¹ United States Government Interagency Working Group on Social Cost of Greenhouse Gases, *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990*. February 2021. https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf

⁵² California Air Resources Board, *2022 Scoping Plan for Achieving Carbon Neutrality*. 27-28. November 16, 2022. https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp_1.pdf

⁵³ Office of Management and Budgets. *Circular A-4*. September 17, 2023.

<https://www.transportation.gov/sites/dot.gov/files/docs/OMB%20Circular%20No.%20A-4.pdf>

⁵⁴ National Academies of Sciences, Engineering, and Medicine, *Valuing Climate Damages: Updating Estimation of Carbon Dioxide*. National Academies Press, Washington DC. 2017. <https://nap.nationalacademies.org/catalog/24651/valuing-climate-damages-updating-estimation-of-the-social-cost-of> <https://nap.nationalacademies.org/catalog/24651/valuing-climate-damages-updating-estimation-of-the-social-cost-of>

The SC-CO₂ is year-specific and is highly sensitive to the discount rate used to adjust the value of the damages in the future due to CO₂. The SC-CO₂ increases over time as systems become more stressed from the aggregate impacts of climate change and future emissions cause incrementally larger damages. A higher discount rate decreases the value today of future environmental damages. This analysis uses the IWG standardized range of discount rates from 2.5 to 5% to represent varying valuation of future damages. Table 3 shows the range of IWG SC-CO₂ values (Consumer Price Index adjusted) used in California's regulatory assessments which reflect the societal value of reducing carbon emissions by one metric ton.⁵⁵

Table 3: SC-CO₂ Discount Rates (in 2021\$ per Metric Ton of CO₂)

Year	5% Discount Rate	3% Discount Rate	2.5% Discount Rate
2020	\$16	\$57	\$85
2025	\$19	\$63	\$93
2030	\$22	\$68	\$100
2035	\$25	\$75	\$107
2040	\$29	\$82	\$115
2045	\$31	\$88	\$122
2050	\$36	\$94	\$130

The GHG reductions due to the proposed amendments are calculated in CO₂e which includes reductions in carbon, methane, and other GHGs. As the CI of a fuel is based on a life cycle assessment of GHG emissions from the use of a fuel converted to CO₂e units, there is not a simple way to assess the breakdown of emissions reduction by GHG (i.e., CO₂, methane, or other GHG) due to the proposed amendments.

As there is no Social Cost of CO₂e, there is not a straightforward metric to estimate the benefits of the proposed amendments. If all GHG reductions under the proposed amendments are assumed to be carbon dioxide reductions, the cumulative estimated benefits from the proposed amendments would range from approximately \$14 billion to \$61 billion (in 2021\$). In Table 4 staff calculated the avoided SC-CO₂ values (2021\$) by applying values in Table 3 to the annual GHG emissions change.

⁵⁵ United States Government Interagency Working Group on Social Cost of Greenhouse Gases, *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990*. 2021. https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf

Table 4: Avoided Social Cost of CO₂ from Proposed Amendments 2024-2046

Year	GHG Emission Reductions (MMT)	5% Discount Rate	3% Discount Rate	2.5% Discount Rate
2026	13	\$254	\$852	\$1,250
2030	20	\$438	\$1,368	\$1,997
2034	29	\$716	\$2,149	\$3,065
2038	34	\$921	\$2,670	\$3,775
2042	33	\$1,008	\$2,794	\$3,939
2046	21	\$680	\$1,841	\$2,550
Total	558	\$14,544	\$43,045	\$61,099

It is important to note that the SC-CO₂, while intended to be a comprehensive estimate of the damages caused by carbon globally, does not represent the cumulative cost of climate change and air pollution to society. There are additional costs to society outside of the SC-CO₂, including costs associated with changes in co-pollutants and the social cost of other GHGs including nitrous oxide. The IPCC has stated that the Interagency Working Group on the Social Cost of Greenhouse Gases (IWG) SC-CO₂ estimates are likely underestimated due to the omission of significant impacts that cannot be accurately monetized, including important physical, ecological, and economic impacts.⁵⁶

As mentioned, the SC-CO₂ calculation incorporates GHG emission reductions associated with methane reductions from the regulation. The LCFS supports CARB's work to meet Short Lived Climate Pollutant (SLCP) targets set by Senate Bill 1383 (Lara, Chapter 395, Statutes of 2016) by incentivizing dairies to capture and convert methane-rich biogas into transportation fuels (compressed natural gas, hydrogen, and electricity). Methane is a potent climate pollutant with a Global Warming Potential 25 times higher than CO₂. CARB staff used the SC-CH₄ values provided by the IWG, adjusted to 2021\$, shown in Table 5 to estimate the avoided social cost of in-state methane converted to fuel. These values are consistent with the 2021 IWG interim numbers but adjust for inflation using the California Consumer Price Index. Staff use conversion factors from the Livestock Offset Protocol⁵⁷ and U.S. Energy Information

⁵⁶ United States Environmental Protection Agency, *Social Cost of Carbon Fact Sheet*. December 2016. https://www.epa.gov/sites/default/files/2016-12/documents/social_cost_of_carbon_fact_sheet.pdf

⁵⁷ California Air Resources Board, *Compliance Offset Protocol Livestock Projects*. November 14, 2014. <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2014/capandtrade14/ctlivestockprotocol.pdf>

Administration⁵⁸ to calculate the methane emission reductions associated with in-state dairy biogas volumes from the California Transportation Supply (CATS) model outputs, resulting in a conversion factor of 0.020 metric tons of methane per million British thermal unit (0.020MT/MMBtu).

Table 5: Social Cost of Methane Discount Rates (in 2021\$ per Metric Ton of CH₄)

Year	5% Discount Rate	3% Discount Rate	2.5% Discount Rate
2020	\$739	\$1,641	\$2,188
2025	\$889	\$1,915	\$2,462
2030	\$1,039	\$2,188	\$2,735
2035	\$1,231	\$2,462	\$3,146
2040	\$1,368	\$2,735	\$3,556
2045	\$1,641	\$3,146	\$3,830
2050	\$1,778	\$3,419	\$4,240

Table 6 presents a sampling of years of avoided social cost of instate methane, and the cumulative total avoided social cost instate from 2024 to 2046, from the proposed amendments. The cumulative estimated benefits from the proposed amendments would range from approximately \$6 billion to \$16 billion (in 2021\$).

Table 6: Avoided Social Cost of Methane from Proposed Amendments 2024-2046 (million 2021\$)

Year	CH ₄ Emission Reductions (MT)	5% Discount Rate	3% Discount Rate	2.5% Discount Rate
2026	314,024	\$288	\$601	\$816
2030	292,597	\$304	\$640	\$800
2034	389,068	\$468	\$958	\$1,171
2038	447,125	\$605	\$1,223	\$1,529

⁵⁸ United States Energy Information Administration, *Energy Conversion Calculators*. (Updated June 16, 2023). <https://www.eia.gov/energyexplained/units-and-calculators/energy-conversion-calculators.php>

Year	CH ₄ Emission Reductions (MT)	5% Discount Rate	3% Discount Rate	2.5% Discount Rate
2042	0	0	0	0
2046	0	0	0	0
Total	5,350,641	\$6,146	\$12,593	\$15,990

C. Health Benefits

The proposed amendments to the Low Carbon Fuel Standard regulation would reduce fine particulate matter (PM_{2.5}) and oxides of nitrogen (NO_x) emissions, resulting in health benefits in California. CARB analyzed the value of health benefits associated with 12 health outcomes, most of which were added or updated through CARB's recent expansion of the health analysis⁵⁹: cardiopulmonary mortality, acute myocardial infarction, lung cancer incidence, asthma onset, asthma symptoms, hospitalizations for cardiovascular illness, hospitalizations for respiratory illness, hospitalizations for Alzheimer's disease, hospitalizations for Parkinson's disease, cardiovascular emergency department (ED) visits, respiratory ED visits, and work loss days.

These health outcomes have been identified by U.S. EPA as having a causal or likely causal relationship with exposure to PM_{2.5} based on a substantial body of scientific evidence.^{60,61} U.S. EPA has determined that both long-term and short-term exposure to PM_{2.5} plays a causal role in premature mortality, meaning that a substantial body of scientific evidence shows a relationship between PM_{2.5} exposure and increased risk of death. This relationship persists when other risk factors such as smoking rates, poverty, and other factors are taken into account. U.S. EPA has also determined a causal relationship between non-mortality cardiovascular effects (e.g., acute myocardial infarction) and short- and long-term exposure to PM_{2.5}, a likely causal relationship between non-mortality respiratory effects (including worsening asthma) and short- and long-term PM_{2.5} exposure, and a likely causal relationship between non-mortality neurological effects and long-term PM_{2.5} exposure.

CARB staff evaluated health impacts associated with exposure to PM_{2.5} and NO_x emissions from the proposed amendments. NO_x includes nitrogen dioxide, a potent lung irritant, which

⁵⁹ California Air Resources Board, *California Air Resources Board Updated Health Endpoints Bulletin*. 2022. https://ww2.arb.ca.gov/sites/default/files/2022-11/California%20Air%20Resources%20Board%20Updated%20Health%20Endpoints%20Bulletin%20-%20Edited%20Nov%202022_0.pdf

⁶⁰ United States Environmental Protection Agency, *Integrated Science Assessment for Particulate Matter*. December 2019. <https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=347534>

⁶¹ United States Environmental Protection Agency, *Estimating PM_{2.5}- and Ozone-Attributable Health Benefits*. March 2021. https://www.epa.gov/sites/default/files/2021-03/documents/estimating_pm2.5-_and_ozone-attributable_health_benefits_tsd.pdf

can aggravate lung diseases such as asthma when inhaled.⁶² However, the most serious quantifiable impacts of NO_x emissions occur through the conversion of NO_x to fine particles of ammonium nitrate aerosols through chemical processes in the atmosphere. PM_{2.5} formed in this manner is termed secondary PM_{2.5}. Both directly emitted PM_{2.5} and secondary PM_{2.5} are associated with adverse health outcomes. As a result, reductions in PM_{2.5} and NO_x emissions are associated with reductions in these adverse health outcomes.

CARB staff's analysis of health outcomes from the proposed amendments is limited to fuel changes incremental to the baseline. The baseline includes implementation of technology changes expected from implementation of the on-road light duty (ACC II) and on-road heavy duty (ACT and ACF) regulations, and therefore the conservative LCFS analysis does not reflect the health benefits of transitioning to zero emission vehicles. However, the proposed amendments to the LCFS are expected to play a key role in supporting implementation of these vehicle-focused regulations, by reducing the cost of electricity and hydrogen used as vehicle fuels, supporting installation and operation of charging and hydrogen refueling stations, and promoting investment in transportation electrification in disadvantaged, low-income and rural communities. Although not quantified in the health outcomes analysis conducted by CARB staff, the LCFS program remains a key tool in supporting the transition to ZEV technology and the concurrent air quality and GHG benefits.

1. Incidence-Per-Ton Methodology

CARB uses the incidence-per-ton (IPT) methodology to quantify the health benefits of emissions reductions in cases where dispersion modeling results are not available. A description of this method is included on CARB's webpage. CARB's IPT methodology is based on a methodology developed by U.S. EPA.^{63,64}

Under the IPT methodology, it is assumed that changes in emissions are approximately proportional to changes in health outcomes. IPT factors are derived by calculating the number of health outcomes associated with exposure to PM_{2.5} for a baseline scenario using measured ambient concentrations and dividing by the emissions of PM_{2.5} or a precursor. The calculation is performed separately for each air basin using the following equation:

Equation 1: Incidence-per-ton calculation

$$IPT = \frac{\text{number of health outcomes in air basin}}{\text{annual emissions in air basin}}$$

⁶² United States Environmental Protection Agency, *Integrated Science Assessment for Oxides of Nitrogen – Health Criteria*. January 2016. <https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=310879>

⁶³ Fann N., Fulcher C.M., & Hubbell B.J., *The influence of location, source, and emission type in estimates of the human health benefits of reducing a ton of air pollution*. Air Quality, Atmosphere & Health, 2:169-176. June 9, 2009. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2770129/>

⁶⁴ Fann, N., Baker, K. R., Chan, E. A., Eyth, A., Macpherson, A., Miller, E., & Snyder, J. *Assessing human health PM_{2.5} and ozone impacts from US oil and natural gas sector emissions in 2025*. Environmental Science & Technology, 52(15), 8095-8103. July 13, 2018. <https://pubs.acs.org/doi/full/10.1021/acs.est.8b02050>

Multiplying the emissions reductions from the proposed amendments in an air basin by the IPT factor then yields an estimate of the reduction in health outcomes achieved by the proposed amendments. For future years, the number of outcomes is adjusted to account for population growth. CARB's current IPT factors are based on a 2014-2016 baseline scenario, which represents the most recent data available at the time the current IPT factors were computed. IPT factors are computed for the two types of PM_{2.5}: primary PM_{2.5} and secondary PM_{2.5} of ammonium nitrate aerosol formed from precursors.

2. Reduction in Adverse Health Impacts

CARB recently initiated an expanded health analysis to include additional health endpoints in order to provide a more comprehensive analysis of the benefits of the agency's plans and regulations. A description of the updated and new health outcomes was provided in CARB's Updated Health Endpoints Bulletin, released November 2022. This expansion was based on U.S. EPA's Technical Support Document for the Final Revised Cross-State Air Pollution Rule Update for the 2008 Ozone Season NAAQS and is associated with U.S. EPA's Environmental Benefit Mapping and Analysis Program – Community Edition version 1.5.8.⁶⁵

CARB staff estimates that the total number of cases statewide that would be reduced (from 2024 to 2046) from implementation of the proposed amendments are as follows:

- 364 (201 - 519) fewer cases of cardiopulmonary mortality;
- 74 (54 - 94) fewer cases of hospitalizations for cardiovascular illness;
- 97 (-37 - 227) fewer cases of cardiovascular ED visits;
- 41 (15 - 109) fewer cases of nonfatal acute myocardial infarction;
- 11 (0 - 22) fewer cases of hospitalizations for respiratory disease;
- 219 (43 - 457) fewer cases of respiratory ED visits;
- 27 (8 - 45) fewer cases of lung cancer incidence;
- 852 (818 - 884) fewer cases of asthma onset;
- 73,433 (-35,816 – 178,171) fewer cases of asthma symptoms;
- 53,427 (45,055 – 61,482) fewer cases of work loss days;
- 174 (133 - 212) fewer cases of hospitalizations for Alzheimer's disease;
- 25 (13 - 36) fewer cases of hospitalizations for Parkinson's disease;

These reductions in adverse health cases are expected to be seen across all ages in the State. Children in particular will benefit from the reduced cases of asthma onset and symptoms due to the proposed amendments. This may lead to better health outcomes in these children when they become adults since studies have shown that childhood asthma puts individuals at

⁶⁵ United States Environmental Protection Agency, *Technical Support Document (TSD) for the Final Revised Cross-State Air Pollution Rule Update for the 2008 Ozone Season NAAQS Estimating PM_{2.5}- and Ozone-Attributable Health Benefits*. March 2021. https://www.epa.gov/sites/default/files/2021-03/documents/estimating_pm2.5-_and_ozone-attributable_health_benefits_tsd.pdf

greater risk for respiratory disease and lower respiratory function in adulthood.^{66,67} Adults are also expected to benefit from the proposed amendments due to fewer lost work days, nonfatal acute myocardial infarctions (heart attacks), lung cancer incidences, and reduced cardiopulmonary mortality. Seniors may benefit from reduced cases of hospitalizations for not just cardiovascular and respiratory diseases, but also neurological conditions (Alzheimer's and Parkinson's diseases). And there will be fewer ED visits for both cardiovascular and respiratory diseases across all ages in the population.

Table 7 shows the air basin distribution of avoided health endpoints for the proposed amendments for 2024 through 2046 in California, relative to the baseline.

⁶⁶ Sears, M. R., Greene, J. M., Willan, A. R., Wiecek, E. M., Taylor, D. R., Flannery, E. M., Cowan, J.O., Herbison, G.P., Silva, P.A., & Poulton, R., *A longitudinal, population-based, cohort study of childhood asthma followed to adulthood*. New England Journal of Medicine, 349(15), 1414-1422. October 9, 2003.

<https://www.nejm.org/doi/full/10.1056/nejmoa022363>

⁶⁷ McGeachie M.J., Yates K.P., Zhou X., Guo F., Sternberg A.L., Van Natta M.L., Wise R.A., Szeffler S.J., Sharma S., Kho A.T., Cho M.H., Croteau-Chonka D.C., Castaldi P.J., Jain G., Sanyal A., Zhan Y., Lajoie B.R., Dekker J., Stamatoyannopoulos J., Covar R.A., Zeiger R.S., Adkinson N.F., Williams P.V., Kelly H.W., Grasemann H., Vonk J.M., Koppelman G.H., Postma D.S., Raby B.A., Houston I., Lu Q., Fuhlbrigge A.L., Tantisira K.G., Silverman E.K., Tonascia J., Weiss S.T., & Strunk, R.C., *Patterns of growth and decline in lung function in persistent childhood asthma*. New England Journal of Medicine, 374(19), 1842-1852. May 12, 2016.

<https://www.nejm.org/doi/full/10.1056/nejmoa1513737>

Table 7: Avoided Mortality and Morbidity Incidents per Air Basin from 2024 to 2046 under the Proposed Amendments*

Air Basin	SC	SCC	SJV	SFB	SD	Statewide
Cardiopulmonary Mortality	208 (115 - 296)	8 (5 - 12)	56 (31 - 79)	38 (21 - 54)	18 (10 - 26)	364 (201 - 519)
Hospitalizations for Cardiovascular Disease	42 (31 - 54)	2 (1 - 2)	11 (8 - 14)	8 (6 - 10)	5 (3 - 6)	74 (54 - 94)
Cardiovascular ED Visits	56 (-22 - 132)	2 (-1 - 5)	13 (-5 - 31)	11 (-4 - 26)	5 (-2 - 12)	97 (-37 - 227)
Acute Myocardial Infarction	24 (9 - 63)	1 (0 - 2)	6 (2 - 15)	5 (2 - 13)	2 (1 - 5)	41 (15 - 109)
Hospitalizations for Respiratory Disease	7 (0 - 13)	0 (0 - 0)	2 (0 - 3)	1 (0 - 2)	1 (0 - 1)	11 (0 - 22)
Respiratory ED Visits	119 (23 - 247)	4 (1 - 9)	36 (7 - 74)	28 (5 - 58)	9 (2 - 19)	219 (43 - 457)
Lung Cancer Incidence	15 (5 - 25)	1 (0 - 1)	3 (1 - 6)	4 (1 - 6)	2 (0 - 3)	27 (8 - 45)
Asthma Onset	471 (452 - 489)	21 (20 - 22)	102 (98 - 105)	134 (128 - 139)	45 (43 - 47)	852 (818 - 884)
Asthma Symptoms	40,494 (-19,758 – 98,213)	1,840 (-898 – 4,459)	9,106 (-4,447 – 22,068)	11,227 (-5,469 – 27,274)	3,798 (-1,850 – 9,226)	73,433 (-35,816 – 178,171)
Work Loss Days	29,258 (24,676 – 33,666)	1,251 (1,055 – 1,439)	6,991 (5,897 – 8,043)	7,677 (6,472 – 8,837)	3,110 (2,622 – 3,580)	53,427 (45,055 – 61,482)
Hospitalizations for Alzheimer's Disease	101 (78 - 123)	3 (2 - 4)	26 (20 - 32)	18 (13 - 22)	14 (11 - 18)	174 (133 - 212)
Hospitalizations for Parkinson's Disease	14 (7 - 20)	1 (0 - 1)	3 (2 - 5)	3 (2 - 5)	2 (1 - 2)	25 (13 - 36)

* Numbers in parentheses throughout this table represent the 95% confidence interval.

** Air Basins listed: South Coast, South Coast Central, San Joaquin Valley, San Francisco Bay, San Diego County

Table 7 continued

Air Basin	SS	SV	NP	NC	NCC	Statewide
Cardiopulmonary Mortality	6 (4 - 9)	9 (5 - 14)	0 (0 - 1)	1 (0 - 1)	3 (2 - 4)	364 (201 - 519)
Hospitalizations for Cardiovascular Disease	1 (1 - 1)	2 (1 - 2)	0 (0 - 0)	0 (0 - 0)	1 (0 - 1)	74 (54 - 94)
Cardiovascular ED Visits	2 (-1 - 5)	2 (-1 - 5)	0 (0 - 0)	0 (0 - 0)	1 (0 - 2)	97 (-37 - 227)
Acute Myocardial Infarction	1 (0 - 2)	1 (0 - 3)	0 (0 - 0)	0 (0 - 0)	0 (0 - 1)	41 (15 - 109)
Hospitalizations for Respiratory Disease	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	11 (0 - 22)
Respiratory ED Visits	6 (1 - 12)	6 (1 - 12)	0 (0 - 1)	1 (0 - 1)	2 (0 - 5)	219 (43 - 457)
Lung Cancer Incidence	1 (0 - 1)	1 (0 - 1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	27 (8 - 45)
Asthma Onset	16 (15 - 16)	22 (21 - 22)	1 (1 - 1)	2 (2 - 2)	10 (9 - 10)	852 (818 - 884)
Asthma Symptoms	1,414 (-688 – 3,436)	1,863 (-908 – 4,527)	96 (-47 - 233)	154 (-75 - 375)	827 (-403 - 2010)	73,433 (-35,816 – 178,171)
Work Loss Days	1,063 (896 - 1224)	1,449 (1221 - 1668)	58 (49 - 67)	117 (99 - 135)	577 (486 - 664)	53,427 (45,055 – 61,482)
Hospitalizations for Alzheimer's Disease	2 (2 - 2)	2 (2 - 3)	0 (0 - 0)	0 (0 - 0)	1 (1 - 1)	174 (133 - 212)
Hospitalizations for Parkinson's Disease	0 (0 - 1)	1 (0 - 1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	25 (13 - 36)

Table 7 continued

Air Basin	MC	MD	LT	LC	GBV	Statewide
Cardiopulmonary Mortality	1 (1 - 2)	14 (8 - 20)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	364 (201 - 519)
Hospitalizations for Cardiovascular Disease	0 (0 - 0)	3 (2 - 4)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	74 (54 - 94)
Cardiovascular ED Visits	0 (0 - 1)	4 (-1 - 9)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	97 (-37 - 227)
Acute Myocardial Infarction	0 (0 - 0)	2 (1 - 4)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	41 (15 - 109)
Hospitalizations for Respiratory Disease	0 (0 - 0)	0 (0 - 1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	11 (0 - 22)
Respiratory ED Visits	1 (0 - 2)	8 (2 - 16)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	219 (43 - 457)
Lung Cancer Incidence	0 (0 - 0)	1 (0 - 1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	27 (8 - 45)
Asthma Onset	4 (4 - 4)	24 (23 - 25)	1 (1 - 1)	0 (0 - 0)	1 (0 - 1)	852 (818 - 884)
Asthma Symptoms	352 (-171 - 855)	2,140 (-1,042 - 5,199)	45 (-22 - 108)	28 (-14 - 68)	49 (-24 - 120)	73,433 (-35,816 - 178,171)
Work Loss Days	256 (216 - 295)	1,527 (1,287 - 1,758)	41 (35 - 48)	17 (14 - 20)	34 (29 - 40)	53,427 (45,055 - 61,482)
Hospitalizations for Alzheimer's Disease	0 (0 - 0)	6 (4 - 7)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	174 (133 - 212)
Hospitalizations for Parkinson's Disease	0 (0 - 0)	1 (0 - 1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	25 (13 - 36)

3. Uncertainties Associated with the Mortality and Illness Analysis

Although the estimated health outcomes presented in this report are based on a well-established methodology, they are subject to uncertainty. Uncertainty is reflected in the 95% confidence intervals included with the central estimates in Table 7. These confidence intervals take into account uncertainties in translating air quality changes into health outcomes.

Other sources of uncertainty include the following:

- The relationship between changes in pollutant concentrations and changes in pollutant or precursor emissions is assumed to be proportional, although this is an approximation.
- Emission reductions are reported at a state level and do not capture local variations.
- Future population estimates are subject to increasing uncertainty as they are projected further into the future.
- Fuel use projections from the CATS model are estimates based on technoeconomic analysis, which approximates but does not capture all real-world conditions.
- Baseline incidence rates can experience year-to-year variation.

4. Monetization of Health Benefits

The reductions in adverse health impacts described above can be assigned monetary values so the health benefits can be directly compared to other costs and savings associated with the proposed amendments. These values are derived from economics studies and are based on the expenses that an individual must bear for air pollution related health impacts such as medical bills and lost work, or willingness to pay metrics, which in addition to capturing the direct expenses of the health outcomes also capture the value that individuals place on pain and suffering, loss of satisfaction, and leisure time. For more information on the methodology used to determine the monetary value of health outcomes, see Appendix C-1. The value per incident is shown in Table 8 below.

Table 8: Valuation per Incident for Avoided Health Outcomes (2021\$)

Category	Endpoint	Value Per Incident (2021\$)	Valuation Methodology	Notes
Premature Mortality	Premature Mortality	\$12,483,845	WTP	Shown at 2021 income levels. The estimate will grow annually proportional to income growth using U.S. EPA's central estimate for income elasticity of 0.40, and income growth forecast from BenMAP-CE.

Category	Endpoint	Value Per Incident (2021\$)	Valuation Methodology	Notes
Hospitalizations and ER Visits	HA, Parkinson's Disease	\$15,520	COI	Direct cost of hospitalization incident.
Hospitalizations and ER Visits	HA, Respiratory-2	\$11,815	COI	Direct cost of hospitalization incident.
Hospitalizations and ER Visits	HA, Alzheimer's Disease	\$14,539	COI	Direct cost of hospitalization incident.
Hospitalizations and ER Visits	HA, Cardio-, Cerebro- and Peripheral Vascular Disease	\$18,696	COI	Direct cost of hospitalization incident.
Hospitalizations and ER Visits	ER visits, All Cardiac Outcomes	\$1,403	COI	Direct cost of ER visit.
Hospitalizations and ER Visits	ER visits, respiratory	\$1,057	COI	Direct cost of ER visit.
Health Endpoint Onset/Occurrence	Incidence, Asthma	\$53,753	COI	Present value of lifetime healthcare cost and productivity losses using a 3% discount rate.
Health Endpoint Onset/Occurrence	Asthma Symptoms, Albuterol use	\$253	WTP for symptoms + COI for Albuterol use	Willingness to pay plus cost of albuterol.
Health Endpoint Onset/Occurrence	Incidence, Lung Cancer	\$30,377	COI	Direct medical cost of lung cancer. Cost discounted to present value at 3%.
Health Endpoint Onset/Occurrence	Acute Myocardial Infarction, Nonfatal	\$94,334	COI	Present value of 3 years medical cost and earnings lost over a 5-year period. Using a 3% discount rate.
Health Endpoint Onset/Occurrence	Work Loss Days	\$204	COI	Based on county-level median daily wages.

The statewide valuation of health benefits from 2024-2046 are shown in Table 9. The total statewide health benefits derived from criteria emissions reductions is estimated to be approximately \$5 billion, with \$4.9 billion resulting from reduced premature cardiopulmonary mortality and \$85 million resulting the reductions in other adverse health impacts. The spatial distribution of these benefits across the State follows the distribution of the health impacts by

air basin as described in Table 7. These monetized benefits from all COI based endpoint valuations are included in the macroeconomic modeling.

Table 9: Statewide Valuation from Avoided Health Outcomes (million 2021\$)

Avoided Health Incident	2026	2030	2034	2038	2042	2046	Total
Cardiopulmonary Mortality	138	127	203	279	264	268	4,892
Hospitalizations for Parkinson's Disease	<1	<1	<1	<1	<1	<1	<1
Respiratory ED Visits	<1	<1	<1	<1	<1	<1	<1
Hospitalizations for Alzheimer's Disease	<1	<1	<1	<1	<1	<1	3
Hospitalizations for Cardiovascular Disease	<1	<1	<1	<1	<1	<1	1
Cardiovascular ED Visits	<1	<1	<1	<1	<1	<1	<1
ER visits, respiratory	<1	<1	<1	<1	<1	<1	<1
Asthma Onset	2	1	2	3	2	2	46
Asthma Symptoms	1	1	1	1	1	1	19
Lung Cancer Incidence	<1	<1	<1	<1	<1	<1	1
Acute Myocardial Infarction	<1	<1	<1	<1	<1	<1	4
Work Loss Days	0	0	0	1	1	1	11
Total Valuation	141	129	206	284	268	273	4,977

D. Benefits to Typical California Businesses

LCFS incentives may encourage California firms, as well as other firms doing business in California, to invest early in innovative, low-CI fuel technologies and develop mature businesses earlier than firms not participating in the California market. Early investment may result in competitive advantages to these businesses as other state, federal, or international jurisdictions adopt similar carbon intensity standards.⁶⁸ The proposed amendments will also

⁶⁸ Currently Oregon, Washington, British Columbia, Canada, Brazil, and the European Union have LCFS-like policies in place.

help promote a wider range of clean fuels and vehicles for California businesses to choose from, including vehicles operating on electricity, hydrogen, and biomethane.

The proposed amendments also benefit California fuel providers that have compliance obligations under the Cap-and-Trade Program. As the LCFS reduces the CI of fuels, it changes the composition of the State's transportation fuel mix and dependence on traditional petroleum-based fuels. CARB designed the LCFS and Cap-and-Trade Programs to complement one another. Investments made to comply with one of the programs may result in reduced compliance requirements for the other program. Increased use of low-carbon fuel due to the LCFS will reduce fuel suppliers' GHG emissions covered by the Cap-and-Trade Program, reducing the Cap-and-Trade Program compliance obligation of these firms. Similarly, selling cleaner fuels or investing in emission reduction projects at California refineries and oil fields to comply with the Cap-and-Trade Program may also generate credits under the LCFS.

Cumulatively, from 2024 through 2046, the proposed amendments are estimated to increase total revenue for credit generating businesses as compared to the baseline scenario by \$149 billion, of which approximately \$128 billion is estimated to accrue to California businesses.

See Chapter VIII and the Standardized Regulatory Impact Analysis (Appendix C-1) for further discussion of benefits to typical California businesses.

E. Benefits to Small Businesses

Staff defines small businesses as independently owned businesses located in California, with 100 employees or less and annual revenues under \$10 million.

In addition to the benefits already discussed for California businesses, CARB estimates that small businesses will see benefits from the proposed amendments. Many of California's biodiesel producers, hydrogen producers, electric charging stations, hydrogen stations, and natural gas stations are small businesses. Staff identified the following small businesses in California, which represented 16% of the LCFS parties registered in the LCFS in September 2021:

- Three biodiesel providers
- Six natural gas (CNG and LNG) fueling station operators
- 21 electric charging station operators
- One propane provider

In total, these small businesses generated approximately 119,000 LCFS credits in 2021, which provided an estimated \$22 million in credit revenue as estimated using the 2021 average LCFS credit price of \$188.

The proposed amendments will increase the demand for low-CI fuels and are anticipated to increase the prices for LCFS credits relative to the baseline, thereby increasing revenue to these small businesses. In addition, larger potential revenue resulting from the proposed amendments may allow other small businesses to enter the market. Therefore, staff kept the 2021 credit total of 119,000 as a static proxy for future small business credit generation.

V. Air Quality

A. Baseline Assumptions

The economic and emissions impacts of the proposed amendments are estimated against a baseline scenario. As the proposed amendments retain the market flexibility of the current LCFS, it is not possible to predict the exact path or fuels used for future compliance.

The LCFS is a flexible policy tool to reduce emissions by encouraging the development and use of low-carbon transportation fuels to meet increasingly stringent annual carbon intensity benchmarks, similar to the Renewable Portfolio Standard for the electricity sector. The LCFS interacts with many different State and federal regulations. Estimating the baseline fuel demand requires accounting for compliance with existing regulations and standards, changes in fuel consumption as the fleet turns over to vehicles that meet more stringent emission standards, and the expected price of fuels in the future.

The baseline reflects the changing transportation fuel mix from implementation of State and federal laws and regulations that impact future on-road transportation fuel demand that existed or had been adopted as of Summer 2023, which include the ACF regulation, and both the existing ACC II and ACT regulations. The baseline also includes the newly signed Clean Truck Partnership. The baseline does not include any light-duty vehicle transportation fuel demand reductions that would result from successful implementation of vehicle-miles traveled (VMT) reductions. The baseline energy demand for medium- and heavy-duty sectors includes the same vehicle sales and population growth, VMT, and zero-emission technology assumptions currently reflected in CARB's latest version of its emission inventory tool, Emission FAcT or 2021 (EMFAC2021). The light-duty vehicle energy demand is calculated using a combination of vehicle populations and growth modeled for the 2022 Scoping Plan Update, VMT from the Department of Motor Vehicles, and fuel efficiencies from EMFAC2021.

The most important policies that drive change in fuel demand and/or carbon intensity that are represented in the baseline are the following:

- Low Carbon Fuel Standard: Under the current LCFS, a 20% reduction in average fuel CI will be achieved by 2030. This target then remains constant for years 2030 and beyond.
- Advanced Clean Cars II: ACC II requires 100% of new vehicle sales to be zero-emission or plug-in hybrid electric by 2035 for manufacturers producing passenger cars, trucks, and SUVs.
- Advanced Clean Trucks: ACT requires truck manufacturers to sell ZEVs as an increasing percentage of their annual California sales from 2024 to 2035. By 2035, zero-emission truck/chassis sales must be 55% of Class 2b – 3 truck sales, 75% of Class 4 – 8 straight truck sales, and 40% of truck tractor sales.
- Advanced Clean Fleets: ACF requires trucking fleets to turn over their fleets to ZEV technology starting in 2024, with specific transition timelines based on fleet types. The ACF rule includes an end to combustion truck sales in 2036.
- U.S. Environmental Protection Agency's (U.S. EPA) Renewable Fuel Standard: The U.S. EPA's RFS mandates minimum volumes of renewable fuels, which are required to be blended into transportation fuels. Staff assumes that the RFS will continue to operate, providing monetary incentive for biofuels such as ethanol, biodiesel, renewable diesel, renewable natural gas, and electric vehicle

deployment. While the U.S. EPA recently proposed mandated volumes for the RFS program through 2025, the program does not expire or sunset in 2025. In addition, the costs and supply variability provided across scenarios yield estimates and ranges that can account for the uncertainty in the post-2025 RFS.

- U.S. EPA Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emission Standards and National Highway Traffic Safety Administration (NHTSA) Corporate Average Fuel Economy standards for Model Years 2024-2026 Passenger Cars and Light Trucks: These regulations require vehicle manufacturers to comply with new GHG vehicle emission standards and fuel economy standards through 2026. U.S. EPA and NHTSA have also separately proposed more stringent GHG vehicle emission and fuel economy standards, respectively, for later model years.
- Inflation Reduction Act of 2022: This bill revised Section 45 of the Internal Revenue Code to establish and/or increase the tax credits available for production of low-carbon fuels and CO₂ capture and storage/sequestration.
- California Phase 2 GHG Standards for On-Road Medium- and Heavy-Duty Vehicles: This regulatory program primarily establishes greenhouse gas (GHG) emissions standards for new medium- and heavy-duty vehicles and engines.
- The requirements of Clean Energy, Jobs, and Affordability Act of 2022⁶⁹ that dictates retail electricity be supplied by zero-carbon sources equal to 90% of supply in 2035, 95% in 2040, and 100% by 2045, with State agencies required to procure 100% zero-carbon electricity in 2035.
- The longer-term requirements of the 100 Percent Clean Energy Act of 2018⁷⁰ that requires electricity be supplied by zero-carbon sources by 2045. This requirement will affect the CI of electricity.

B. Total Emissions Benefits

The proposed amendments will reduce GHG emissions and smog-forming and toxic air pollutants from the transportation sector by shifting to low-CI fuels which, in many cases, also release fewer pollutants when combusted than fossil fuels. Reductions in GHG emissions and improvements in California air quality under the proposed amendments are anticipated to result in fewer damages due to climate change and in health benefits for California individuals. These health benefits result in cost savings to individuals, businesses, and government agencies due to fewer premature mortalities, fewer hospital and emergency room visits, and fewer lost days of work. When combusted, transportation fuels emit harmful pollutants, which this proposal would help to eliminate. These pollutants include NO_x and fine particulate matter (PM_{2.5}). NO_x is a precursor to ozone and secondary particulate matter formation. Exposure to ozone and to PM_{2.5}, which are inhalable particles with diameters that are generally 2.5 micrometers and smaller, is associated with increases in premature death, hospitalizations,

⁶⁹ California Legislature, *Senate Bill 1020 Clean Energy, Jobs, and Affordability Act of 2022*. Signed September 16, 2022. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB1020

⁷⁰ California Legislature, *Senate Bill 100 California Renewables Portfolio Standard Program: emissions of greenhouse gases*. Signed September 10, 2018. https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB100

visits to doctors, use of medication, and emergency room visits due to exacerbation of chronic heart and lung diseases and other adverse health conditions.

The baseline includes the technology changes that are expected from implementation of on-road light-duty (ACC II), on-road heavy-duty (ACT and ACF), and off-road (At-Berth and TRU) regulations. In the Standardized Regulatory Impact Analysis (Appendix C-1), staff analyzed the benefits from the proposed changes to the LCFS regulation incremental to the baseline. Those benefits from the proposed changes to the LCFS regulation incremental to the baseline include quantification of the upstream emissions benefits of reduced California oil and gas extraction, which staff estimates will come from reduced demand for petroleum fuels in the future. During the COVID-19 pandemic and the stay-at-home orders, there was a drastic reduction in demand for petroleum fuels as residents stayed home. Data collected under the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions for 2020 and 2021 show a reduction in oil and gas sector GHG emissions relative to previous years driven primarily from the reduced demand for petroleum fuels that occurred during 2020.⁷¹ The 2022 edition of the AB 32 Annual GHG Inventory also shows a 13% reduction in oil and gas sector emissions from 2019 to 2020.⁷² As such, a reduction in GHG, criteria, and toxic emissions from oil and gas extraction is expected to result from corresponding petroleum fuel demand reductions, further expanding the benefits of this regulation. The methodology used to estimate the emissions impact and the incremental impacts of the proposed amendments (relative to the baseline) are detailed in Appendix C-1.

1. Greenhouse Gas Emissions Benefits of the Proposed Amendments

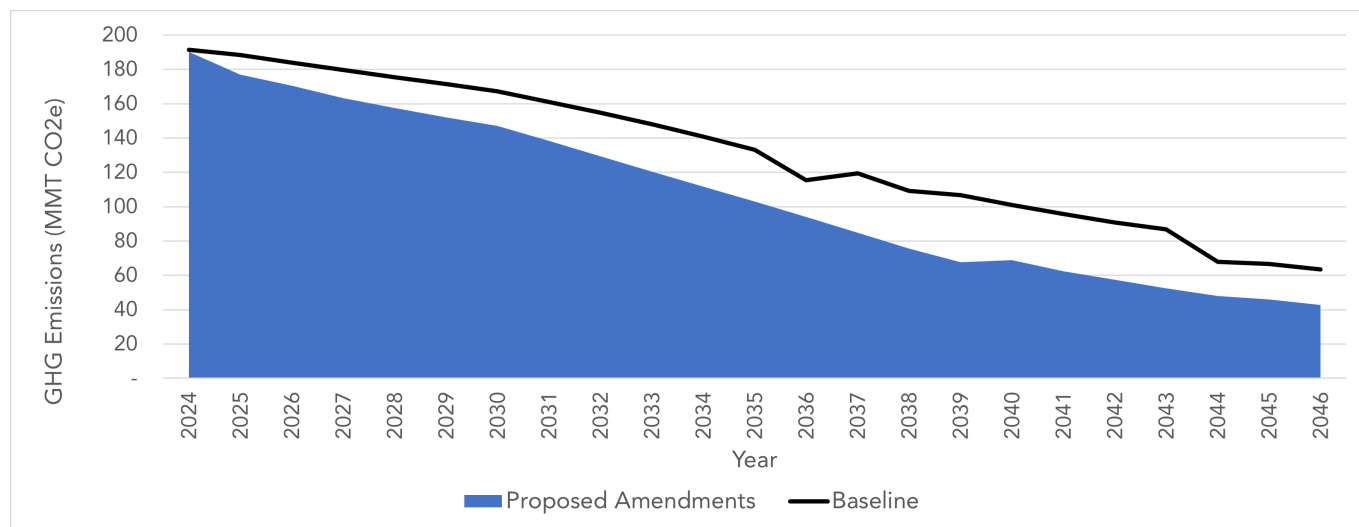
Figure 7 summarizes the annual life cycle greenhouse gas emissions reductions under the baseline and the proposed amendments scenario. Staff expects the proposed amendments to reduce GHG emissions relative to the baseline by 558 million metric tons in carbon dioxide equivalent (MMTCO₂e) from 2024 through 2046. It is important to note that because the LCFS calculates emission reductions on a full life cycle basis, the GHG emission reductions occur both in California and out-of-state.

These GHG reduction estimates are derived from the California Transportation Supply (CATS) outputs of the fuel quantities and average annual CI associated with each fuel, as well as GHG reductions associated with oil and gas extraction emissions.

⁷¹ California Air Resources Board, *Mandatory Greenhouse Gas Reporting 2021 Emissions Year Frequently Asked Questions*. November 4, 2022. <https://ww2.arb.ca.gov/sites/default/files/classic/cc/reporting/ghg-rep/reported-data/2021mrrfaqs.pdf>

⁷² California Air Resources Board, *California Greenhouse Gas Emissions for 2000 to 2020 Trends of Emissions and Other Indicators*. October 26, 2022. https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/2000-2020_ghg_inventory_trends.pdf

Figure 7: Annual GHG Emissions of Baseline and Proposed Amendments



2. Criteria Pollutant Emission Benefits of Proposed Amendments

The proposed amendments would affect air quality through four main categories: 1) changes in tailpipe emissions for on-road and off-road vehicles, 2) changes in aircraft emissions at airports, 3) changes in emissions at stationary sources from fuel production, and 4) changes in upstream emissions associated with oil and gas extraction where quantified.

Fossil fuels contain benzene, toluene, ethyl benzene, and xylenes (BTEX compounds), which can be emitted to the air and contaminate soil and water. Gasoline engine exhaust contains benzene, 1,3-butadiene, formaldehyde, and acetaldehyde. Diesel engine exhaust contains diesel particulate matter, which is a toxic air contaminant. Generally, all exhaust from the combustion of hydrocarbon fuels contains benzene as a product of incomplete combustion (PIC). Staff expects reductions in these criteria pollutants and toxics due to decreased use of fossil fuels in regions with heavy use of motor vehicles and diesel engines, such as big population centers (e.g., South Coast) and areas with heavy truck use (San Joaquin Valley), and regions with commercial airports. Converting from fossil jet fuel to alternative jet fuel yields significant benefits, averaging an annual reduction of 346 tons of NO_x and 28 tons of PM_{2.5} from the proposed amendments.

Reducing criteria pollutants and toxic emissions from fuel combustion in line with California's air quality goals requires deploying ZEVs and ensuring the availability of fueling infrastructure to support ZEV deployment. In the Standardized Regulatory Impact Assessment (SRIA), CARB staff estimated air quality benefits attributable to the proposed amendments. The emissions analysis includes expected reductions in emissions from upstream oil and gas extraction that would be expected to result from corresponding petroleum fuel demand reductions. First, staff estimated upstream extraction-based criteria pollutant emission changes associated with reduced petroleum demand. To estimate the emission benefits of reduced upstream oil extraction, staff focused on the proportion of demand reduction associated with fossil diesel declines expected from the LCFS proposal, given that staff expects diesel demand may persist longer than gasoline demand in California and future in-state extraction reductions may be limited by the pace of diesel demand reductions. The reductions shown in Table 10 also include estimated changes in emissions that occur from changes in renewable fuel use in vehicles, feedstock and fuel transport, and changes in renewable fuel production.

In summary, the proposed amendments achieve reductions of PM2.5 and NOx through 2046, shown in Table 10. These emissions reductions are driven in part by increased use of renewable diesel and alternative jet fuel, which displace fossil diesel and fossil jet fuel. As noted earlier, emissions reductions from phasing down oil extraction and refining operations in tandem with petroleum demand reductions are included in this analysis. In total, the proposed amendments achieve reductions of 4,281 tons of PM2.5 and 25,586 tons of NOx in aggregate through 2046.

Table 10: NOx and PM2.5 Emission Changes under the Proposed Amendment Scenario (tons per day)

Year	NOx (tpd)	PM2.5 (tpd)
2024	-0.4	-0.1
2025	-2.2	-0.3
2026	-2.2	-0.3
2027	-2.5	-0.3
2028	-2.7	-0.4
2029	-2.5	-0.4
2030	-2.1	-0.3
2031	-2.8	-0.4
2032	-3.0	-0.4
2033	-3.0	-0.4
2034	-3.0	-0.4
2035	-3.1	-0.5
2036	-3.2	-0.5
2037	-3.4	-0.5
2038	-3.8	-0.6
2039	-3.9	-0.6
2040	-4.0	-0.8
2041	-4.0	-0.8
2042	-3.6	-0.7
2043	-3.7	-0.7

Year	NOx (tpd)	PM2.5 (tpd)
2044	-3.7	-0.8
2045	-3.6	-0.7
2046	-3.7	-0.8

VI. Environmental Impact Analysis

CARB is the lead agency for the proposed regulation and has prepared an environmental impact analysis (EIA) pursuant to its certified regulatory program (title 17, CCR, sections 60000 through 60008) to comply with the requirements of the California Environmental Quality Act (CEQA). CARB's regulatory program, which involves the adoption, approval, amendment, or repeal of standards, rules, regulations, or plans for the protection and enhancement of the State's ambient air quality has been certified by the California Secretary for Natural Resources under Public Resources Code section 21080.5 of CEQA (title 14, CCR, section 15251(d)). Public Resources Code section 21080.5 allows public agencies with certified regulatory programs to prepare a "functionally equivalent" or substitute document in lieu of an environmental impact report or negative declaration, once the program has been certified by the Secretary for the Resources Agency as meeting the requirements of CEQA. CARB, as a lead agency, prepares a substitute environmental document (referred to as an "Environmental Impact Analysis" or "EIA") as part of the Staff Report to comply with CEQA (title 17, CCR, section 60005).

The Draft EIA for the proposed amendments is included in Appendix D. The Draft EIA provides a programmatic environmental analysis of an illustrative, reasonably foreseeable compliance scenario that could result from implementation of the proposed amendments.

For the purpose of determining whether the proposed LCFS regulation would have a potential adverse effect on the environment, CARB evaluated the potential physical changes to the environment resulting from reasonably foreseeable compliance responses.

Reasonably foreseeable compliance responses associated with the proposed amendments include the following responses, which could result in changes to the existing physical environment: modifications to cultivation volume and transport of feedstock; changes to location and types of feedstock; new or modified processing facilities for feedstock and finished fuel production; increased transportation of finished alternative fuels to blending terminals or retail fuel sites; construction and operation of new facilities to produce renewable diesel, renewable gasoline, AJF, and renewable propane; construction of biomass gasification and pyrolysis systems for hydrogen and renewable natural gas production; construction of new anaerobic facilities to digest manure from dairies, sewage from wastewater treatment plants, and organic waste diverted from landfills; construction of infrastructure to collect biogas and produce methane; construction of stand-alone and bolt-on cellulosic processing units for renewable fuels production; increase in collection of yard waste or removal of forest litter and agricultural residues; construction of electrolysis units and substitution of renewable natural gas for fossil gas in production of hydrogen; construction of solar and wind electricity generation projects; modification to existing or new industrial facilities to capture CO₂ emissions; construction of new infrastructure such as pipelines, wells and other surface facilities; construction and operation of additional refueling hydrogen stations and EV charging stations; modifications to electricity distribution and transmission infrastructure; modifications to existing crude production facilities to accommodate solar and wind electricity, solar heat, and/or solar steam generation; electrification of equipment and installation of renewable

electricity and battery storage systems at petroleum refineries and alternative fuel production facilities; expansion of public transit systems; and land use changes and changes to fuel-associated shipment patterns.

While many impacts associated with the compliance responses identified for the proposed amendments could be reduced to less-than-significant levels through conditions of approval applied and mitigation measures to project-specific development, the authority to apply that mitigation lies with land use agencies or other agencies approving the development projects, not with CARB. Consequently, if a potentially significant environmental effect cannot be feasibly mitigated with certainty, the EIA takes a conservative approach and identifies the impact as significant and unavoidable while disclosing the impact for CEQA compliance purposes. As such, reasonably foreseeable compliance responses associated with the proposed amendments could result in potentially significant and unavoidable environmental impacts. Table 11 summarizes the potential environmental impacts of the proposed amendments.

Table 11: Summary of Potential Environmental Impacts

Impact Number	Resource Area Impact	Significance
1-1	Short-Term Construction-Related and Long-Term Operational-Related Impacts on Aesthetics	Potentially Significant and Unavoidable
2-1	Short-Term Construction-Related and Long-Term Operational-Related Impacts on Agriculture and Forest Resources	Potentially Significant and Unavoidable
2-2	Agricultural and Forest Resource Impacts Related to Feedstock Cultivation	Potentially Significant and Unavoidable
3-1, 3-2	Short-Term Construction-Related and Long-Term Operational-Related Impacts on Air Quality	Potentially Significant and Unavoidable
3-3	Short-Term Construction-Related and Long-Term Operational Impacts from Odors	Less than Significant
4-1, 4-2	Short-Term Construction-Related and Long-Term Operational-Related Impacts to Biological Resources	Potentially Significant and Unavoidable
5-1	Short-Term Construction-Related and Long-Term Operational-Related Effects to Cultural Resources	Potentially Significant and Unavoidable
6-1, 6-2	Short-Term Construction-Related and Long-Term Operational-Related Impacts to Energy Resources	Less than Significant
7-1	Short-Term Construction-Related and Long-Term Operational-Related Impacts to Geology and Soils	Potentially Significant and Unavoidable

Impact Number	Resource Area Impact	Significance
7-2	Long-Term Operational-Related Impacts to Geology and Soil Associated with Land Use Changes	Potentially Significant and Unavoidable
8-1	Short-Term Construction-Related and Long-Term Operational-Related Impacts to Greenhouse Gas Emissions	Beneficial
9-1, 9-2	Short-Term Construction-Related and Long-Term Operational-Related Impacts Related to Hazards and Hazardous Materials	Potentially Significant and Unavoidable
10-1, 10-2	Short-Term Construction-Related and Long-Term Operational-Related Impacts to Hydrology and Water Quality	Potentially Significant and Unavoidable
11-1	Short-Term Construction-Related and Long-Term Operational-Related Impacts on Land Use	Potentially Significant and Unavoidable
11-2	Long-Term Operational Impacts on Land Use Related to Feedstock Production	Potentially Significant and Unavoidable
12-1	Short-Term Construction-Related Impacts to Mineral Resources	Less than Significant
12-2	Long-Term Operational-Related Impacts on Mineral Resources	Potentially Significant and Unavoidable
13-1, 13-2	Short-Term Construction-Related and Long-Term Operational-Related Impacts to Noise and Vibration	Potentially Significant and Unavoidable
14-1	Short-Term Construction-Related and Long-Term Operational-Related Impacts to Population and Housing	Less than Significant
15-1	Short-Term Construction-Related and Long-Term Operational-Related Impacts to Public Services	Less than Significant
16-1	Short-Term Construction-Related and Long-Term Operational-Related Impacts to Recreation	Less than Significant
17-1, 17-2	Short-Term Construction-Related and Long-Term Operational-Related Impacts to Transportation	Potentially Significant and Unavoidable
18-1	Short-Term Construction-Related and Long-Term Operational-Related Impacts on Tribal Cultural Resources	Potentially Significant and Unavoidable
19-1	Long-Term Operational-Related Impacts to Utilities and Service Systems	Potentially Significant and Unavoidable
20-1	Short-Term Construction-Related and Long-Term Operational-Related Impacts on Wildfire	Less than Significant

Staff prepared a Notice of Preparation and made it available for review and comment for 30 days, per the CEQA Guidelines (Cal. Code Regs., tit. 14, § 15082(b)). The comment period for the Notice of Preparation began on February 13, 2023 and ended on March 15, 2023. Written comments on the Draft EIA will be accepted starting January 5, 2024 through February 20, 2024. The Board will consider the Final EIA and responses to comments received on the Draft EIA before taking action to adopt the proposed amendments. If the proposed amendments are adopted, a Notice of Decision will be posted on CARB's website and filed with the Secretary of the Natural Resources Agency for public inspection (Cal. Code Regs., tit. 17, § 60004.2(d)).

VII. Environmental Justice

State law defines environmental justice (EJ) as the fair treatment and meaningful involvement of people of all races, cultures, incomes, and national origins with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies (Gov. Code, § 65040.12, subd. (e)(1)). The advancement of state and federal law on environmental justice was greatly influenced by the Principles of Environmental Justice.⁷³ Environmental justice includes, but is not limited to, the following:

- The availability of a healthy environment for all people;
- The deterrence, reduction, and elimination of pollution burdens for populations and communities experiencing the adverse effects of that pollution, so that the effects of the pollution are not disproportionately borne by those populations and communities;
- Governmental entities engaging and providing technical assistance to populations and communities most impacted by pollution to promote their meaningful participation in all phases of the environmental and land use decision making process; and
- At a minimum, the meaningful consideration of recommendations from populations and communities most impacted by pollution into environmental and land use decisions (Gov. Code, § 65040.12, subd. (e)(2)).

The Board approved its Environmental Justice Policies and Actions (Policies) on December 13, 2001, to establish a framework for incorporating environmental justice into CARB's programs consistent with the directives of State law. These policies apply to all communities in California but are intended to address the disproportionate environmental exposure burden borne by low-income communities and communities of color. Environmental justice is one of CARB's core values and fundamental to achieving its mission for all Californians.

CARB continues to integrate environmental justice into its rulemaking, policy development and other key decision-making and implementation activities, including the LCFS. In October 2022, the Board laid out a Vision for Environmental Justice and Racial Equity that reaffirms the Board's goal to create and implement policies, regulations and programs that address environmental justice and provide tangible and immediate gains for historically oppressed people.⁷⁴

With the passage of AB 32, CARB was charged with developing a Scoping Plan that outlines how California will achieve its climate goals and to update it every five years. The Board was also required to convene an Environmental Justice Advisory Committee (EJAC) to advise the Board during the development and subsequent updates of the Scoping Plan, and any other

⁷³ Delegates to the First National People of Color Environmental Leadership Summit, *The Principles of Environmental Justice (EJ)*. 1991. <https://www.ejnet.org/ej/principles.html>

⁷⁴ California Air Resources Board, *Vision for Environmental Justice and Racial Equity*. October 24, 2022. <https://ww2.arb.ca.gov/sites/default/files/2023-04/CARB%20Vision%20Racial%20Equity%20Final%20ENG.pdf>

pertinent matter in implementing AB 32. The EJAC consists of representatives of communities in the State with significant exposure to air pollution, including disadvantaged communities with minority or low-income populations. Four iterations of the Committee have been convened. The first EJAC advised on the initial 2008 Scoping Plan, the second was convened in March 2013 to advise the Board on the 2013 Scoping Plan Update, the third in 2015 to advise on the 2030 Target Scoping Plan Update, and the fourth in 2021 to advise on the 2022 Scoping Plan Update.⁷⁵ More than five dozen of the EJAC's recommendations were incorporated into the 2022 Scoping Plan Update.

In September 2022, Governor Newsom issued Executive Order N-16-22, which directs California agencies and departments developing or updating strategic plans from 2023 to 2026 to reflect the use of data analysis and inclusive practices to more effectively advance equity and respond to identified disparities with changes to the organization's mission, vision, goals, data tools, policies, programs, operations, community engagement, tribal consultation policies and practices, and other actions as necessary to serve all Californians. The Order also directs departments to gather input from disadvantaged and underserved communities as part of this process.

A. Uplifting Equity

CARB hosted 11 public workshops to discuss potential future changes to the LCFS program since 2020, including two community-oriented meetings in May and June 2023. Environmental justice advocates have attended all the workshops and provided verbal or written feedback on behalf of their organizations and community members. LCFS staff has also met with advocates throughout the informal pre-rulemaking process and the EJAC approved a resolution with recommendations for the LCFS program in August 2023.⁷⁶ The input of advocates and community members has helped staff refine many proposed LCFS amendments.

The central goals of the LCFS program are to reduce greenhouse gas emissions from the transportation sector and improve air quality by incentivizing the production of zero- and low-carbon energy fuels and infrastructure. Environmental justice advocates and community members have shared support for these fundamental goals throughout the public process and there is an ongoing recognition that many frontline communities are located adjacent to ports, rail, and major freight paths such as freeways. This section highlights program design features and proposals that align with EJ requests.

The LCFS program has been successful at increasing the supply of alternative fuels in California, helping to double the volume of low-carbon fuel consumption in just 10 years and displacing over 25 billion gallons of petroleum fuels with low-carbon fuels since 2011. Staff is proposing to increase the stringency of the program with measures that will enable an even

⁷⁵ Environmental Justice Advisory Committee, *AB 32 Environmental Justice Advisory Committee Charter*. 2023. <https://ww2.arb.ca.gov/sites/default/files/barcu/board/books/2023/032323/23-3-4ejaccharter.pdf>

⁷⁶ Environmental Justice Advisory Committee, *Draft Recommendations to the California Air Resources Board (CARB) on the Low Carbon Fuel Standard Regulation Updates*. August 28, 2023. <https://ww2.arb.ca.gov/sites/default/files/2023-08/EJAC%20DRAFT%20Low%20Carbon%20Fuel%20Standard%20Recommendations%20Version%202%20082823.pdf>

faster transition to zero- and low-carbon fuels, where greater benefits should accrue for frontline communities:

1. A 'step down' in the CI reduction target in 2025 from the current 13.75% to 18.75%;
2. A change in the 2030 CI reduction target from 20% to 30% with a target of 90% CI reduction in 2045;
3. An acceleration mechanism that will automatically trigger a set increase in the CI reduction target if certain specified market conditions are met.

Raising the carbon intensity reduction requirement of transportation fuel through the LCFS incentivizes the use of increasingly lower carbon fuel and is consistent with the EJAC's 2022 Scoping Plan recommendation to increase the stringency of the LCFS program.⁷⁷ Credits for low-carbon fuels will support the mobile source regulations that are driving the transition to zero-emission vehicle (ZEV) technology, such as the Advanced Clean Cars II and Advanced Clean Fleets regulations. The step-down will also help send a near-term signal to prompt investment in cleaner fuels.

As California moves toward a zero-emission transportation future, the LCFS is crucial in supporting the transition from fossil-based fuels. The program also supports other regulations in California that encourage or require the use of renewable diesel, such as the Innovative Clean Transit and In-use Locomotive regulations. Since legacy fleets, locomotives and airplanes will operate for decades more before they are completely replaced with zero-emission technology, it's important that the transportation fuel used during this time is increasingly lower-carbon and reduces the negative health impacts from the combustion of fossil-based fuels. The growing displacement of fossil-based fuels with renewable biofuels, supported by LCFS credit revenue, continues to improve air quality through the reduction in particulate matter and NOx emissions, as explained in Chapter IV. This is especially important in communities located near major transportation corridors and around airports and ports where legacy fleets will continue to operate.

In line with EJ recommendations, LCFS staff is proposing to expand incentives for electrification zero emission vehicles to accelerate the transition to electric and hydrogen-powered vehicles by extending light-duty vehicle infrastructure crediting and introducing a new medium- and heavy-duty vehicle (MHD) infrastructure credit.⁷⁸ Staff proposes to accept applications for public light-duty refueling infrastructure past the current end-date of December 31, 2025, with the provision that all new Fast Charging Infrastructure (FCI) and Hydrogen Refueling Infrastructure (HRI) applications for light-duty vehicles must be in low-income, disadvantaged or rural communities or more than 10 miles from the nearest fast charger to maximize coverage. For MHD FCI and HRI refueling infrastructure, staff is proposing to add capacity credits for up to 10 years of crediting to support the transition to zero emission technology in trucking fleets. This policy will incentivize the development of MHD refueling

⁷⁷ Environmental Justice Advisory Committee, *Environmental Justice Advisory Committee 2022 Scoping Plan Recommendations*: NF44 & NF54. 15-16. September 30, 2022.

<https://ww2.arb.ca.gov/sites/default/files/barcu/board/books/2022/090122/finalejacrecs.pdf>

⁷⁸ Recommendations NF6, NF7, NF8, and NF52. Environmental Justice Advisory Committee, *Environmental Justice Advisory Committee 2022 Scoping Plan Recommendations*. September 30, 2022.

<https://ww2.arb.ca.gov/sites/default/files/barcu/board/books/2022/090122/finalejacrecs.pdf>

infrastructure for battery-electric and hydrogen fuel cell-electric trucks and support the trucking industry's transition to ZEVs, reducing emissions and criteria pollutants across the State and in communities heavily impacted by freight travel.

Staff is proposing changes to the allocation and use of base credits generated by utilities from non-metered residential electric vehicle charging that will go farther in reducing emissions in communities near freight corridors. Under the Staff Proposal, the Clean Fuel Reward program will change from a new light-duty EV rebate to rebates for new and used medium- and heavy-duty zero emission trucks that are exempted from the Advanced Clean Fleets regulation. This will help accelerate the transition for this hard-to-transition segment of the trucking sector that is not covered by other CARB regulations. The proportion of residential base credits will change to reflect this change in rebate from 60% of total base credits to 40% with a corresponding increase in "holdback credits." As a result of this increase in holdback credits, staff is proposing to increase the requirements for investments in equity communities from 50% to 75% for investor-owned utilities, as well as proposing new pre-approved categories for investment of these credits. These new categories reflect priorities from the 2022 Scoping Plan Update as well as community input and include re-skilling and workforce development for transportation electrification, and transportation projects identified in AB 617 Community Emission Reduction Plans.

CARB staff are also proposing additional guardrails on the use of crop-based feedstocks for biofuel production. These changes will help to reduce the risk that rapid expansion of biofuel production and biofuel feedstock demand could result in deforestation or adverse land use change, a concern that was raised multiple times during the LCFS and Scoping Plan Workshops from EJ and environmental organizations.

Staff is also proposing to include deficit-generating fossil jet fuel for intrastate flights in the LCFS, beginning in 2028. This proposal aligns with the 2022 Scoping Plan Update toward decarbonizing the aviation sector, and with EJAC's recommendation to further integrate opt-in sectors into the regulation.^{79,80} The use of alternative jet fuels, which generate credits under the LCFS, will achieve particulate matter emissions reductions that benefit communities living near airports. Adding fossil jet fuel as a deficit generator also strengthens the signal to invest in zero-emission aviation technology, as modeled in the 2022 Scoping Plan Update in the 2040s.

B. Conclusion

Many elements of the Low Carbon Fuel Standard support key environmental justice-related recommendations, including the reduction of fossil fuel use, promotion of cleaner fuels, and the incentivization of charging and fueling infrastructure in disadvantaged communities. LCFS

⁷⁹ Recommendation NF54 in the Environmental Justice Advisory Committee 2022 Scoping Plan Recommendations.

⁸⁰ Environmental Justice Advisory Committee, *Draft Recommendations to the California Air Resources Board (CARB) on the Low Carbon Fuel Standard Regulation Updates*. August 28, 2023.

<https://ww2.arb.ca.gov/sites/default/files/2023-08/EJAC%20DRAFT%20Low%20Carbon%20Fuel%20Standard%20Recommendations%20Version%202%20082823.pdf>

complements other State policies as part of a suite of policies in California's portfolio of strategies to support reducing petroleum dependence by 94% by 2045.

VIII. Standardized Regulatory Impact Analysis

This section summarizes the economic impact of the Proposed Regulation as presented in the Standardized Regulatory Impact Analysis (SRIA), which can be found in Appendix C-1, as well as on the Department of Finance website. CARB responses to comments received from the Department of Finance can be found in Appendix C-3.

A. Changes Since the Release of the Standardized Regulatory Impact Assessment

The proposed amendments have been updated since the release of the SRIA on September 8, 2023. The changes and their potential impacts on the economic analysis are found below.

1. Verification Costs

Staff updated the verification cost estimates to include the expected costs to companies that own/operate between 1 and 10 fueling supply equipment (FSE), provisions for deferred verification for companies generating less than 6,000 credits per year, and less intensive verification requirements for fuel reporting entities reporting only electricity transactions. This change resulted in approximately \$2.25 billion less verification costs over the lifetime of the regulation.

a) Direct Costs

The total net cost of the proposed regulation from 2024 to 2046 is estimated to be approximately \$32 billion, with total direct costs of approximately \$160.5 billion and total revenue from LCFS credit sales of approximately \$128.4 billion. Direct costs of the amendments include the cost of compliance to in-state high carbon fuel producers that generate deficits (e.g., Direct costs of the amendments include the cost of compliance to in-state high carbon fuel producers that generate deficits (e.g., petroleum refiners), changes in statewide high carbon-intensity fuel expenditures of \$7 billion, and the cost of third-party verification for electric and hydrogen fuel supply equipment, which were not previously subject to verification before these proposed amendments, of \$5.5 billion. petroleum refiners), changes in statewide high carbon-intensity fuel expenditures of \$7 billion, and the cost of third-party verification for electric and hydrogen fuel supply equipment, which were not previously subject to verification before these proposed amendments, of \$5.5 billion. The highest annual cost occurs in 2039 with an estimated direct cost of \$11.1 billion.

2. REMI Modeling: Correction to References and Update of Population Projections

The SRIA incorporated Department of Finance’s economic and population projections of U.S. Real Gross Domestic Product, income, and employment,⁸¹ as well as California civilian employment by industry,⁸² released with the 2023-2024 May Revision to the Governor’s Budget on May 12, 2023 and Department of Finance demographic forecasts for California population forecasts updated in July 2021.⁸³ The text of the SRIA accurately describes the use of the July 2021 population projections in the SRIA’s macroeconomic analysis, but the footnote reference number 86 in the SRIA erroneously references the July 2023 interim population projection. Footnote 86 of the SRIA should instead read:

California Department of Finance, *Demographic Research Unit. Report P-3: Population Projections, California, 2010-2060* (Baseline 2019 Population Projections; Vintage 2020 Release). 2021.

After the completion of the analysis, Finance released a population projection interim series informed by available 2020 Census data dated July 19, 2023.⁸⁴ The interim projection released July 2023 has been incorporated into the macroeconomic results presented in the Form 399 and the following sections.

The macroeconomic results presented in the SRIA were presented in a 2021-dollar value. Per the direction of Department of Finance in their SRIA Comment Letter, the Form 399 presents the results of the macroeconomic analysis in 2023-dollar values. The economic analysis contained in the sections below also use 2023-dollar values.

3. Social Cost of Methane

Staff updated the avoided social cost of methane to account for all pathways that have dairy biogas as their feedstock and to match the years between the CATS model outputs and Annual SC-CH₄ values. Staff also corrected the conversion factor cited in the text to align with the calculation which used 0.020 metric tons of methane per million British thermal unit (instead of “per British thermal unit”). This resulted in an approximate doubling of avoided social cost: the SRIA identified values between 3 billion to 9 billion (2021\$), the updated values are between 6 and 16 billion, depending on the discount rate selected.

⁸¹ California Department of Finance, *National Economic Forecast – Annual & Quarterly* (Updated in April 2023). <https://dof.ca.gov/Forecasting/Economics/economic-forecasts-u-s-and-california/>

⁸² California Department of Finance, *Economic Research Unit. California Economic Forecast – Annual & Quarterly* (Updated in April 2023). <https://dof.ca.gov/Forecasting/Economics/economic-forecasts-u-s-and-california/>

⁸³ California Department of Finance, *Demographic Research Unit, Report P-3: Population Projections, California, 2010-2060* (Baseline 2019 Population Projections; Vintage 2020 Release). 2021.

⁸⁴ California Department of Finance, *Demographic Research Unit. Report P-3: Population Projections, California, 2020-2060* (Baseline 2019 Population Projections; Vintage 2023 Release). 2023. Zip File.

4. Small Business Benefits

Staff corrected the number of biodiesel producers considered small businesses from two to three and changed the ratio of small businesses to reflect the number as compared to the California, not national, total companies in the LCFS. Per this correction, small businesses represented 16% of the LCFS parties registered in the LCFS in September 2021.

B. The creation or elimination of jobs within the State of California.

REMI Policy Insight Plus Version 3.0.0 is used to estimate the macroeconomic impacts of the proposed amendments on the California economy including changes to employment demands and output based on expected costs and benefits by industry.

Table 12 presents the impact of the proposed amendments on total employment in California across all industries. Employment comprises estimates of the number of jobs, full-time and part-time, by place of work for all industries. Full-time and part-time jobs are counted at equal weight. Employees, sole proprietors, and active partners are included, but unpaid family workers and volunteers are not included. The employment impacts represent the net change in employment, which consist of positive impacts for some industries and negative impacts for others.

The statewide employment impacts of the proposed amendments are estimated to have a slightly positive impact on employment (approximately +0.02% of California employment) through 2027, followed by a slightly negative impact on employment (approximately 0 to -0.03% of California employment) through 2046 (Figure 8). The positive impacts on employment primarily result from the credits generated by low-CI fuels. The demand for these credits leads to expansion in the industries producing these fuels. After 2040, the CATS model predicts the costs for DAC will be lower than the costs of obtaining credits directly from low-CI fuel producers. As a result, the latter years of the assessment are characterized by high production costs for high-CI fuel producers, but less benefits overall for low-CI fuel producers. Increases in production costs and reductions in credit revenue for low-CI fuel producers negatively affect employment projections, as producers must cut employment to compensate for overall profit losses. Overall, the changes in employment do not exceed 0.05% of baseline California employment in any one year during the regulatory horizon.

The analysis will not fully capture all employment benefits from the proposed amendments. For instance: specific employment benefits for direct air capture were not included in the analysis due to a modeling limitation, the specific fuel pathways' supply chains are not perfectly captured in the model but instead modeled at a more aggregate level, and credit revenue to the electricity industry may be spent in ways that were not modeled, such as increased zero-emission infrastructure or rebates to EV customers which could result in increases in construction or consumer spending larger than those shown in this analysis. Importantly, the analysis of employment benefits captures only the portion that would occur in California, which is a subset of overall employment benefits for low-CI fuel industries resulting from the proposed amendments.

Table 12: Total California Employment Impacts⁸⁵

Year	California Employment	Change in Total Jobs	% Change
2026	25,898,820	4,096	0.02%
2030	26,126,846	-5,301	-0.02%
2034	26,441,359	-3,448	-0.01%
2038	27,000,858	-911	0.00%
2042	27,527,827	-9,442	-0.03%
2046	28,102,362	-12,909	-0.05%
Average	26,711,377	-4,085	-0.01%

Figure 8 illustrates employment impacts by major sector. The services and manufacturing sectors receive the majority of job increases until 2040 when all sectors show a decrease in job growth. The services and manufacturing sectors are projected to have initial increases in employment as resources are invested in development of low-CI fuel technologies, and then experience a decrease in employment over the baseline after the first five years. The decrease in employment after 2040 corresponds to the more stringent CI targets that increase operational costs without increasing output, given the stringency of the CI targets and the increase in direct air capture crediting.

⁸⁵ After the completion of the SRIA analysis, Finance released a population projection interim series informed by available 2020 Census data dated July 19, 2023. The interim projection released July 2023 has been incorporated into the macroeconomic results presented in this Form 399.

Figure 8: Employment Impacts by Major Sector

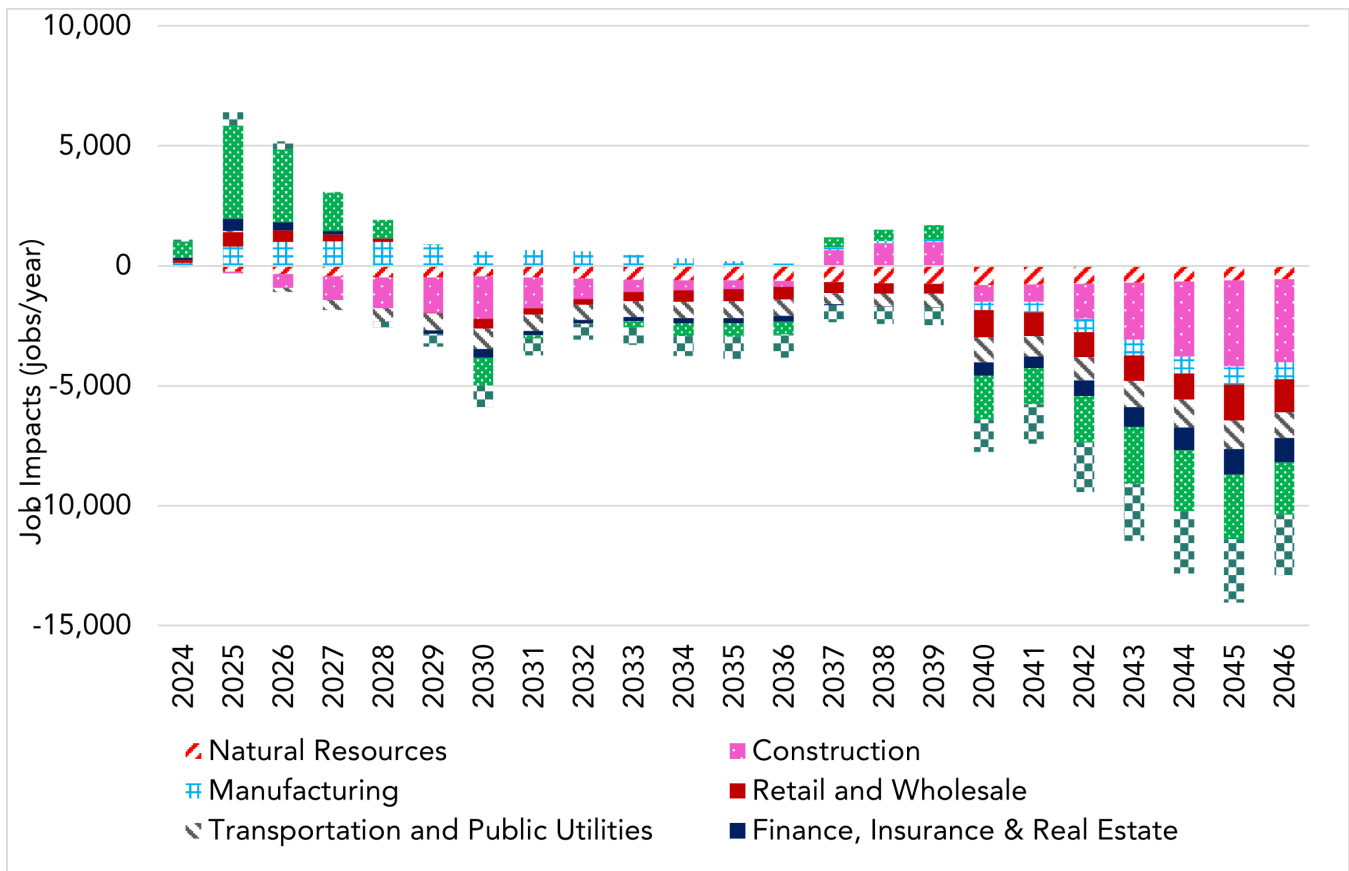


Table 13 presents changes in employment for industries directly impacted by the proposed amendments. Losses in jobs are largest in the petroleum and coal products manufacturing industry and are caused by reduced demand for these high-CI fuels as demand increases for low-CI fuels and increased production costs from the deficits generated by fossil gasoline and diesel fuels, with an average annual loss of 1,168 jobs when compared to the baseline. Basic chemical manufacturing employment increases by an average of 429 jobs annually, driven by credits generated by hydrogen, renewable diesel, ethanol, and alternative jet fuels and additional demand for these fuels. The electrical power generation, transmission, and distribution industry is expected to increase jobs by 741 positions annually associated with credit generation from electricity projects. Overall, between 2026 and 2046, California employment grows by 2.2 million jobs, increasing from 25.9 million jobs in 2026 to 28.1 million jobs in 2046.

Overall California's employment continues to grow and averages 26.7 million jobs between 2024 and 2046. On average, across all industries the estimated job impacts are approximately 4,085 fewer jobs created when compared to the baseline, with over a quarter of those job losses coming from the petroleum sector. This net decline in employment, similar to the net cost of the Proposed Alternatives, is because all of the deficit generating businesses – and therefore the cost of the proposed amendments – are within California, while job growth associated with credit-generating businesses and revenues from low-CI fuel credits are distributed across the U.S. The decreases in employment for high-CI fuel producers is countered by increases in employment growth in industries that include producers of low-CI

fuels. These industries include basic chemical manufacturing, natural gas distribution, and electrical power generation, transmission, and distribution. For example, between 2026 and 2046, California employment grows by 2.2 million jobs, going from 25.9 million jobs in 2026 to 28.1 million jobs in 2046.

Table 13: Employment Changes of Proposed Regulation 2024-2046

Industry	Units	2026	2030	2034	2038	2042	2046	Average
Petroleum and coal products manufacturing (324)	Change in jobs	-665	-864	-1230	-1561	-1591	-1176	-1,168
Petroleum and coal products manufacturing (324)	Percent Change	-5.13%	-6.78%	-9.81%	-12.57%	-12.82%	-9.43%	-9.31%
Basic chemical manufacturing (3251)	Change in jobs	417	409	486	535	373	246	429
Basic chemical manufacturing (3251)	Percent Change	6.36%	6.06%	6.95%	7.43%	5.08%	3.28%	6.13%
Natural gas distribution (2212)	Change in jobs	37	28	21	-2	226	283	81
Natural gas distribution (2212)	Percent Change	0.27%	0.21%	0.17%	-0.02%	1.91%	2.47%	0.68%
Electric power generation, transmission, and distribution (2211)	Change in jobs	295	354	883	1,361	1,037	434	741
Electric power generation, transmission, and distribution (2211)	Percent Change	0.72%	0.92%	2.41%	3.87%	3.09%	1.35%	2.09%

C. The creation of new business or the elimination of existing businesses within the State of California.

The proposed amendments are not expected to directly result in business creation or elimination; specifically, the proposed amendments do not require any new businesses to be created nor do they require closure of any existing businesses.

However, the LCFS program has supported the creation or expansion of many businesses in California and the U.S., as shown by the hundreds of credit-generating participants in the program. The proposed amendments are anticipated to also support business creation or expansion in the areas of low-CI fuels. In industries that experience increased costs, the proposed amendments may also contribute to business contraction or eliminations. However, due to the variety of businesses that participate in the LCFS and the breadth of their business models, staff cannot predict a specific number of businesses created nor eliminated.

The macroeconomic modeling of the proposed amendments can also be used to understand some of the potential impacts to business creation and elimination. REMI Policy Insight Plus Version 3.0.0 is used to estimate the macroeconomic impacts of the proposed amendments on the California economy. Although the REMI model cannot directly estimate the creation or elimination of businesses, the model does estimate impacts to California jobs and output which can be used to understand some of the potential impacts to businesses. Reductions in output could indicate elimination of businesses within an industry. Conversely, increased output within an industry could signal the potential for additional business creation if existing businesses cannot accommodate all future demand. There is no threshold that identifies the creation or elimination of business.

The Statewide jobs and output impacts of the proposed amendments are small relative to the total California economy suggesting the proposed amendments will have a minimal impact on overall business expansion or contraction. The largest employment increase is estimated to be 0.02% for 2025 compared to the baseline. The largest employment decrease is estimated to be 0.05% for 2044 through 2046 compared to the baseline. Output is expected to decrease for the lifetime of the regulation compared to the baseline. The largest output decrease in the State is estimated to be 0.16% for 2040 through 2045. However, impacts to specific industries are larger or smaller as described in the previous sections.

D. The expansion of businesses currently doing business within the State of California.

The proposed amendments will increase the demand for low-carbon fuels, which provides an opportunity for businesses, both in-state and out-of-state, to increase revenue from the sale of low-carbon fuels in California. The sale of LCFS credits provides an additional revenue stream for these firms, enabling them to increase their market share and increase their competitiveness against high-CI fuels such as fossil gasoline or diesel.⁸⁶ In Table 15, staff monetized the value of the revenues generated by both in-state and out-of-state low-CI fuels. The value will vary based on the actual credit price.

Moreover, LCFS incentives may encourage California firms, as well as other firms doing business in California, to invest early in innovative, low-CI fuel technologies and develop mature businesses earlier than firms not participating in the California fuel market. Early investment may result in competitive advantages to these businesses as other state, federal,

⁸⁶ The LCFS incentive is incremental to incentives created by federal biofuel/low-carbon fuel policy, including the RFS.

or international jurisdictions adopt similar carbon intensity standards.⁸⁷ The proposed amendments will also help promote a wider range of clean fuels and vehicles for California businesses to choose from, including vehicles operating on electricity, hydrogen, and biomethane.

The proposed amendments also benefit California fuel providers that have compliance obligations under the Cap-and-Trade Program. As the LCFS reduces the CI of fuels, it changes the composition of the State's transportation fuel mix and dependence on traditional petroleum-based fuels. CARB designed the LCFS and Cap-and-Trade Programs to complement one another. Investments made to comply with one of the programs may result in reduced compliance requirements for the other program. Increased use of low-carbon fuel due to the LCFS will reduce fuel suppliers' GHG emissions covered by the Cap-and-Trade Program, reducing the Cap-and-Trade Program compliance obligation of these firms. Similarly, selling cleaner fuels or investing in emission reduction projects at California refineries and oil fields to comply with the Cap-and-Trade Program may also generate credits under the LCFS.

Table 14 summarizes the estimated increase in revenue to small and typical credit generating California companies⁸⁸ from the sale of LCFS credits due to the proposed amendments. To apportion credits between in-state and out-of-state businesses, staff used an assumed percentage for production in-state and out-of-state for each fuel type, which is detailed in Appendix C-1. Cumulatively, from 2024 through 2046, the proposed amendments are estimated to increase total revenue for credit generating businesses as compared to the baseline scenario by \$149 billion, of which approximately \$128 billion is estimated to accrue to California businesses.

Table 14: Estimated Increase in Revenue from LCFS Credit Sales under the Proposed Amendments Relative to Baseline (million 2021\$)

Year*	Typical California Businesses	California Small Business	Total California Businesses	Out-of-State Businesses	Total California and Out-of-State
2024	298	2	301	166	467
2025	4,108	19	4,127	1,326	5,454
2026	4,329	19	4,348	1,532	5,880
2027	4,019	15	4,034	1,290	5,325
2028	4,221	16	4,237	1,111	5,348
2029	4,016	15	4,031	951	4,982
2030	2,697	9	2,706	511	3,217

⁸⁷ Currently Oregon, Washington, British Columbia, Canada, Brazil, and the European Union have LCFS-like policies in place.

⁸⁸ "Typical credit generating California companies" are all California credit generators, excluding small businesses with less than 100 employees and earning less than 10 million in annual revenue.

Year*	Typical California Businesses	California Small Business	Total California Businesses	Out-of-State Businesses	Total California and Out-of-State
2031	4,769	15	4,784	732	5,516
2032	5,681	16	5,697	819	6,516
2033	6,033	16	6,050	735	6,785
2034	6,215	16	6,232	731	6,963
2035	6,426	16	6,443	635	7,078
2036	6,633	16	6,649	500	7,149
2037	8,895	22	8,918	708	9,625
2038	9,304	24	9,328	724	10,052
2039	9,733	26	9,760	765	10,525
2040	8,041	26	8,067	-	8,067
2041	8,827	26	8,853	1,353	10,206
2042	7,158	22	7,180	1,286	8,466
2043	5,676	19	5,695	1,244	6,939
2044	4,346	15	4,361	1,195	5,556
2045	3,357	12	3,370	1,245	4,614
2046	3,234	12	3,246	1,064	4,310
Total	128,017	399	128,416	20,623	149,040

* Years shown are samples from the regulatory period of 2024-2046. "Total" is the cumulative sum of revenues in all years from 2024 to 2046.

In addition to the benefits for California businesses, CARB estimates that small businesses will see benefits from the proposed amendments. Many of California's biodiesel producers, hydrogen producers, electric charging stations, hydrogen stations, and natural gas stations are small businesses. Staff identified the following small businesses in California, which represented 16% of the LCFS parties registered in the LCFS in September 2021:

- Three biodiesel providers
- Six natural gas (CNG and LNG) fueling station operators
- 21 electric charging station operators
- One propane provider

In total, these small businesses generated approximately 119,000 LCFS credits in 2021, which provided an estimated \$22 million in credit revenue as estimated using the 2021 average LCFS credit price of \$188.

The proposed amendments will increase the demand for low-CI fuels and are anticipated to increase the prices for LCFS credits relative to the baseline, thereby increasing revenue to these small businesses. In addition, larger potential revenue resulting from the proposed amendments may allow other small businesses to enter the market. Therefore, staff kept the 2021 credit total of 119,000 as a static proxy for future small business credit generation.

E. Significant Statewide Adverse Economic Impact Directly Affecting Business, Including Ability to Compete

The Executive Officer has made an initial determination that the proposed regulatory action would not have a significant statewide adverse economic impact directly affecting businesses, including the ability of California businesses to compete with businesses in other state, or on representative private persons.

F. The competitive advantages or disadvantages for businesses currently doing business within the State

The proposed amendments will increase the demand for low-carbon fuels, which provides an opportunity for businesses, both in-state and out-of-state, to increase revenue from the sale of low-carbon fuels in California. Indeed, California has continued to reduce emissions, and emissions per capita, while observing robust economic growth. Table 15 shows the potential LCFS credit revenue for several low-carbon fuels in 2025, 2030, 2035, 2040, and 2045. To allow comparison across fuels, the potential revenues are expressed as an equivalent gallon of either gasoline (GGE) or diesel (DGE) that the low-CI fuel displaces. The sale of LCFS credits provides an additional revenue stream for these firms, enabling them to increase their market share and increase their competitiveness against high-CI fuels such as fossil gasoline or diesel.⁸⁹ In Table 15, staff monetized the value of the revenues generated by both in-state and out-of-state low-CI fuels. The value will vary based on the actual credit price.

⁸⁹ The LCFS incentive is incremental to incentives created by federal biofuel/low-carbon fuel policy, including the RFS.

Table 15: Value Added from LCFS Credit for Low Carbon Fuels under the Proposed Amendments

Fuel	Average CI Value (gCO ₂ e/MJ)	2025	2030	2035	2040	2045	Units
<i>Proposed Amendments Estimated Credit Price*</i>		\$221	\$76	\$138	\$221	\$105	\$/MT
Corn Ethanol**	55	0.66	0.13	-0.12	-0.77	-0.55	\$/gge
Electricity**	64	5.39	1.52	1.54	0.52	-0.37	\$/gge
Hydrogen**	-79	7.20	2.25	3.40	4.31	1.38	\$/dge
Biodiesel**	40	1.37	0.35	0.28	-0.15	-0.42	\$/dge
Renewable Diesel**	44	1.25	0.31	0.20	-0.27	-0.48	\$/dge
Landfill NG	45	0.96	0.22	0.08	-0.41	-0.51	\$/dge
Dairy NG	-293	11.01	3.68	6.35	9.64	4.26	\$/dge

* The following EERs were used for this calculation: 2.5 for hydrogen, 3.4 for electricity, and 0.9 for landfill NG and dairy NG.⁹⁰

** Hydrogen CI shown is the average of all hydrogen pathways as of August 2023 in the CATS model. Electricity CI is the average value from SP projections from 2023-2046. Corn ethanol CI is the average of projections from 2023-2046 as of August 2023 in the CATS model. Biodiesel and renewable diesel CIs are the average of waste and virgin oil pathway CIs as of August 2023 in the CATS model.

Moreover, LCFS incentives may encourage California firms, as well as other firms doing business in California, to invest early in innovative, low-CI fuel technologies and develop mature businesses earlier than firms not participating in the California fuel market. Early investment may result in competitive advantages to these businesses as other state, federal, or international jurisdictions adopt similar carbon intensity standards.⁹¹ The proposed amendments will also help promote a wider range of clean fuels and vehicles for California

⁹⁰ “Energy Economy Ratio (EER)” means the dimensionless value that represents the efficiency of a fuel as used in a powertrain as compared to a reference fuel. EERs are often a comparison of miles per gasoline gallon equivalent (mpge) between two fuels.

⁹¹ Currently Oregon, Washington, British Columbia, Canada, Brazil, and the European Union have LCFS-like policies in place.

businesses to choose from, including vehicles operating on electricity, hydrogen, and biomethane.

The proposed amendments also benefit California fuel providers that have compliance obligations under the Cap-and-Trade Program. As the LCFS reduces the CI of fuels, it changes the composition of the State's transportation fuel mix and reduces dependence on traditional petroleum-based fuels. CARB designed the LCFS and Cap-and-Trade Programs to complement one another. Investments made to comply with one of the programs may result in reduced compliance requirements for the other program. Increased use of low-carbon fuel due to the LCFS will reduce fuel suppliers' GHG emissions covered by the Cap-and-Trade Program, reducing the Cap-and-Trade Program compliance obligation of these firms. Similarly, selling cleaner fuels or investing in emission reduction projects at California refineries and oil fields to comply with the Cap-and-Trade Program may also generate credits under the LCFS.

Because the proposed amendments are designed to increase the competitiveness of low-CI fuels in California, California businesses that produce low-CI fuels may become more competitive. Petroleum fuel producers will face increased compliance costs under the proposed amendments. California sectors that rely heavily on fossil transportation fuel may also face higher prices, resulting in a potential competitive disadvantage relative to out-of-state entities that are not subject to the LCFS. However, as sectors transition to lower CI transportation fuels, they will realize lower operational costs and increased competitiveness associated with a more diverse liquid fuel pool and/or vehicle efficiency gains associated with transitioning to zero emission vehicles. Staff analysis of costs associated with this transition suggest that the cost per mile driven will decline by 42% between 2022 and 2046. Although LCFS credits help support increased deployment of zero emission vehicles by providing funding for both zero emission infrastructure and vehicle purchases, this analysis does not claim the vehicle-side benefits of increased zero emission vehicle deployment because those benefits have previously been attributed to the implementation of CARB's vehicle regulations. Additionally, any potential impact of the proposed amendments on the competitiveness of California businesses will likely be reduced as more low-carbon fuel policies similar to California's LCFS are adopted across North America. Oregon, Washington, and British Columbia all have similar clean fuels programs to California's program, and several other states are considering their own programs.

G. The increase or decrease of investment in the state

Private domestic investment consists of purchases of residential and nonresidential structures and of equipment and software by private businesses and nonprofit institutions. It is used as a proxy for impacts on investments in California because it provides an indicator of the future productive capacity of the economy.

The proposed amendments require implementing processes that substitute low-carbon sources of energy, such as waste oils and renewable electricity, in place of fossil fuel sources. The proposed amendments, and the LCFS more broadly, are structured to encourage ongoing innovation and improvement in reducing the carbon intensity of transportation fuels as well as investment in innovative direct air capture and carbon capture, utilization, and sequestration approaches. Over the past decade, the LCFS has resulted in approximately 650 Tier 2 fuel pathway certifications under the current CA-GREET3.0 model, which includes more complex and innovative production methods than are represented by more conventional pathways. The proposed amendments are expected to continue to incentivize investment in low-carbon fuel

production. The proposed amendments will also lead to an overall higher price for LCFS credits relative to the baseline, which will send a signal for research, development, and deployment of innovative technologies and fuels that support California's long-term GHG emissions reduction goals.

The economic modeling utilized for the economic analysis is not structured to capture these types of innovation in the transportation fuel market and focuses on the direct impacts of the proposed amendments. Given the limitations of the model and the fact that some of the benefits of the proposed amendments likely have an unquantifiable impact on innovation in the transportation fuels sector, as modeled, the proposed amendments result in slight annual private investment decreases of \$11 million on average. The difference in private investment for the proposed amendments is modest and does not exceed 0.10% of baseline investment across the analytical time period for any one year and averages no percentage change over the regulatory horizon (Table 16).

Table 16: Change in Private Investment

Year	Private Investment (2023M\$)	Change (2023M\$)	% Change
2026	631,710	-28	0.00%
2030	684,020	-386	-0.06%
2034	739,174	99	0.01%
2038	811,556	684	0.08%
2042	882,928	102	0.01%
2046	957,233	-752	-0.08%
Average	766,518	-11	0.00%

H. The incentives for innovation in products, materials, or processes

As mentioned above, the proposed amendments will incentivize research, development, and deployment of innovative technologies and fuels that support California's long-term GHG emissions reduction goals and displace fossil fuels.

All fuel producers will have an increased incentive to innovate and deploy new methods that reduce the CI of their fuels. The proposed amendments will additionally provide long term price stability for LCFS credits, which is essential for low-CI fuel producers to make investments in long-term capital projects and research and development.

I. The benefits of the regulation to the health and welfare of California residents, worker safety, and the state's environment.

The proposed amendments are designed to reduce toxic air contaminant, criteria pollutant, and GHG emissions by decrease the carbon intensity of California's transportation fuel pool and reducing dependence on petroleum fuel. Cumulatively, from 2024 to 2046, the proposed amendments are expected to reduce statewide transportation emissions by approximately 4,281 tons of PM2.5 and 25,586 tons of NOx relative to the baseline. The total statewide valuation of avoided health outcomes from 2024 to 2046 is approximately \$5 billion. These reductions in toxic air contaminants and criteria pollutant emissions may improve safety for workers, particularly at freight hubs, where substitution of renewable diesel for fossil diesel will reduce exposure to harmful air pollution. For detailed information on health and emissions benefits of the proposed regulation, see Chapter IV.

The proposed regulations provide credit generating revenue to California businesses of \$128.4 billion over the lifetime of the regulation. The total monetized benefit from credit revenue and avoided health outcomes of the proposed amendment is \$133.4 billion.

As Californians transition away from fossil fuels and into more energy efficient ZEVs and lower-carbon fuel alternatives, CARB staff estimates that the fuel costs Californians pay to travel will also decrease, resulting in billions of dollars in savings on fuel costs each year. The regulations CARB has adopted (e.g. ACC II, ACF/ACT) in combination with the LCFS will help to increase the deployment of vehicles with higher fuel efficiency (e.g. BEVs/FCEVS) and reduce the costs of the alternative fuels into the future.

CARB staff estimates the amount of money Californians spend on transportation costs across all vehicle classes could be up to 42% lower in 2045 than compared to the amount of money spent on transportation in 2021. This translates into an annual savings of over \$20 billion⁹² in fuel expenditures in 2045 alone. Each year between 2025 and 2045 CARB estimates the annual fuel cost savings will increase as Californians transition away from fossil gasoline and diesel expenditures and increase their use of more efficient vehicles and the use of low-carbon fuels. In 2021, expenditures on fossil gasoline and fossil diesel made up approximately 93% of the State's total transportation fuel costs, and on a per mile basis gasoline and diesel combined cost Californians approximately \$0.20 per mile. In 2045, with implementation of CARB's vehicle regs and LCFS, California will have significantly reduced the amount of fossil gasoline and diesel used in California. CARB staff estimated that in 2045, over 75% of the State's transportation fuel expenditures will go to non-fossil alternative fuels like electricity, hydrogen, and low-carbon biofuels, and that Californian's will be paying \$0.12 per mile traveled, for an overall 42% savings in fuel costs per mile statewide (see Figure 9 and Table 17). For the light duty sector, the savings will be even more pronounced, with costs going from \$0.19 per mile to \$0.08 per mile by 2045, an over 50% reduction in costs as the light-duty sector transitions away from fossil fuels and becomes mostly ZEVs supplied by electricity and hydrogen.

⁹² These costs savings were not reflected in the SRIA because the economic modeling conducted for the SRIA was limited to calculating the direct costs associated with the purchase of LCFS credits.

The SRIA for this rulemaking (Appendix C-1) included Table 22 which provided a potential cost-pass through for select fossil fuels. However, this metric was incomplete as it looked only at fossil fuels and did not capture all of the transportation fuels that will be available in response to these regulatory updates. The fuel cost per mile metric described above incorporates the costs for all transportation fuels into one metric and provides a more comprehensive and accurate metric of costs to California consumers. Furthermore, retail fossil fuel prices are strongly influenced by many factors beyond LCFS credit prices (e.g., global events, holiday weekends, seasonal fluctuations, refinery disruptions and decisions about production that affect supply, refinery pricing decisions, seasonal fuel blends, taxes) and fossil fuel producer pricing strategies are complex and reflect local and regional market conditions. Few of these factors are determined by government entities, including the State of California. Between 2017 and 2022, the retail price of gasoline fell as low as \$3.08 and rose as high as \$5.41, and similarly for diesel, the retail price ranged between \$3.07 and \$6.02.⁹³ Predicting how LCFS credit price changes impact these complex pricing strategies and the per gallon gasoline and diesel prices paid at the pump in the future by consumers is beyond the scope of this work.

Instead of providing a per gallon price, the SRIA included a narrow analysis on retail fossil fuels as an estimate of the upper bound of possible consumer price impacts based on the carbon content of fuel, without consideration for the complex fossil fuel pricing strategies or the availability and impact of other competing fuels (e.g., biofuels, electricity, hydrogen, etc.) on fuel prices. The SRIA took a very conservative approach- assuming, for example, that maximum possible costs of the program compliance would be passed through to fossil fuel consumers while no benefits of program credits (e.g., for completing fuels) would be passed through as savings to consumers. Importantly, the SRIA did not represent the actual cost pass-through that would happen in the real world. Actual costs of pass-through depends on how much fossil fuel is still in use, the supply of clean fuel, and credits in the market. In addition to having a narrow and incomplete focus on fossil fuel cost impacts, the SRIA was a point-in-time analysis that represented policy decisions that are different than this regulatory proposal and it is no longer an up-to-date assessment to reference in the context of current proposed changes to the Program. As laid out above, fossil fuel in use and deficits under the Program will go down over time as the zero-emissions vehicle (ZEV) population increases. Clean fuels will increase as the program becomes more stringent and a stronger market signal is supported and the costs of some of the lowest carbon fuels will fall over time as the technology to produce and use these fuels is deployed. Federal incentives and funding will also help support clean fuel production and deployment at lower costs. Finally, the program has a price ceiling to ensure credit prices do not go unchecked. This further ensures that the cost pass-through is managed and unnecessary costs of the program are not passed on to consumers.

In short, just as LCFS credit prices have not shown any historical correlations with retail gasoline prices, there is no expectation that a more stringent Program would lead to higher

⁹³ United States Energy Information Administration, *Annual Retail Gasoline and Diesel Prices* (Updated on July 31, 2023). https://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_sca_a.htm

fossil fuel transportation costs for Californians in view of the combination of factors detailed above that can impact retail gasoline prices.

Figure 9: California's Fuel Expenditures by Type

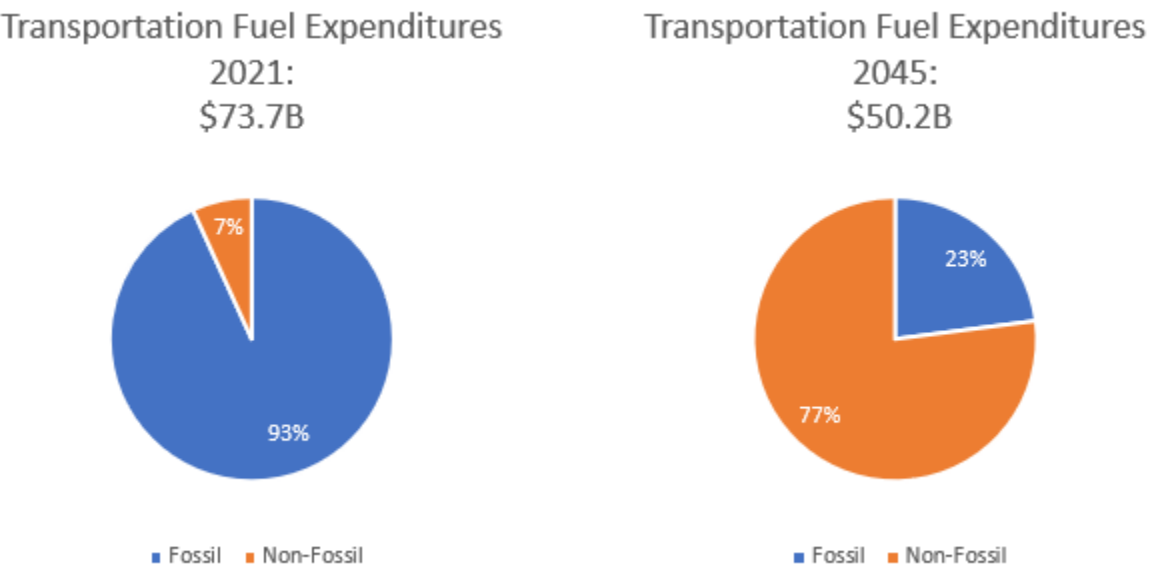


Table 17: Transportation Cost Metrics

Transportation Cost Metrics	2021	2030	2045
Total Expenditures (Billions)	\$73.7	\$62.5	\$50.2
Average cost-per-mile for all fuels	\$0.21	\$0.17	\$0.12

IX. Evaluation of Regulatory Alternatives

Government Code section 11346.2, subdivision (b)(4) requires CARB to consider and evaluate reasonable alternatives to the proposed regulatory action and provide reasons for rejecting those alternatives. This section discusses alternatives evaluated and provides reasons why these alternatives were not included in the proposal. As explained below, no alternative proposed was found to be less burdensome and equally effective in achieving the purposes of the regulation in a manner that ensures full compliance with the authorizing law.

The primary objectives of the proposed LCFS regulation include the following:

1. Improve California's long-term ability to support the production and use of increasingly lower-CI transportation fuels and to improve the program's overall effectiveness;
2. Update the annual carbon intensity benchmarks through 2030 and establish more stringent post-2030 benchmarks in alignment with the 2022 Scoping Plan Update;
3. Increase the flexibility of the program to adjust for potential future market over-performance by including a mechanism that would automatically accelerate the compliance targets under certain conditions;
4. Include a step-down in the near-term CI target to further support ambition;
5. Incentivize fuel production and refueling infrastructure buildout needed to meet California's long-term climate goals and reduce dependence on petroleum fuels, including opportunities to leverage federal funding for low-carbon hydrogen production and ZEV fueling, and support the transition of biomethane fuel pathways for combustion out of transportation;
6. Update standard values in the regulation, including emission factors, as well as life cycle assessment (LCA) modeling tools to use more detailed or recent data;
7. Streamline implementation of the program; and
8. Make minor updates for typographical errors and specifications of intent.

A. Alternatives to the Regulation

CARB solicited public input regarding alternatives to the proposed amendments. This solicitation was presented and discussed at a workshop held on November 9, 2022.⁹⁴ In the

⁹⁴ California Air Resources Board, *Low Carbon Fuel Standard Public Workshop: Concepts and Tools for Compliance Target Modeling*. November 9, 2022. <https://ww2.arb.ca.gov/sites/default/files/2022-11/LCFSPresentation.pdf>

solicitation, staff requested that alternatives be submitted by December 2, 2022. Several stakeholders responded to the solicitation by proposing alternatives.

Staff analyzed two regulatory alternatives to the proposed amendments and analyzed two additional concepts, which are discussed in detail Section B. Both regulatory alternatives increase the stringency of benchmarks beyond the baseline since more low-CI fuels are entering the market than previously expected, and CI reductions are outpacing the current benchmark schedule. They both reach a 90% benchmark reduction in 2045 but have different rates of change in the interim years in order to provide analysis on the comparative cost and benefits of more rapidly declining benchmarks in early years as compared to later years.

While the overall benchmark schedule of the first alternative (based off proposals and stakeholder feedback) is more stringent than the baseline, it is less stringent than the proposed amendments and has a 3% step-down, achieving a 28% CI reduction in 2030. The second alternative (based off proposals and stakeholder feedback) is more aggressive than the proposed amendments and achieves a CI reduction target of 35% by 2030, after a 5% step-down and a linear compliance trajectory from 2025 to 2030. Both alternatives reach the same 90% CI reduction in 2045 as the proposed amendments but have different compliance curves from 2025-2045 to account for the difference in their 2030 targets, as shown in Figure 10 and Table 18. Although the scenarios reach the same end-goal of 90% CI reduction in 2045, Alternative 1 is the least stringent through 2030, while Alternative 2 reflects the higher costs of front-loading the stringency of the CI targets through 2030.

Figure 10: Carbon Intensity Compliance Curves for Each Alternative

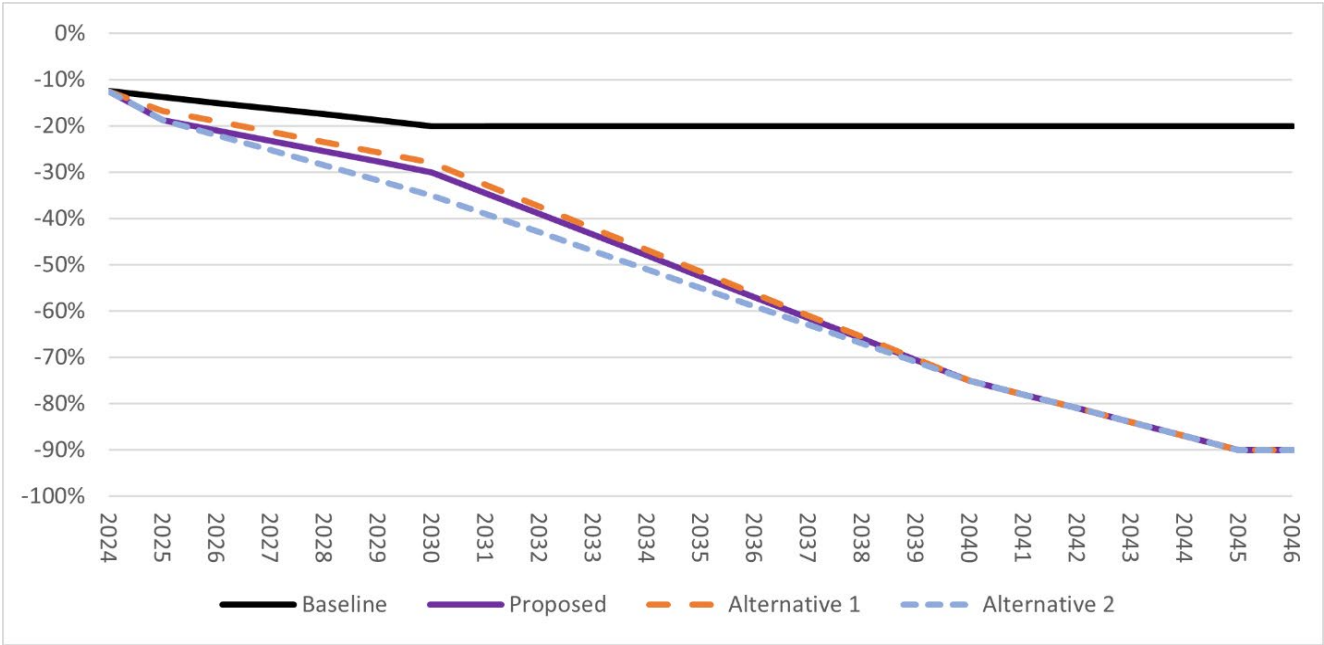


Table 18: CI Target Benchmark Percent Reduction for the Proposed Amendments and Alternatives

Year	Proposed Amendments	Alternative 1	Alternative 2
2024	12.5%	12.4%	12.4%
2025	18.75%	16.8%	18.6%
2026	21.0%	19.0%	21.9%
2027	23.25%	21.3%	25.2%
2028	25.5%	23.5%	28.5%
2029	27.75%	25.8%	31.7%
2030	30.0%	28.0%	35.0%
2031	34.5%	32.7%	39.0%
2032	39.0%	37.4%	43.0%
2033	43.5%	42.1%	47.0%
2034	48.0%	46.8%	51.0%
2035	52.5%	51.5%	55.0%
2036	57.0%	56.2%	59.0%
2037	61.5%	60.9%	63.0%
2038	66.0%	65.6%	67.0%
2039	70.5%	70.3%	71.0%
2040	75.0%	75.0%	75.0%
2041	78.0%	78.0%	78.0%
2042	81.0%	81.0%	81.0%

Year	Proposed Amendments	Alternative 1	Alternative 2
2043	84.0%	84.0%	84.0%
2044	87.0%	87.0%	87.0%
2045	90.0%	90.0%	90.0%
2046	90.0%	90.0%	90.0%

1. Alternative 1

Compared to the proposed amendments, Alternative 1 has a less stringent CI compliance curve before 2030. It then accelerates to meet the same 90% carbon reduction in 2045 but is more stringent than the baseline. Compared to the proposed amendments, this scenario is less stringent in the early years when aggressive CI reductions are expected to be more expensive and challenging to meet because some renewable fuel production has yet to reach economies of scale. Figure 11 shows the resultant low-CI fuel volumes.

Alternative 1 is more easily attainable given current supplies of low-CI fuels and requires fewer additional low-CI fuels in early years. Accordingly, Alternative 1 includes several policy mechanisms that have the effect of limiting the number of credits created from existing low-CI pathways. For example, Alternative 1 includes a complete phase out of light-duty battery electric forklifts from the program. Alternative 1 also includes a limit on total credits from diesel fuels or sustainable aviation fuel produced from virgin oil feedstocks. Figure 11 and Figure 12 depict the alternative fuel volume and total fuel mix for Alternative 1.

Figure 11: Low-CI Fuel Volumes in the Alternative 1 Scenario

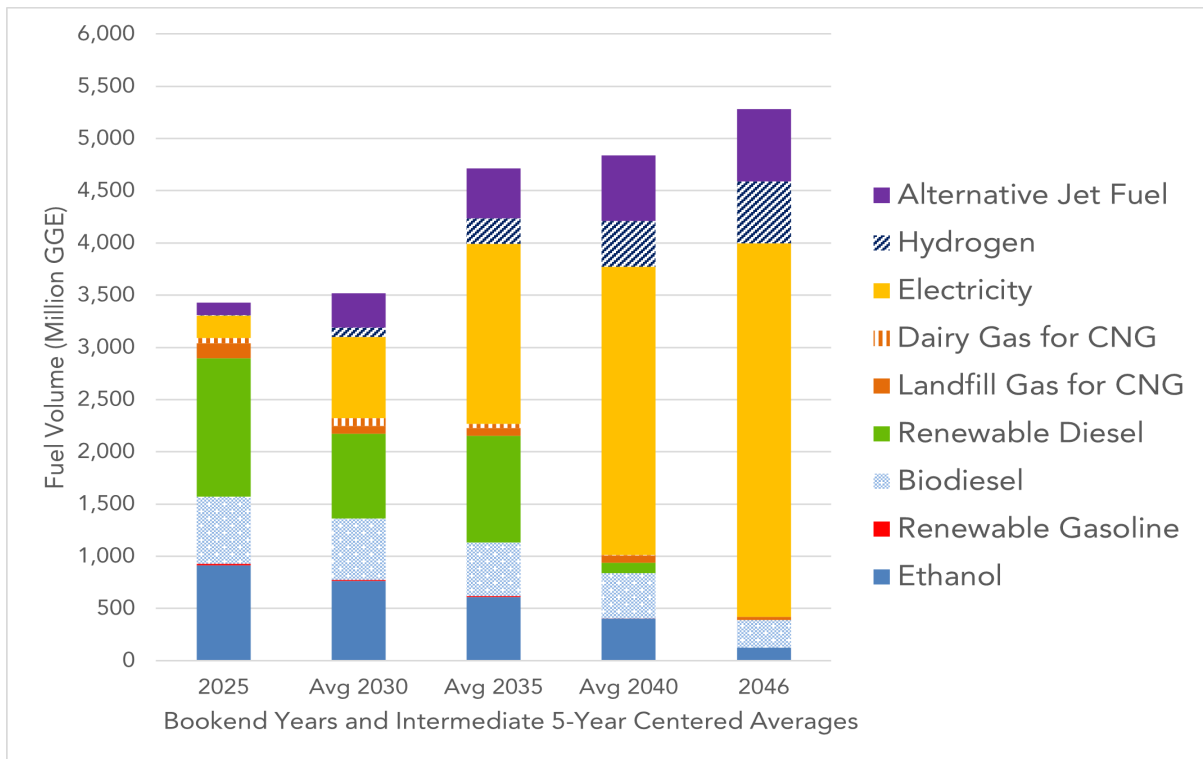
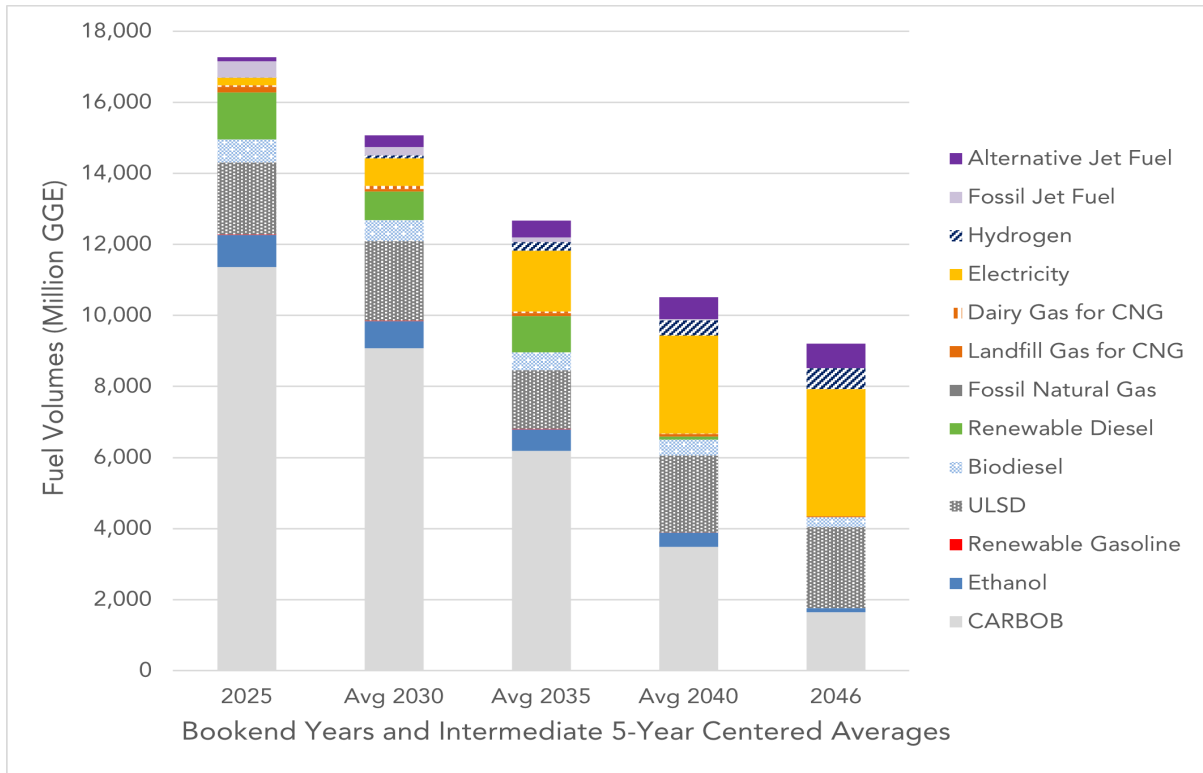


Figure 12: Fuel Mix – Alternative 1 Scenario



a) Costs

Alternative 1 has total costs of \$162 billion, approximately 1% more than the proposed amendments. The main reason is that diesel fuel is a larger part of the fuel mixture and continues generating large amounts of in-state deficits through 2046. This is because renewable diesel produced from virgin oil feedstock is phased out, waste oil feedstocks are used to produce alternative jet fuel, and more fossil diesel is needed to fuel the remaining vehicles with internal combustion engines. Credit revenues to low-carbon fuel producers in California are \$126 billion, 2% less than the proposed amendments.

Table 19: Estimated Total Direct Costs to California of Alternative 1 to Deficit Generators and on Statewide Fuel Expenditures Relative to Baseline (million 2021\$)

Year	Verification Cost	Purchasing Credits	Statewide Fuel Expenditures	Total Cost	Total Revenues	Net Cost
2024	18	736	10	764	508	255
2025	24	2617	107	2,748	1,906	843
2026	33	2915	176	3,124	2,241	883
2027	45	2636	259	2,941	1,930	1,011

Year	Verification Cost	Purchasing Credits	Statewide Fuel Expenditures	Total Cost	Total Revenues	Net Cost
2028	60	4138	262	4,459	3,275	1,184
2029	78	4395	206	4,678	3,604	1,074
2030	98	3077	123	3,299	2,633	665
2031	122	6196	158	6,475	5,214	1,261
2032	145	6507	240	6,893	5,678	1,215
2033	171	6713	340	7,223	5,877	1,346
2034	199	6800	374	7,373	6,117	1,257
2035	229	6837	378	7,444	6,259	1,185
2036	259	6770	387	7,416	6,292	1,124
2037	288	11407	343	12,038	10,478	1,560
2038	318	11953	298	12,569	10,158	2,411
2039	346	11966	281	12,594	9,819	2,775
2040	373	12024	270	12,667	8,280	4,387
2041	399	11383	265	12,047	9,692	2,355
2042	424	9158	261	9,843	7,721	2,122
2043	445	7542	240	8,227	6,175	2,051
2044	465	6138	231	6,834	4,865	1,969
2045	484	4958	-71	5,371	3,718	1,653
2046	503	4658	-70	5,091	3,595	1,496
Total	5,525	151,525	5,068	162,118	126,035	36,083

b) Benefits

i) Emissions

Alternative 1 reduces GHG emissions by 461 MMTCO₂e compared to the baseline scenario (as shown in Figure 13). This is approximately 18% fewer reductions than the proposed amendments. Accordingly, the social cost of carbon benefits for Alternative 1 from reduced CO₂e range from approximately \$12 to \$50 billion, values approximately 18% lower than the proposed amendments. Table 20 shows the change in NO_x and PM_{2.5} as compared to the baseline. Alternative 1 results in a reduction in cumulative NO_x emissions by 14,605 tons and a decrease in PM_{2.5} emissions by 1,508 tons. Compared to the proposed amendments, Alternative 1 increases NO_x emissions by an additional 10,981 tons and increases PM_{2.5} emissions by 2,773 tons. Alternative 1 has more NO_x and PM_{2.5} emissions than the proposed amendments because this scenario uses less renewable diesel than the proposed amendments.

Figure 13: Alternative 1 - GHG Emissions

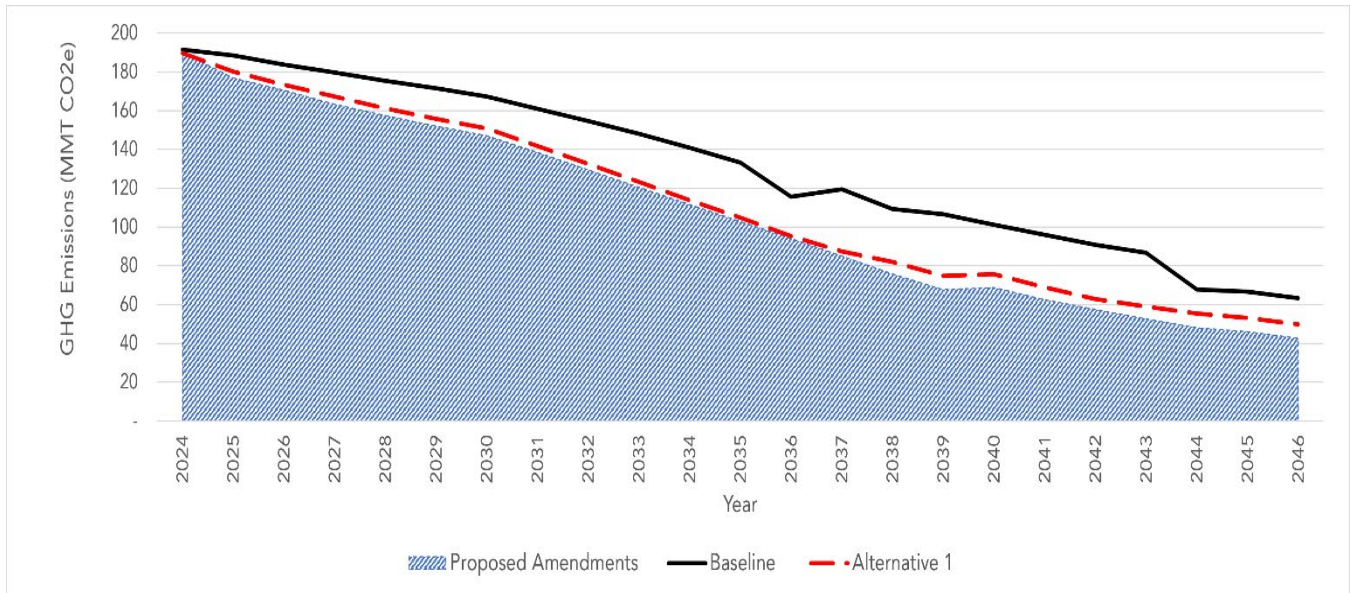


Table 20: Alternative 1 – NOx and PM2.5 Emission Changes (tons per day)

Year	NOx (tpd)	PM2.5 (tpd)
2024	-0.5	-0.1
2025	-1.2	-0.1
2026	-1.1	-0.1
2027	-2.0	-0.3
2028	-2.3	-0.3
2029	-1.5	-0.2
2030	-1.0	-0.1
2031	-0.8	0.0
2032	-1.7	-0.2
2033	-2.3	-0.3
2034	-2.8	-0.4
2035	-3.0	-0.4
2036	-3.2	-0.5
2037	-2.1	-0.3
2038	-1.0	-0.1
2039	-0.9	0.0
2040	-0.9	-0.1
2041	-1.0	-0.1
2042	-1.3	-0.2
2043	-1.9	-0.1
2044	-2.3	-0.1
2045	-2.5	-0.1
2046	-2.7	-0.1

ii) Health Benefits

Staff used the methods described in Chapter IV, to estimate avoided cardiopulmonary mortality, hospitalizations for cardiovascular illness and respiratory illness, and emergency room visits for respiratory illness and asthma that would be expected to result from implementing Alternative 1 when compared to the Baseline scenario. The results are presented in Table 21 for each California air basin. As shown in Table 22, Alternative 1 has a valuation of health benefits at \$1.58 billion compared to the proposed amendments with a valuation of \$4.98 billion, a difference of \$3.4 billion less in health benefits. The lower avoided health impacts of Alternative 1 are primarily associated with increases in PM_{2.5} over the baseline due to lower utilization of renewable diesel.

Table 21: Alternative 1 - Avoided Mortality and Morbidity Incidents from 2024 to 2046

Air Basin	SC	SCC	SJV	SFB	SD	Statewide
Cardiopulmonary Mortality	48 (27 - 67)	6 (3 - 8)	30 (17 - 43)	12 (6 - 17)	13 (7 - 18)	119 (66 - 168)
Hospitalizations for Cardiovascular Disease	9 (7 - 12)	1 (1 - 2)	6 (4 - 7)	2 (2 - 3)	3 (2 - 4)	24 (17 - 30)
Cardiovascular ED Visits	14 (-5 - 32)	1 (-1 - 3)	7 (-3 - 17)	4 (-1 - 8)	3 (-1 - 8)	32 (-12 - 75)
Acute Myocardial Infarction	6 (2 - 15)	1 (0 - 2)	3 (1 - 8)	1 (1 - 4)	1 (0 - 4)	13 (5 - 36)
Hospitalizations for Respiratory Disease	1 (0 - 3)	0 (0 - 0)	1 (0 - 2)	0 (0 - 1)	0 (0 - 1)	4 (0 - 7)
Respiratory ED Visits	29 (6 - 59)	3 (1 - 6)	20 (4 - 41)	9 (2 - 18)	6 (1 - 13)	74 (14 - 153)
Lung Cancer Incidence	3 (1 - 5)	0 (0 - 1)	2 (1 - 3)	1 (0 - 2)	1 (0 - 2)	9 (3 - 14)
Asthma Onset	105 (102 - 109)	14 (13 - 14)	55 (53 - 57)	42 (40 - 43)	31 (29 - 32)	270 (260 - 280)
Asthma Symptoms	10,221 (-5,020 – 24,634)	1,248 (-610 – 3,021)	5,059 (-2,476 – 12,235)	3,585 (-1,749 – 8,695)	2,619 (-1,276 – 6,359)	24,920 (-12,197 – 60,258)
Work Loss Days	7,117 (6,012 – 8,176)	833 (703 - 959)	3,847 (3,247 – 4,423)	2,402 (2,025 – 2,763)	2,140 (1,804 – 2,463)	17,862 (15,077 – 20,538)
Hospitalizations for Alzheimer's Disease	15 (13 - 16)	2 (2 - 2)	12 (10 - 15)	5 (4 - 6)	9 (7 - 12)	47 (38 - 55)
Hospitalizations for Parkinson's Disease	2 (1 - 3)	0 (0 - 1)	2 (1 - 2)	1 (1 - 1)	1 (1 - 2)	7 (4 - 10)

Table 21 continued

Air Basins	SS	SV	NP	NC	NCC	Statewide
Cardiopulmonary Mortality	3 (2 - 5)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	1 (1 - 2)	119 (66 - 168)
Hospitalizations for Cardiovascular Disease	1 (0 - 1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	24 (17 - 30)
Cardiovascular ED Visits	1 (0 - 2)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 1)	32 (-12 - 75)
Acute Myocardial Infarction	0 (0 - 1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	13 (5 - 36)
Hospitalizations for Respiratory Disease	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	4 (0 - 7)
Respiratory ED Visits	3 (1 - 6)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	1 (0 - 3)	74 (14 - 153)
Lung Cancer Incidence	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	9 (3 - 14)
Asthma Onset	9 (8 - 9)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	5 (5 - 5)	270 (260 - 280)
Asthma Symptoms	785 (-382 - 1,908)	59 (-29 - 141)	-27 (13 - -67)	-30 (15 - -74)	425 (-207 - 1,032)	24,920 (-12,197 - 60,258)
Work Loss Days	583 (491 - 671)	13 (11 - 15)	-19 (-16 - -22)	-30 (-26 - -35)	293 (247 - 337)	17,862 (15,077 - 20,538)
Hospitalizations for Alzheimer's Disease	1 (1 - 1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 1)	47 (38 - 55)
Hospitalizations for Parkinson's Disease	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	7 (4 - 10)

Table 21 continued

Air Basin	MC	MD	LT	LC	GBV	Statewide
Cardiopulmonary Mortality	-1 (0 - -1)	7 (4 - 10)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	119 (66 - 168)
Hospitalizations for Cardiovascular Disease	0 (0 - 0)	1 (1 - 2)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	24 (17 - 30)
Cardiovascular ED Visits	0 (0 - 0)	2 (-1 - 4)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	32 (-12 - 75)
Acute Myocardial Infarction	0 (0 - 0)	1 (0 - 2)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	13 (5 - 36)
Hospitalizations for Respiratory Disease	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	4 (0 - 7)
Respiratory ED Visits	0 (0 - -1)	4 (1 - 8)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	74 (14 - 153)
Lung Cancer Incidence	0 (0 - 0)	0 (0 - 1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	9 (3 - 14)
Asthma Onset	-1 (-1 - -2)	12 (11 - 12)	1 (1 - 1)	0 (0 - 0)	0 (0 - 0)	270 (260 - 280)
Asthma Symptoms	-126 (61 - -305)	1,069 (-521 - 2,597)	40 (-20 - 98)	-2 (1 - -6)	-4 (2 - -10)	24,920 (-12,197 - 60,258)
Work Loss Days	-103 (-87 - -118)	757 (638 - 871)	37 (32 - 43)	-2 (-2 - -3)	-4 (-3 - -5)	17,862 (15,077 - 20,538)
Hospitalizations for Alzheimer's Disease	0 (0 - 0)	3 (2 - 3)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	47 (38 - 55)
Hospitalizations for Parkinson's Disease	0 (0 - 0)	0 (0 - 1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	7 (4 - 10)

Table 22: Alternative 1 Number of Avoided Health Outcomes and Valuation (million 2021\$)

Avoided Health Incident	2026	2030	2034	2038	2042	2046	Total
Cardiopulmonary Mortality	68	48	184	26	8	2	1,555
Hospitalizations for Parkinson's Disease	<1	<1	<1	<1	<1	<1	<1
Respiratory ED Visits	<1	<1	<1	<1	<1	<1	<1
Hospitalizations for Alzheimer's Disease	<1	<1	<1	<1	<1	<1	1
Hospitalizations for Cardiovascular Disease	<1	<1	<1	<1	<1	<1	<1
Cardiovascular ED Visits	<1	<1	<1	<1	<1	<1	<1
ER visits, respiratory	<1	<1	<1	<1	<1	<1	<1
Asthma Onset	<1	<1	2	<1	<1	<1	15
Asthma Symptoms	<1	<1	<1	<1	<1	<1	6
Lung Cancer Incidence	<1	<1	<1	<1	<1	<1	<1
Acute Myocardial Infarction	<1	<1	<1	<1	<1	<1	1
Work Loss Days	<1	<1	<1	<1	<1	<1	4
Total Valuation	69	49	187	26	8	2	1,583

c) Economic Impacts

Alternative 1 is less stringent than the proposed amendments since Alternative 1 uses less stringent CI targets, which in turn result in a smaller credit market overall and lower compliance costs. Lower compliance costs translate to a smaller overall effect on the California economy, but at the cost of not achieving as many GHG emissions reductions.

The macroeconomic impact analysis results shown in Table 23 indicate that Alternative 1 would result in more positive impacts on gross state product (GSP), personal income, employment (Figure 14), output (Figure 15) and private investment when compared to the proposed amendments, but that the impacts would still on average be negative for GSP, employment, and output. This trend is expected, as Alternative 1 is the least stringent in the earlier years of the program and makes up for this early lag by accelerating the rate of CI reductions in the later years of the program to achieve the same endpoint as the proposed amendments, 90% CI reduction in 2046. In general, the California economic indicators decline more in later years as achieving higher CI targets becomes more difficult and costly.

Table 23: Summary of Economic Impacts of Alternative 1

	GSP	GSP	Personal Income	Personal Income	Employment	Employment	Output	Output	Private Investment	Private Investment
Year	Change (2023M\$)	% Change	Change (2023M\$)	% Change	Change (2023M\$)	% Change	Change (2023M\$)	% Change	Change (2023M\$)	% Change
2026	236	0.00%	152	-0.01%	4,096	0.02%	-1,576	-0.02%	-28	0.00%
2030	-1,069	-0.05%	-106	-0.02%	-5,301	-0.02%	-5,345	-0.08%	-386	-0.06%
2034	-1,916	-0.05%	847	0.01%	-3,448	-0.01%	-7,377	-0.10%	99	0.01%
2038	-2,101	-0.06%	3,056	0.04%	-911	0.00%	-9,424	-0.12%	684	0.08%
2042	-4,804	-0.09%	1,088	0.00%	-9,442	-0.03%	-14,073	-0.16%	102	0.01%
2046	-5,023	-0.09%	-1,371	-0.05%	-12,909	-0.05%	-13,317	-0.14%	-752	-0.08%
Average	-2,283	-0.05%	657	0.02%	-1,388	0.00%	-7,351	-0.09%	324	0.04%

Figure 14: Alternative 1- Employment Impacts by Major Sector (Jobs)

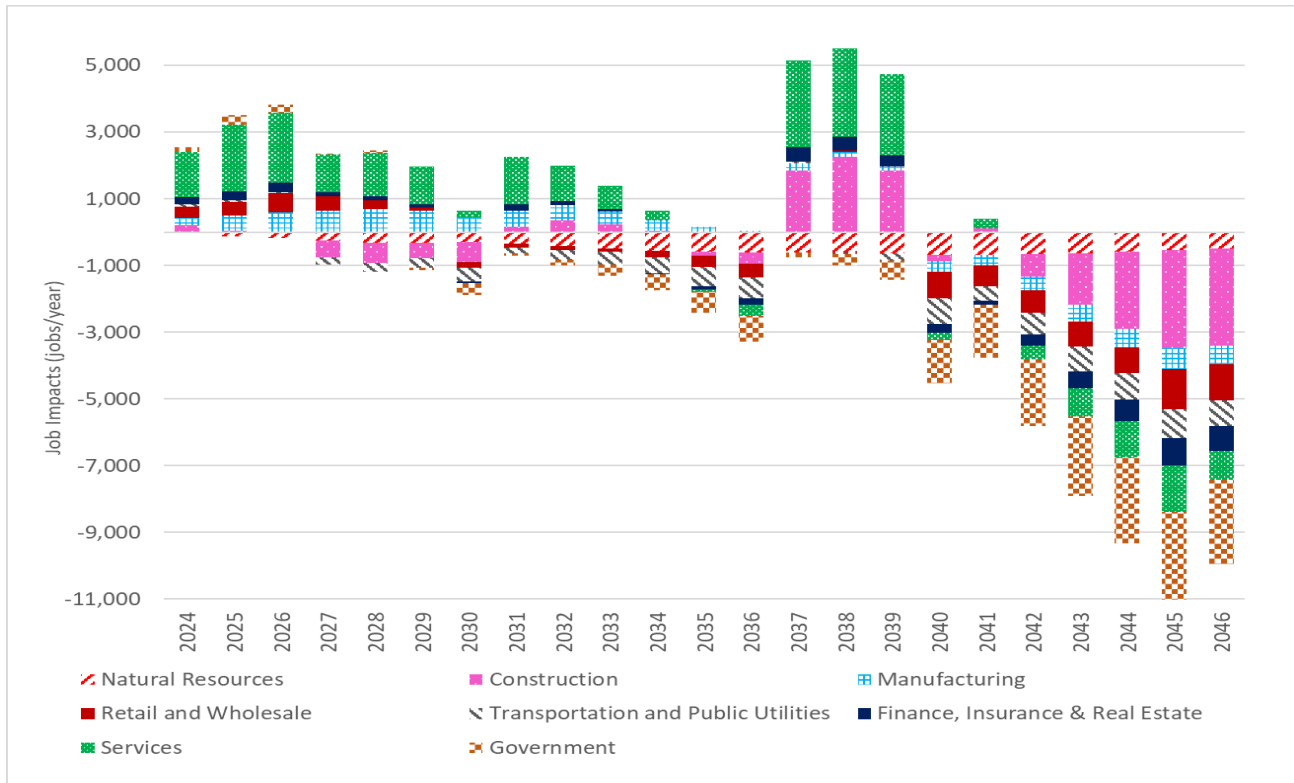
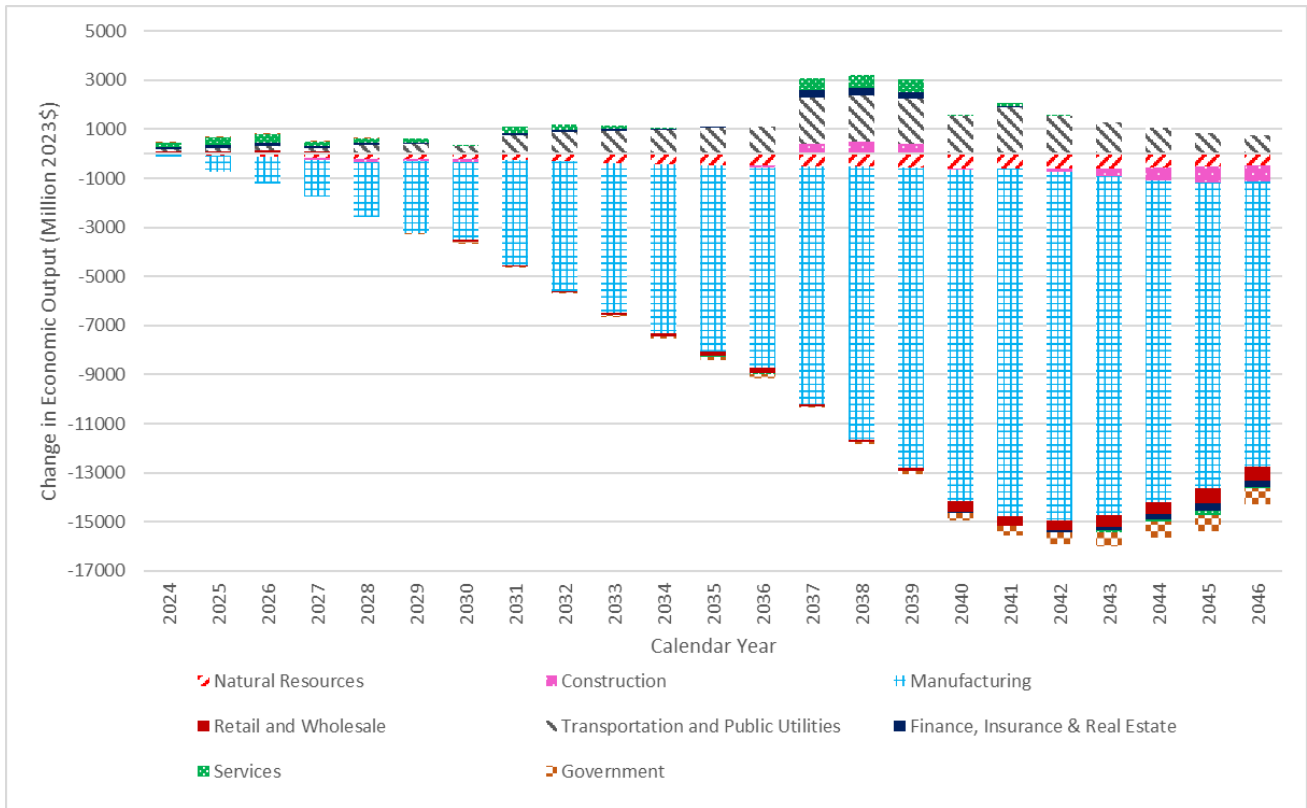


Figure 15: Alternative 1 - Change in Output by Major Sector (2023M\$)



d) Cost-Effectiveness

Alternative 1 has a cost effectiveness of \$78 per metric ton CO₂e, calculated as the net cost to California (relative to baseline) divided by the cumulative GHG reductions (relative to baseline). This is \$21 more per metric ton CO₂e than the proposed amendments, and results in 17% fewer GHG reductions.

e) Reason for Rejecting

Alternative 1 is rejected for several reasons. While all scenarios will ultimately achieve a 90% CI reduction by 2045, the Alternative achieves the fewest emissions reductions of the scenarios considered over the duration of the program, particularly in the near-term through 2030. As described in the 2022 Scoping Plan Update, near-term action is critical to achieving the Statewide 2030 GHG emissions reductions target, and this scenario does not support this goal. Alternative 1 also relies more heavily on fossil fuels and carbon dioxide removal technology than the proposed amendments. As a result, this Alternative does not achieve the same level of NO_x and PM_{2.5} emissions reductions as the proposed amendments and potentially exacerbates existing air quality challenges in the State.

2. Alternative 2

Alternative 2 has more stringent CI reduction targets from 2025 to 2030, then smaller increments until reaching 90% reduction in 2045, as compared to the proposed amendments (Table 18). As a result of the more stringent near-term CI targets, Alternative 2 results in higher credit prices and greater credit generation.

Increasing the pace of CI reductions in early years would require additional policies for credit generation to incentivize near-term investment. Alternative 2 does not include several of the credit limitations in the proposed amendments in order to free up supplies of low-carbon fuels to balance the market. Alternative 2 keeps the existing requirements for forklifts that are now commonplace and allows electric forklifts to continue to generate more credits into the future. In addition, Alternative 2 does not include a deliverability requirement for biomethane pathways that break ground after 2030. Lastly, Alternative 2 does not phase out crediting for biomethane pathways that break ground after 2030 – allowing those credits to continue to be generated for transportation use when the State is moving away from combustion technologies in the sector. Figure 16 and Figure 17 depict the alternative fuel volume and total fuel mix for Alternative 2.

Figure 16: Low-CI Fuel Volumes in the Alternative 2 Scenario

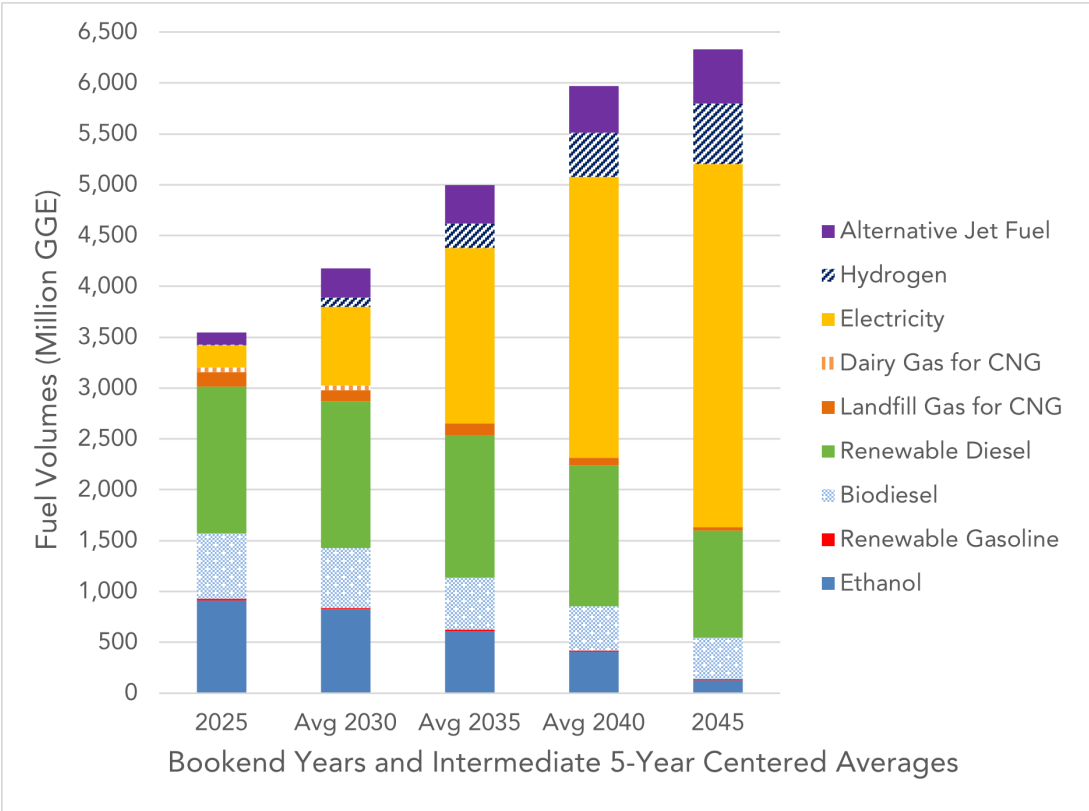
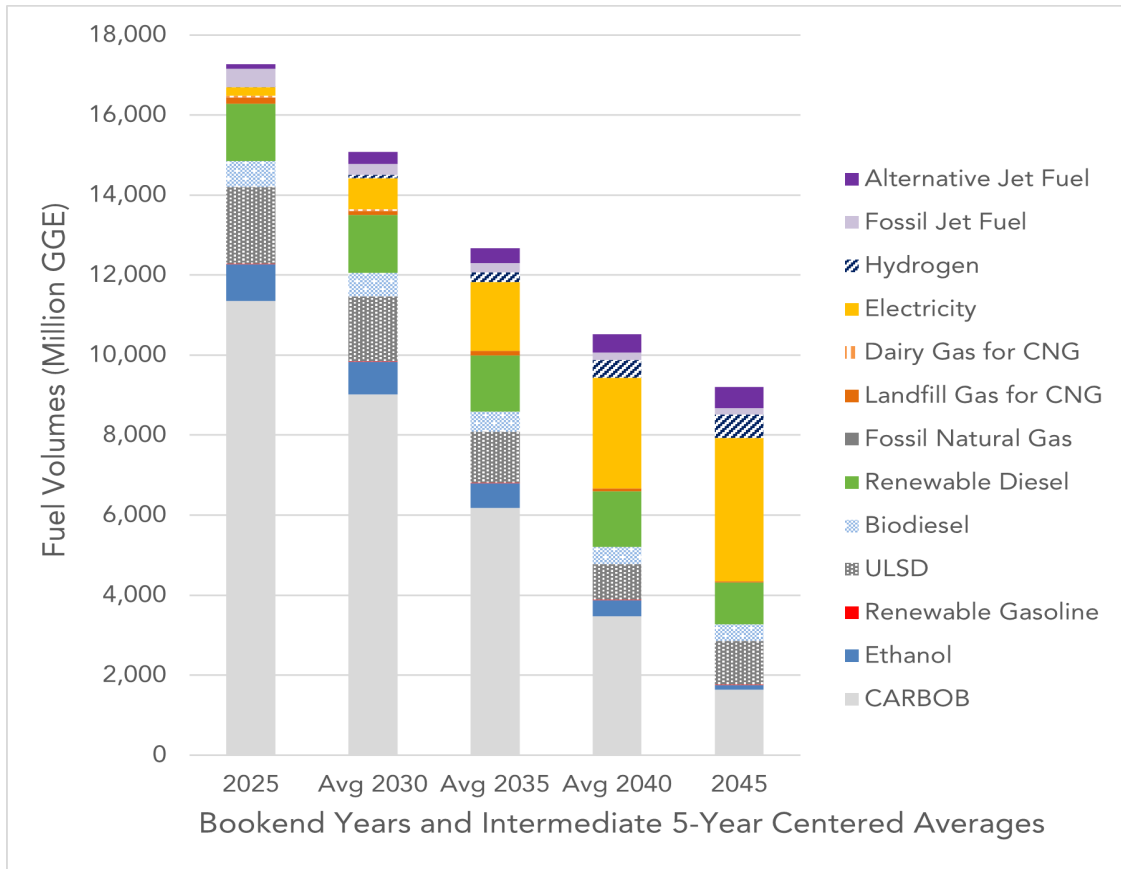


Figure 17: Fuel Mix – Alternative 2 Scenario



a) Costs

Alternative 2 costs approximately \$204 billion as compared to the baseline and 126% the cost of the proposed amendments. Credit prices in Alternative 2 are expected to be at the maximum allowable level for many years under this scenario. Credit revenues in California are \$190.8 billion as compared to the baseline and approximately 130% of the benefit of the proposed amendments, due to the increased stringency of the Alternative and the additional credits needed for compliance.

Table 24: Estimated Total Direct Costs to California of Alternative 2 to Deficit Generators and on Statewide Fuel Expenditures Relative to Baseline (million 2021\$)

Year	Verification Cost	Purchasing Credits	Statewide Fuel Expenditures	Total Cost	Credit Revenues	Net Cost
2024	18	1	-1	18	(54)	72
2025	24	4,601	119	4,745	3,487	1,257
2026	33	6,477	200	6,710	4,600	2,110

Year	Verification Cost	Purchasing Credits	Statewide Fuel Expenditures	Total Cost	Credit Revenues	Net Cost
2027	45	7,161	289	7,495	5,302	2,193
2028	60	9,380	382	9,822	7,081	2,741
2029	78	9,933	383	10,394	7,737	2,656
2030	98	10,353	387	10,838	8,408	2,429
2031	122	10,865	391	11,379	9,031	2,347
2032	145	11,235	396	11,776	9,510	2,266
2033	171	11,485	398	12,054	9,905	2,149
2034	199	11,675	401	12,275	10,423	1,852
2035	229	10,607	403	11,240	9,740	1,500
2036	259	9,975	397	10,631	9,260	1,371
2037	288	9,816	394	10,498	9,213	1,286
2038	318	9,397	402	10,117	8,981	1,135
2039	346	10,425	404	11,176	10,106	1,070
2040	373	10,094	403	10,870	9,574	1,296
2041	399	9,486	398	10,283	9,179	1,104
2042	424	7,962	377	8,763	7,500	1,264
2043	445	6,468	377	7,290	5,993	1,297
2044	465	5,131	377	5,973	4,608	1,366
2045	484	4,321	66	4,871	3,616	1,255
2046	503	4,021	66	4,591	3,436	1,155
Total	5,525	190,870	7,413	203,809	166,638	37,170

b) Benefits

i) Emissions

Social cost of carbon benefits of Alternative 2 from the scenario's 643 MMTCO₂e reduction (Figure 18) range from approximately \$17B to \$71B, as compared to the baseline. This is an average 16% greater valuation than the proposed amendments, since GHG reductions occur earlier and are valued more highly in the near term, as shown by the discount values in Table 3. As shown in Table 25, Alternative 2 results in decreased cumulative NO_x emissions by 28,030 tons and a decrease in PM_{2.5} emissions by 4,367 tons. As compared to the proposed amendments, Alternative 2 results in additional reductions of 2,445 tons of NO_x and 86 tons of PM_{2.5}. NO_x and PM_{2.5} emissions decrease further than the proposed amendments before 2040 since more renewable diesel enters the market.

Figure 18: Alternative 2 - GHG Emissions

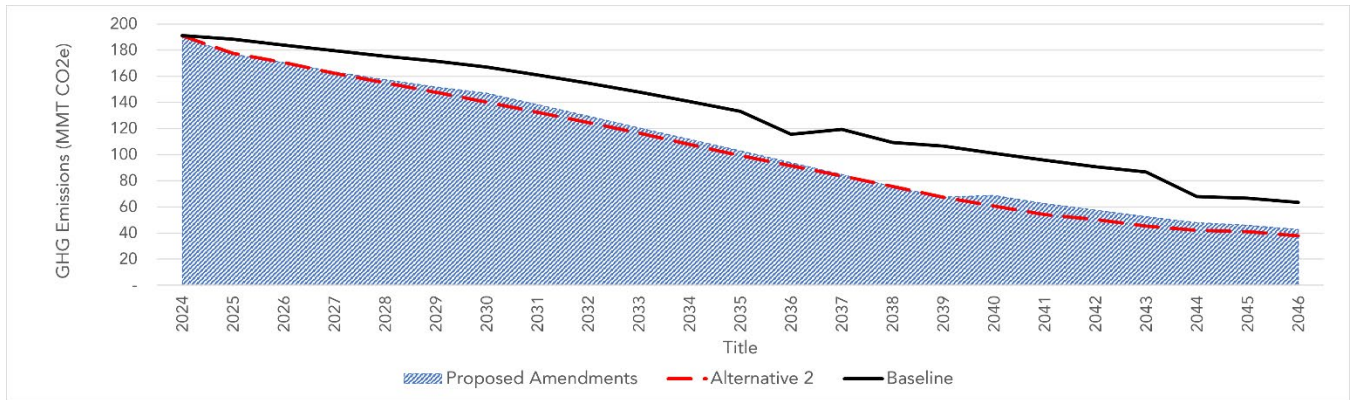


Table 25: Alternative 2 - NOx and PM2.5 Emission Changes (tons per day)

Year	NOx (tpd)	PM2.5 (tpd)
2024	-0.1	0.0
2025	-1.7	-0.2
2026	-2.2	-0.3
2027	-3.0	-0.4
2028	-3.5	-0.5
2029	-3.4	-0.5
2030	-3.7	-0.5
2031	-3.8	-0.5
2032	-3.7	-0.5
2033	-3.7	-0.5
2034	-3.7	-0.6
2035	-3.8	-0.6
2036	-3.6	-0.5
2037	-3.5	-0.5
2038	-3.8	-0.6
2039	-3.9	-0.6
2040	-3.9	-0.7
2041	-3.9	-0.7
2042	-3.5	-0.6
2043	-3.6	-0.6
2044	-3.6	-0.7
2045	-3.5	-0.6
2046	-3.6	-0.7

ii) Health Benefits

Staff used the methods described in Section IV to estimate avoided cardiopulmonary mortality, hospitalizations for cardiovascular illness and respiratory illness, and emergency room visits for respiratory illness and asthma that would be expected to result from implementing Alternative 2 when compared to the Baseline scenario. The results are presented in Table 26.

Alternative 2 has approximately a 11% higher valuation of health benefits at \$5.5 billion more than the baseline (Table 27), as compared to the proposed amendment at \$4.98 billion. The greater avoided health impacts of Alternative 2 are associated with additional decreases in both NO_x and PM_{2.5} over the baseline.

Table 26: Alternative 2 - Avoided Mortality and Morbidity Incidents from 2024 to 2046

Air Basins	SC	SCC	SJV	SFB	SD	Statewide
Cardiopulmonary Mortality	236 (131 - 337)	9 (5 - 13)	56 (31 - 80)	42 (23 - 60)	20 (11 - 29)	405 (224 - 578)
Hospitalizations for Cardiovascular Disease	48 (35 - 61)	2 (1 - 2)	11 (8 - 14)	9 (7 - 11)	5 (4 - 6)	83 (60 - 104)
Cardiovascular ED Visits	64 (-25 - 150)	2 (-1 - 5)	13 (-5 - 31)	12 (-5 - 29)	5 (-2 - 13)	109 (-42 - 253)
Acute Myocardial Infarction	27 (10 - 72)	1 (0 - 2)	6 (2 - 16)	5 (2 - 14)	2 (1 - 6)	46 (17 - 122)
Hospitalizations for Respiratory Disease	7 (0 - 14)	0 (0 - 0)	2 (0 - 3)	1 (0 - 2)	1 (0 - 1)	12 (0 - 24)
Respiratory ED Visits	135 (27 - 281)	5 (1 - 9)	36 (7 - 75)	31 (6 - 65)	10 (2 - 21)	244 (48 - 509)
Lung Cancer Incidence	17 (5 - 28)	1 (0 - 1)	4 (1 - 6)	4 (1 - 7)	2 (1 - 3)	30 (9 - 50)
Asthma Onset	538 (517 - 558)	22 (21 - 23)	104 (100 - 108)	149 (143 - 155)	49 (47 - 51)	954 (917 - 990)
Asthma Symptoms	46,196 (-22,537 - 112,061)	1,950 (-952 - 4,727)	9,287 (-4,534 - 22,511)	12,529 (-6,103 - 30,438)	4,165 (-2,029 - 10,118)	82,175 (-40,074 - 199,409)
Work Loss Days	33,357 (28,132 - 38,385)	1,326 (1,119 - 1,526)	7,118 (6,004 - 8,189)	8,554 (7,211 - 9,847)	3,408 (2,873 - 3,923)	59,701 (50,345 - 68,704)
Hospitalizations for Alzheimer's Disease	116 (89 - 140)	3 (2 - 4)	27 (20 - 32)	20 (15 - 24)	16 (12 - 19)	194 (148 - 236)
Hospitalizations for Parkinson's Disease	16 (8 - 22)	1 (0 - 1)	3 (2 - 5)	4 (2 - 5)	2 (1 - 2)	28 (15 - 40)

Table 26 continued

Air Basins	SS	SV	NP	NC	NCC	Statewide
Cardiopulmonary Mortality	7 (4 - 10)	12 (6 - 17)	0 (0 - 1)	1 (0 - 1)	3 (2 - 5)	405 (224 - 578)
Hospitalizations for Cardiovascular Disease	1 (1 - 2)	2 (2 - 3)	0 (0 - 0)	0 (0 - 0)	1 (0 - 1)	83 (60 - 104)
Cardiovascular ED Visits	2 (-1 - 5)	3 (-1 - 7)	0 (0 - 0)	0 (0 - 1)	1 (0 - 2)	109 (-42 - 253)
Acute Myocardial Infarction	1 (0 - 2)	1 (1 - 4)	0 (0 - 0)	0 (0 - 0)	0 (0 - 1)	46 (17 - 122)
Hospitalizations for Respiratory Disease	0 (0 - 0)	0 (0 - 1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	12 (0 - 24)
Respiratory ED Visits	6 (1 - 13)	7 (1 - 15)	0 (0 - 1)	1 (0 - 2)	3 (1 - 5)	244 (48 - 509)
Lung Cancer Incidence	1 (0 - 1)	1 (0 - 1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 1)	30 (9 - 50)
Asthma Onset	18 (17 - 18)	26 (25 - 27)	1 (1 - 1)	2 (2 - 3)	10 (10 - 11)	954 (917 - 990)
Asthma Symptoms	1,576 (-767 - 3,830)	2,269 (-1,105 - 5,512)	122 (-59 - 297)	195 (-95 - 475)	899 (-438 - 2,186)	82,175 (-40,074 - 199,409)
Work Loss Days	1,181 (995 - 1,359)	1,764 (1,487 - 2,031)	74 (63 - 86)	149 (125 - 171)	626 (528 - 721)	59,701 (50,345 - 68,704)
Hospitalizations for Alzheimer's Disease	2 (2 - 3)	3 (2 - 4)	0 (0 - 0)	0 (0 - 0)	1 (1 - 1)	194 (148 - 236)
Hospitalizations for Parkinson's Disease	1 (0 - 1)	1 (0 - 1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	28 (15 - 40)

Air Basins	MC	MD	LT	LC	GBV	Statewide
Cardiopulmonary Mortality	2 (1 - 2)	16 (9 - 22)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	405 (224 - 578)
Hospitalizations for Cardiovascular Disease	0 (0 - 0)	3 (2 - 4)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	83 (60 - 104)
Cardiovascular ED Visits	0 (0 - 1)	4 (-2 - 10)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	109 (-42 - 253)
Acute Myocardial Infarction	0 (0 - 0)	2 (1 - 5)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	46 (17 - 122)
Hospitalizations for Respiratory Disease	0 (0 - 0)	0 (0 - 1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	12 (0 - 24)
Respiratory ED Visits	1 (0 - 3)	9 (2 - 18)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	244 (48 - 509)
Lung Cancer Incidence	0 (0 - 0)	1 (0 - 2)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	30 (9 - 50)
Asthma Onset	5 (5 - 5)	27 (26 - 28)	1 (1 - 1)	0 (0 - 0)	1 (1 - 1)	954 (917 - 990)
Asthma Symptoms	457 (-222 - 1110)	2,387 (-1,162 – 5,800)	47 (-23 - 115)	36 (-17 - 86)	59 (-29 - 145)	82,175 (-40,074 – 199,409)
Work Loss Days	333 (281 - 384)	1,703 (1,436 – 1,960)	44 (37 - 51)	22 (18 - 25)	41 (35 - 48)	59,701 (50,345 – 68,704)
Hospitalizations for Alzheimer's Disease	0 (0 - 1)	6 (5 - 8)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	194 (148 - 236)
Hospitalizations for Parkinson's Disease	0 (0 - 0)	1 (0 - 1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	28 (15 - 40)

Table 27: Alternative 2 - Number of Avoided Health Outcomes and Valuation in Million 2021\$

Avoided Health Incident	2026	2030	2034	2038	2042	2046	Total
Cardiopulmonary Mortality	139	250	261	274	256	262	5,429
Hospitalizations for Parkinson's Disease	<1	<1	<1	<1	<1	<1	0
Respiratory ED Visits	<1	<1	<1	<1	<1	<1	0
Hospitalizations for Alzheimer's Disease	<1	<1	<1	<1	<1	<1	3
Hospitalizations for Cardiovascular Disease	<1	<1	<1	<1	<1	<1	2
Cardiovascular ED Visits	<1	<1	<1	<1	<1	<1	0
ER visits, respiratory	<1	<1	<1	<1	<1	<1	0
Asthma Onset	2	3	2	3	2	2	51
Asthma Symptoms	<1	1.04	<1	1	<1	<1	21
Lung Cancer Incidence	<1	<1	<1	<1	<1	<1	1
Acute Myocardial Infarction	<1	<1	<1	<1	<1	<1	4
Work Loss Days	<1	<1	<1	<1	<1	<1	12
Valuation (Million 2021\$)	142	255	266	279	260	267	5,524

c) Economic Impacts

Alternative 2 is more stringent than the proposed amendments since Alternative 2 includes more stringent CI targets, which in turn result in a larger credit market overall and greater deficit generation, leading to higher compliance costs. Higher compliance costs would lead to a larger overall effect on the California economy.

The macroeconomic impact analysis results shown in Table 28 indicate that Alternative 2 would result in more negative impacts on GSP, personal income, employment (Figure 19), output (Figure 20), and private investment growth when compared to the proposed amendments and the baseline due to the more stringent requirements.

Table 28: Summary of Economic Impact Indicators for Alternative 2

	GSP	GSP	Personal Income	Personal Income	Employment	Employment	Output	Output	Private Investment	Private Investment
Year	Change (2023M\$)	% Change	Change (2023M\$)	% Change	Change (2023M\$)	% Change	Change (2023M\$)	% Change	Change (2023M\$)	% Change
2026	-799	-0.02%	-1,271	-0.04%	-1,362	-0.01%	-2,875	-0.04%	-368	-0.06%
2030	-3,223	-0.08%	-1,095	-0.03%	-7,908	-0.03%	-9,184	-0.13%	-483	-0.07%
2034	-4,381	-0.10%	-98	0.00%	-8,669	-0.03%	-12,857	-0.18%	18	0.00%
2038	-5,586	-0.12%	-981	-0.02%	-13,369	-0.05%	-15,375	-0.19%	-234	-0.03%
2042	-6,531	-0.13%	-2,505	-0.05%	-16,840	-0.06%	-17,120	-0.20%	-620	-0.07%
2046	-6,232	-0.11%	-4,652	-0.09%	-17,867	-0.06%	-15,237	-0.16%	-1,279	-0.13%
Average	-4,251	-0.09%	-1,495	-0.03%	-10,405	-0.04%	-11,654	-0.15%	-429	-0.05%

Figure 19: Alternative 2 - Employment Impacts by Major Sector (jobs)

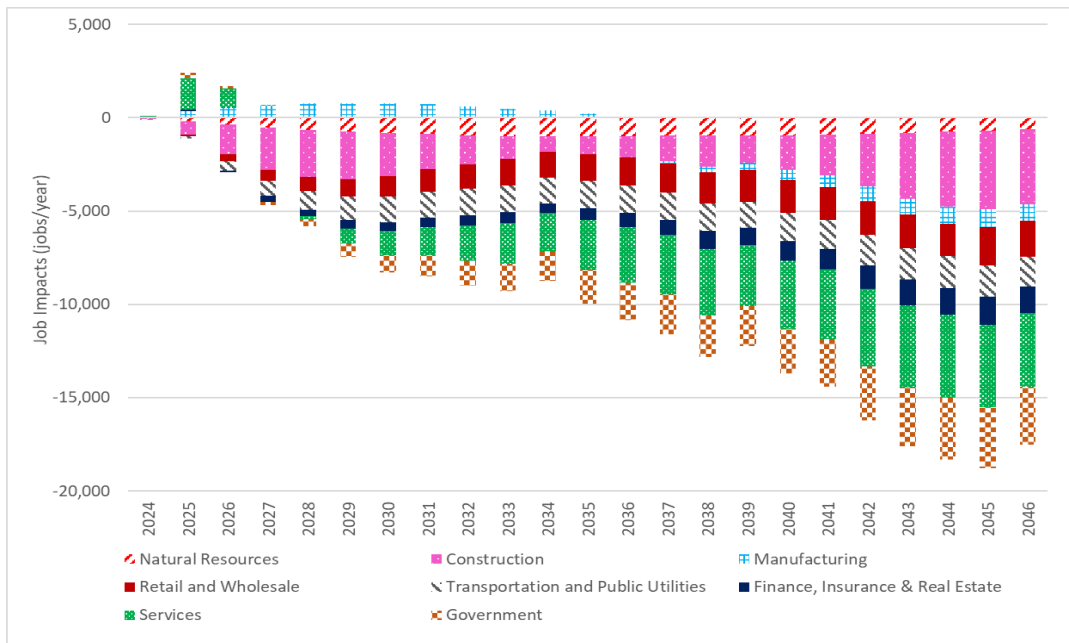
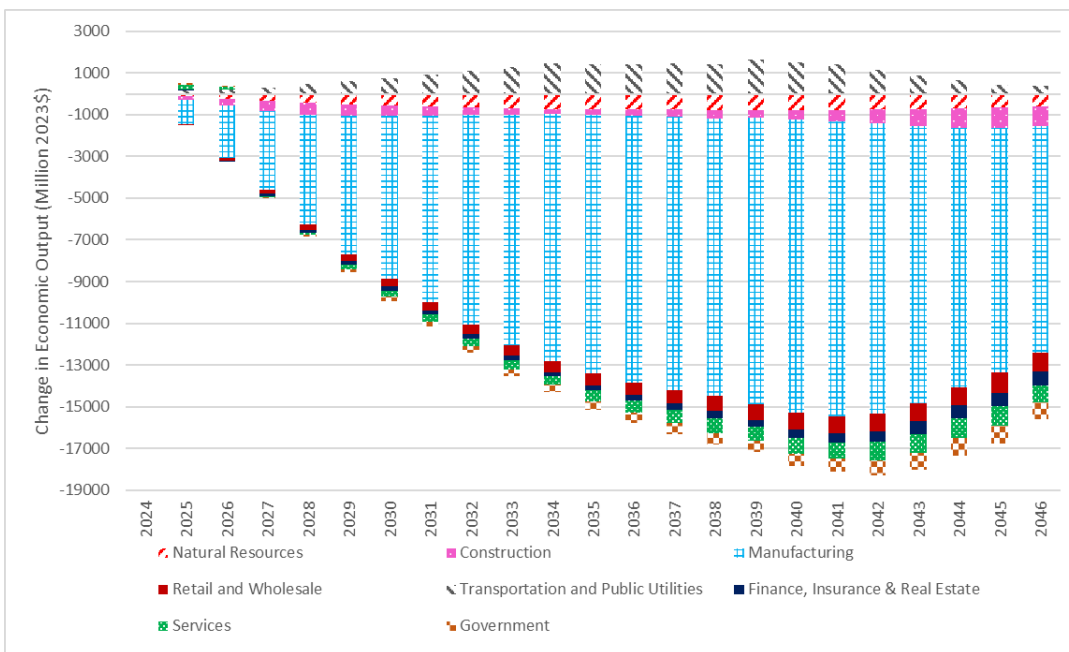


Figure 20: Alternative 2 - Change in Output by Major Sector (2023M\$)



d) Cost-Effectiveness

Alternative 2 has a cost effectiveness of \$58 per metric ton CO_{2e}. This is similar to the proposed amendments due to higher GHG reductions balanced against higher overall cost.

e) Reason for Rejecting

Alternative 2 was rejected for several reasons. First, the scenario is less feasible to achieve than the proposed amendments due to the more stringent near-term CI targets through 2030. Credit prices in this scenario are projected to be at or near the maximum and would quickly trigger advanced crediting requirements if low-carbon fuels are not produced at projected volumes. To achieve these near-term emission reductions, Alternative 2 also necessitates removing several important policy inputs in the proposed amendments, such as updates to the forklift crediting methodology and changing requirements for biomethane. Pursuing faster CI target reductions at the expense of these and other provisions would counteract the broader energy transition that is identified in the approved 2022 Scoping Plan Update. Lastly, the credit prices in Alternative 2 are higher than the proposed amendments and may place additional near-term burden on consumers of fossil fuels at the retail level.

3. Comparison of Costs and Benefit

Table 29: Comparison of Costs and Benefits of Proposed Amendments and Alternatives

	Revenue from LCFS Credit Sales (Million 2021\$)	Health Benefits*	Total Benefits	Total Costs (Million 2021\$)	Net Costs* (Million 2021\$)	Total GHG Reduction (MMT CO2e)	CE* (\$/MT CO2e)
Proposed Amendments	128,416	4,977	133,393	160,531	32,115	558	58
Alternative 1	126,035	1,583	127,618	162,118	36,083	461	78
Alternative 2	166,638	5,524	172,162	203,809	37,171	643	58

*Health benefits are not included in the net cost, nor in the cost-effectiveness metrics

B. Other Concepts

1. Comprehensive Environmental Justice Scenario

This scenario narrows LCFS crediting opportunities to reduce impacts from the production of lipid-based biofuels and manure-based fuels as well as prioritize direct greenhouse gas emissions in California. The scenario was proposed by CARB's Environmental Justice

Advisory Committee⁹⁵ and includes concepts recommended by environmental justice, environmental, health, animal rights, science-based advocacy, and political organizations.⁹⁶ Under this alternative, the following modifications would be made to the proposed LCFS regulation:

1. Eliminate avoided methane credits effective January 1, 2024.
2. Eliminate credit generation for pathways relying on the production of fuel from livestock and dairy manure for emissions reductions that otherwise would have occurred or were legally or contractually required to occur.
3. Cap the use of lipid biofuels (commonly known as crop-based fuels) at 2020 levels, about 855 million gallons, pending an updated risk assessment to determine phase out timelines for high-risk, crop-based feedstocks.
4. Prohibit enhanced oil recovery as an eligible sequestration method.
5. Do not issue LCFS credits for carbon removal projects such as Direct Air Capture.
6. Include intrastate jet fuel.

This scenario matches the proposed amendments with regard to the 2030 carbon intensity target. The provision to include intrastate jet fuel as a deficit generator is also aligned, though the proposed amendments provision begins in 2028 instead of 2025.

The 30% carbon intensity target in 2030, and the carbon intensity schedule generally, is not viable in this scenario due to the removal of substantial crediting pathways for both lipid biofuels and dairy biogas (both which are low-CI fuels). Due to limitations on lipid biofuels and dairy biogas, the Comprehensive EJ Scenario results in higher volumes of fossil diesel being used than any of the other scenarios evaluated. The limits on lipid biofuels, biomethane, and DAC also resulted in credit prices immediately reaching the maximum credit price in 2025 and remaining at the maximum levels for every year analyzed. Because credit generation is limited in this scenario, the modeling suggests that there would not be enough credits available for deficit holders to comply with the CI benchmarks. To resolve this modeling and compliance issue, CARB staff manually included additional banked credit supply into the modelling. Ultimately, this increase in banked credits is outside the bounds of the LCFS regulation as

⁹⁵ Environmental Justice Advisory Committee, *Draft Recommendations to the California Air Resources Board (CARB) on the Low Carbon Fuel Standard Regulation Updates*. August 27, 2023. <https://ww2.arb.ca.gov/sites/default/files/2023-08/EJAC%20DRAFT%20Low%20Carbon%20Fuel%20Standard%20Recommendations%20Version%202%20082823.pdf>

⁹⁶ Leadership Counsel for Justice and Accountability, Earthjustice, Animal Legal Defense Fund, Center on Race, Poverty & the Environment, Union of Concerned Scientists, Defensores Del Valle Central Para El Aire Y Agua Limpia, Santa Cruz Climate Action Network, Food & Water Watch, Center for Food Safety, Clean Water Action, California Environmental Voters, Asian Pacific Environmental Network, CleanEarth4Kids.org, 350 Ventura County Climate Hub, Communities for a Better Environment, Progressives for Democracy in America, Center for Community Action and Environmental Justice, Climate Action California, San Joaquin Valley Democratic Club, 350 Bay Area Action, Center for Biological Diversity, Central California Asthma Collaborative, Central Valley Air Quality Coalition, Center for Community Action Environmental Justice, Central California Environmental Justice Network, Physicians for Social Responsibility - Los Angeles, Valley Improvement Projects, and 350 Humboldt (may not be a comprehensive list).

there are no current or proposed regulatory mechanisms in the LCFS Regulation that would provide this level of additional banked credits. Figure 21 and Figure 22 depict the fuel volume and fuel mix for the Comprehensive EJ Scenario.

Figure 21: Low-CI Fuel Volumes in the Comprehensive EJ Scenario

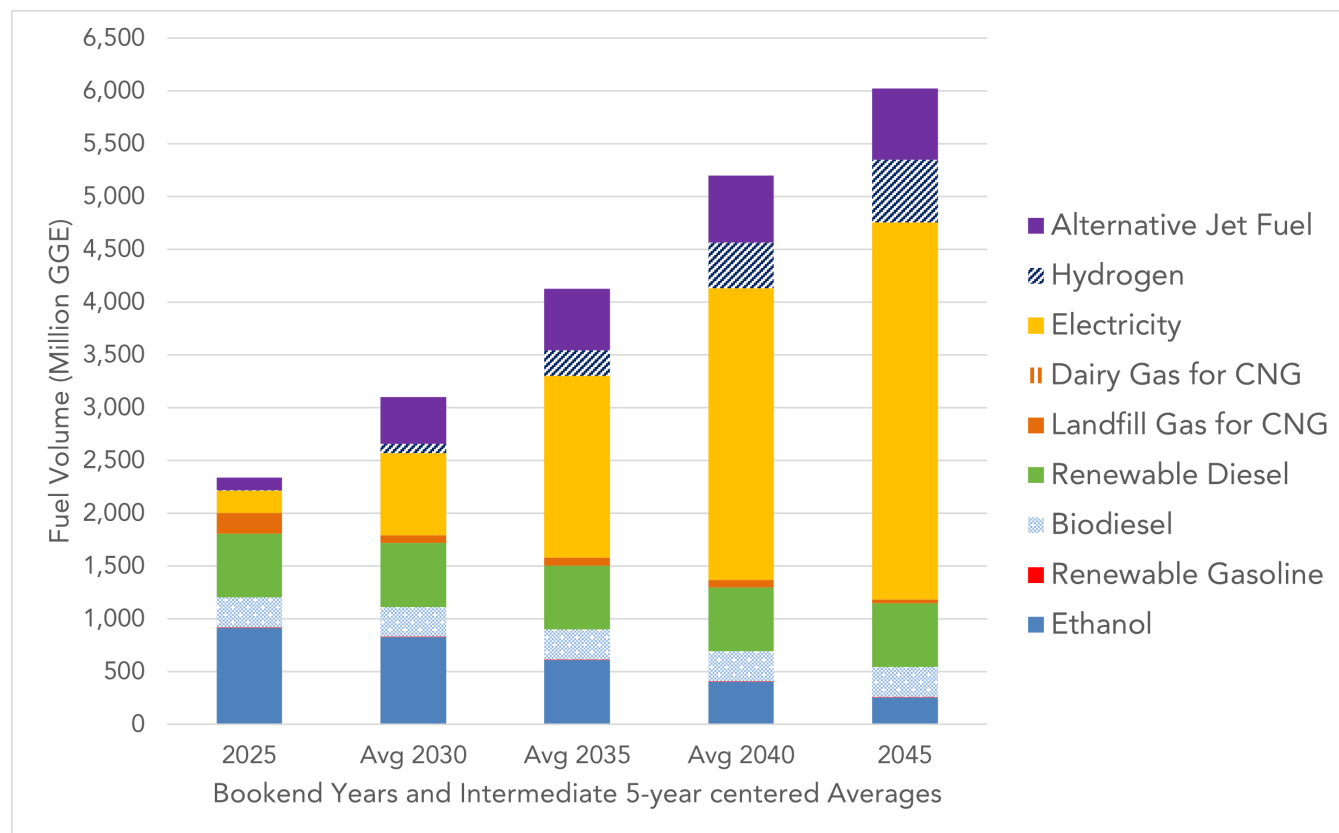
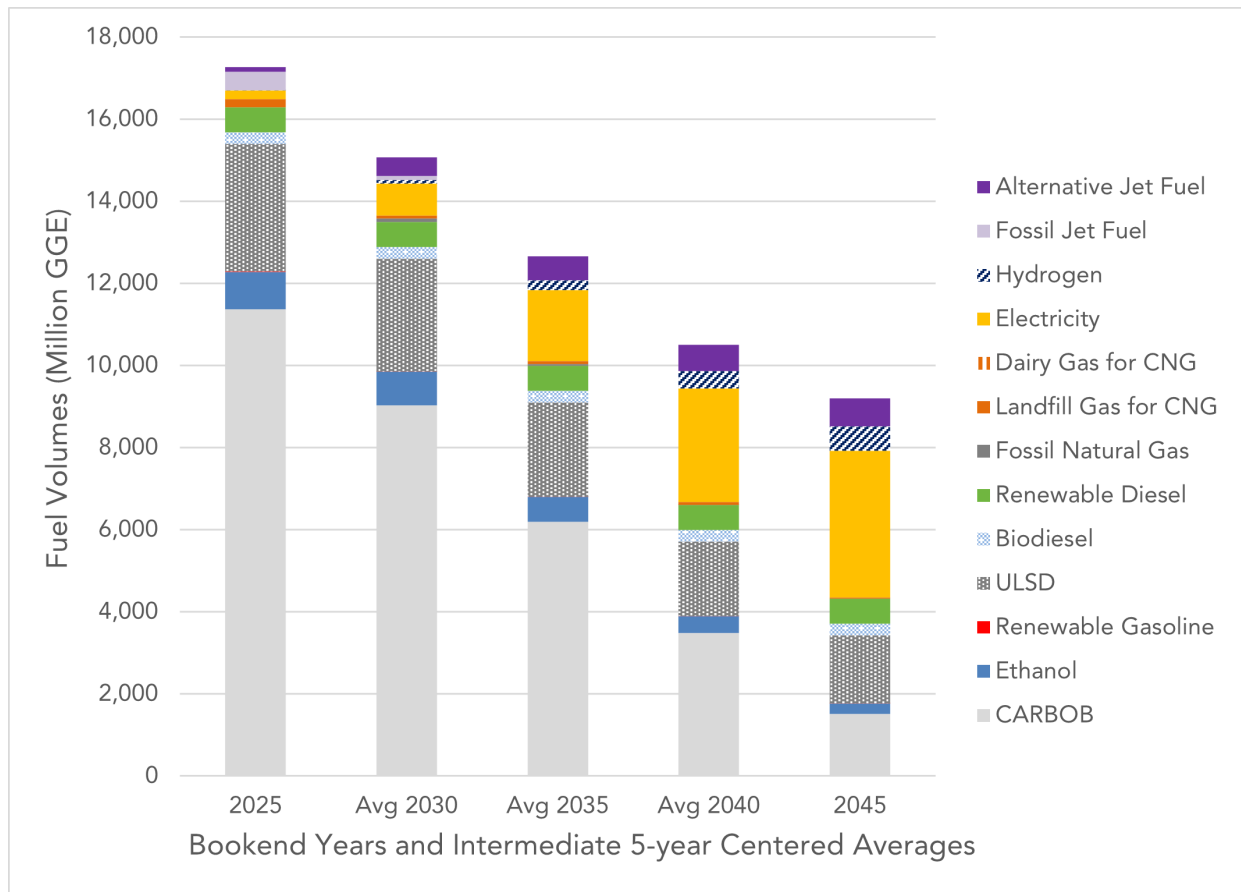


Figure 22: Fuel Mix - Comprehensive EJ Scenario



a) Costs

The scenario costs approximately \$240 billion and brings in revenues of about \$155 billion, as compared to the Proposed scenario's cost of \$160 billion and revenues of \$128 billion. The net cost is \$85 billion, while the proposed amendment's net cost is \$32 billion. The large net cost of this scenario is associated with higher credit prices and the demand for 76 billion banked credits by 2030 and 288 million banked credits between 2024 and 2046, which far exceeds the available quantity even under the credit clearance market.

b) Benefits

This scenario results in NO_x reductions of approximately 27,341 tons, PM_{2.5} increases of 1,350 tons, and GHG reductions of 386 MMT. The criteria pollutant emission changes are primarily due to lower amounts of biofuels entering the market; PM_{2.5} increases are due to fossil diesel being used instead of renewable diesel. NO_x decreases as compared to the proposed amendments are primarily due to smaller volumes of biofuel consumed which leads to lower emissions from biofuel production and biofuel transportation. This scenario results in greater GHG emissions than the proposed amendments due to a combination of fossil fuels

replacing biofuels, and zero-CI hydrogen and electricity replacing carbon negative hydrogen and electricity produced using dairy biomethane.

i) Health Benefits

Staff used the methods described in Appendix C-1 to estimate avoided cardiopulmonary mortality, hospitalizations for cardiovascular illness and respiratory illness, and emergency room visits for respiratory illness and asthma that would be expected to result from implementing the Comprehensive EJ Scenario when compared to the Baseline scenario. The results are presented in Table 30.

The Comprehensive EJ Scenario has approximately a 140% lower valuation of health benefits at \$1,970 million less than the baseline, as compared to the proposed amendment at \$4.98 billion more than baseline. The greater health impacts of Comprehensive EJ Scenario are associated with additional increases in both NO_x and PM_{2.5} over the baseline.

Table 30: Comprehensive EJ Scenario - Avoided Mortality and Morbidity Incidents from 2024 to 2046

Air Basin	SC	SCC	SJV	SFB	SD	Statewide
Cardiopulmonary Mortality	-128 (-70 - -185)	3 (2 - 4)	13 (7 - 18)	-23 (-13 - -33)	5 (3 - 7)	-151 (-82 - -219)
Hospitalizations for Cardiovascular Disease	-24 (-17 - -30)	1 (1 - 1)	3 (2 - 4)	-5 (-3 - -6)	1 (1 - 2)	-27 (-19 - -34)
Cardiovascular ED Visits	-35 (13 - -81)	1 (0 - 2)	3 (-1 - 7)	-7 (3 - -17)	1 (0 - 3)	-42 (16 - -98)
Acute Myocardial Infarction	-14 (-5 - -39)	0 (0 - 1)	1 (0 - 3)	-3 (-1 - -8)	1 (0 - 1)	-17 (-6 - -47)
Hospitalizations for Respiratory Disease	-4 (0 - -7)	0 (0 - 0)	0 (0 - 1)	-1 (0 - -1)	0 (0 - 0)	-4 (0 - -8)
Respiratory ED Visits	-73 (-14 - -152)	2 (0 - 3)	8 (2 - 17)	-18 (-4 - -37)	2 (0 - 5)	-93 (-18 - -194)
Lung Cancer Incidence	-10 (-3 - -17)	0 (0 - 0)	1 (0 - 1)	-2 (-1 - -4)	0 (0 - 1)	-12 (-4 - -21)
Asthma Onset	-324 (-311 - -338)	6 (6 - 7)	17 (16 - 17)	-94 (-90 - -98)	9 (9 - 9)	-440 (-421 - -458)
Asthma Symptoms	-26,300 (12,750 - -64,178)	629 (-309 - 1,512)	1,851 (-921 - 4,404)	-7,827 (3,806 - -19,046)	744 (-364 - 1,797)	-35,551 (17,222 - -86,818)
Work Loss Days	-18,345 (-15,447 - -21,141)	413 (349 - 474)	1,546 (1,310 - 1,772)	-5077 (-4,278 - -5,846)	721 (608 - 829)	-24,066 (-20,260 - -27,740)
Hospitalizations for Alzheimer's Disease	-75 (-54 - -95)	1 (1 - 1)	3 (3 - 2)	-11 (-8 - -14)	4 (3 - 4)	-84 (-60 - -108)
Hospitalizations for Parkinson's Disease	-9 (-4 - -14)	0 (0 - 0)	1 (0 - 1)	-2 (-1 - -3)	0 (0 - 1)	-11 (-5 - -17)

Table 30 continued

Air Basins	SS	SV	NP	NC	NCC	Statewide
Cardiopulmonary Mortality	0 (0 - 0)	-12 (-7 - -18)	-1 (-1 - -1)	-2 (-1 - -2)	0 (0 - 0)	-151 (-82 - -219)
Hospitalizations for Cardiovascular Disease	0 (0 - 0)	-2 (-2 - -3)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	-27 (-19 - -34)
Cardiovascular ED Visits	0 (0 - 0)	-3 (1 - -7)	0 (0 - 0)	0 (0 - -1)	0 (0 - 0)	-42 (16 - -98)
Acute Myocardial Infarction	0 (0 - 0)	-2 (-1 - -4)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	-17 (-6 - -47)
Hospitalizations for Respiratory Disease	0 (0 - 0)	0 (0 - -1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	-4 (0 - -8)
Respiratory ED Visits	0 (0 - 0)	-8 (-1 - -16)	-1 (0 - -2)	-1 (0 - -3)	0 (0 - 0)	-93 (-18 - -194)
Lung Cancer Incidence	0 (0 - 0)	-1 (0 - -1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	-12 (-4 - -21)
Asthma Onset	-1 (-1 - -2)	-29 (-28 - -30)	-3 (-3 - -3)	-5 (-5 - -5)	-1 (-1 - -1)	-440 (-421 - -458)
Asthma Symptoms	-136 (66 - -332)	-2,463 (1,198 - -5,992)	-242 (118 - -588)	-373 (182 - -908)	-82 (40 - -201)	-35,551 (17,222 - -86,818)
Work Loss Days	-69 (-58 - -79)	-1,855 (-1,563 - -2,136)	-146 (-123 - -168)	-285 (-241 - -329)	-43 (-36 - -50)	-24,066 (-20,260 - -27,740)
Hospitalizations for Alzheimer's Disease	0 (0 - 0)	-3 (-2 - -4)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	-84 (-60 - -108)
Hospitalizations for Parkinson's Disease	0 (0 - 0)	-1 (0 - -1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	-11 (-5 - -17)

Table 30 continued

Air Basins	MC	MD	LT	LC	GBV	Statewide
Cardiopulmonary Mortality	-3 (-2 - -4)	-2 (-1 - -3)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	-151 (-82 - -219)
Hospitalizations for Cardiovascular Disease	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	-27 (-19 - -34)
Cardiovascular ED Visits	-1 (0 - -2)	-1 (0 - -1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	-42 (16 - -98)
Acute Myocardial Infarction	0 (0 - 0)	0 (0 - -1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	-17 (-6 - -47)
Hospitalizations for Respiratory Disease	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	-4 (0 - -8)
Respiratory ED Visits	-2 (0 - -5)	-1 (0 - -3)	0 (0 - 0)	0 (0 - 0)	0 (0 - -1)	-93 (-18 - -194)
Lung Cancer Incidence	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	-12 (-4 - -21)
Asthma Onset	-9 (-9 - -10)	-5 (-4 - -5)	0 (0 - 0)	-1 (-1 - -1)	-1 (-1 - -1)	-440 (-421 - -458)
Asthma Symptoms	-815 (397 - -1,982)	-424 (206 - -1,032)	23 (-11 - 55)	-52 (25 - -126)	-83 (40 - -201)	-35,551 (17,222 - -86,818)
Work Loss Days	-590 (-497 - -679)	-270 (-227 - -311)	22 (19 - 25)	-32 (-27 - -37)	-56 (-47 - -65)	-24,066 (-20,260 - -27,740)
Hospitalizations for Alzheimer's Disease	-1 (-1 - -1)	-1 (-1 - -1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	-84 (-60 - -108)
Hospitalizations for Parkinson's Disease	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	-11 (-5 - -17)

Table 31: Comprehensive EJ Scenario - Number of Avoided Health Outcomes and Valuation in Million 2021\$

Avoided Health Incident	2026	2030	2034	2038	2042	2046	Total
Cardiopulmonary Mortality	-411	-151	-96	-27	38	86	-1,928
Hospitalizations for Parkinson's Disease	0	0	0	0	0	0	<-1
Respiratory ED Visits	0	0	0	0	0	0	<-1
Hospitalizations for Alzheimer's Disease	0	0	0	0	0	0	-1
Hospitalizations for Cardiovascular Disease	0	0	0	0	0	0	<-1
Cardiovascular ED Visits	0	0	0	0	0	0	<-1
ER visits, respiratory	0	0	0	0	0	0	<-1
Asthma Onset	-5	-2	-1	0	0	1	-24
Asthma Symptoms	-2	-1	0	0	0	0	-9
Lung Cancer Incidence	0	0	0	0	0	0	<-1
Acute Myocardial Infarction	0	0	0	0	0	0	-2
Work Loss Days	-1	0	0	0	0	0	-5
Total Valuation	-419	-154	-98	-27	38	87	-1,970

c) Cost Effectiveness

The cost effectiveness is \$220/MT GHG reduction, approximately \$162/MT more expensive than the proposed amendments.

d) Reason for Rejecting

This scenario is rejected because, relative to the proposed amendments, it would produce fewer GHG emissions reductions, have worse health outcomes, have the highest costs of any scenario, and create significant LCFS regulatory non-compliance risks.

Additionally, the Comprehensive EJ Scenario is also not responsive to the direction in the 2022 Scoping Plan Update, as capturing methane from dairies is one of the primary measures for achieving the state's 2045 greenhouse gas reduction targets⁹⁷ and SB 1383 methane reduction target.⁹⁸ Ending avoided methane crediting in 2025 could stop the development of new anaerobic digester projects and also cause operating digestors to shut down if the operational expense is greater than the value of the gas and other incentives received by the dairies. Without anaerobic digesters, California would not be able to meet its SB 1383 methane reduction goals. Additionally, eliminating biomethane pathways used to produce hydrogen may unduly restrict the development of low-CI hydrogen supply that California needs in order to displace fossil fuels. Increasing the supply of low-CI renewable hydrogen is a key strategy identified in the 2022 Scoping Plan Update and supports MDV and HDV ZEVs.

And finally, Direct Air Capture (DAC) is a key component of CARB's plan to reduce greenhouse gas emissions and meet carbon neutrality by 2045.⁹⁹ Eliminating credits for DAC projects would eliminate one of the key incentives to deploy this technology, and jeopardizes the feasibility of achieving California's long-term decarbonization targets and the 2045 carbon intensity target proposed under this project.

2. Accelerated Decarbonization Scenario - More Stringent

This alternative is based on a scenario proposed by a coalition of stakeholders that accelerates decarbonization by increasing the stringency of the 2030 CI target and excluding proposed project amendments that limit or phase out credit generation opportunities for certain

⁹⁷ California Air Resources Board, *2022 Scoping Plan for Achieving Carbon Neutrality*. November 16, 2022. <https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>

⁹⁸ California Air Resources Board, *Analysis of Progress toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions Target*. (Accessed on September 19, 2023). <https://ww2.arb.ca.gov/resources/documents/dairy-livestock-sb1383-analysis>

⁹⁹ California Air Resources Board, *2022 Scoping Plan for Achieving Carbon Neutrality*. 91-97. November 16, 2022. https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp_1.pdf

pathways.¹⁰⁰ The coalition proposed a CI target in the range of 40% by 2030, whereas the Proposed Project has a 30% by 2030 CI target. To meet this accelerated target, the coalition proposed no limitations on the volume of crop-based fuels in LCFS, increasing the use of ethanol in gasoline to 15% by volume, no phaseout of avoided methane and no deliverability requirements for biomethane. In addition, the coalition proposed inclusion and crediting of new credit generation opportunities for climate-smart agricultural practices to incentivize lower-CI fuel production. Under this alternative, the following changes would be made to the proposed LCFS amendments:

1. Increase CI reduction target to 40% in 2030 (from the 30% proposed);
2. Eliminate sustainability criteria for crop-based biofuels; and
3. No limitations on forklift crediting
4. No phase out of avoided methane crediting for biomethane pathways; and
5. No deliverability requirements for book-and-claim of biomethane generated outside of California.

The recommended credit generation opportunities for agricultural practices were not included in this alternative because there is not yet a mechanism within the LCFS for quantifying, verifying, and including greenhouse gas emissions reductions or soil-carbon sequestration from changes in individual farm-level management practices in LCFS fuel pathways. The recommended increase in ethanol volume to E15 was also not included because separate California fuel regulations currently limit ethanol use in gasoline to 10% by volume and changing these fuel regulations is outside the scope of this LCFS rulemaking.

¹⁰⁰ ICF Resources LLC, *Analyzing Future Low Carbon Fuel Targets in California: Initial Results for Accelerated Decarbonization, Central Case*. Submitted to Auto-Acceleration Mechanism for the Low Carbon Fuel Standard Public Comment Docket. June 30, 2023. <https://ww2.arb.ca.gov/form/public-comments/submissions/4306>

Figure 23: Low-CI Fuel Volumes in the Accelerated Decarbonization Scenario

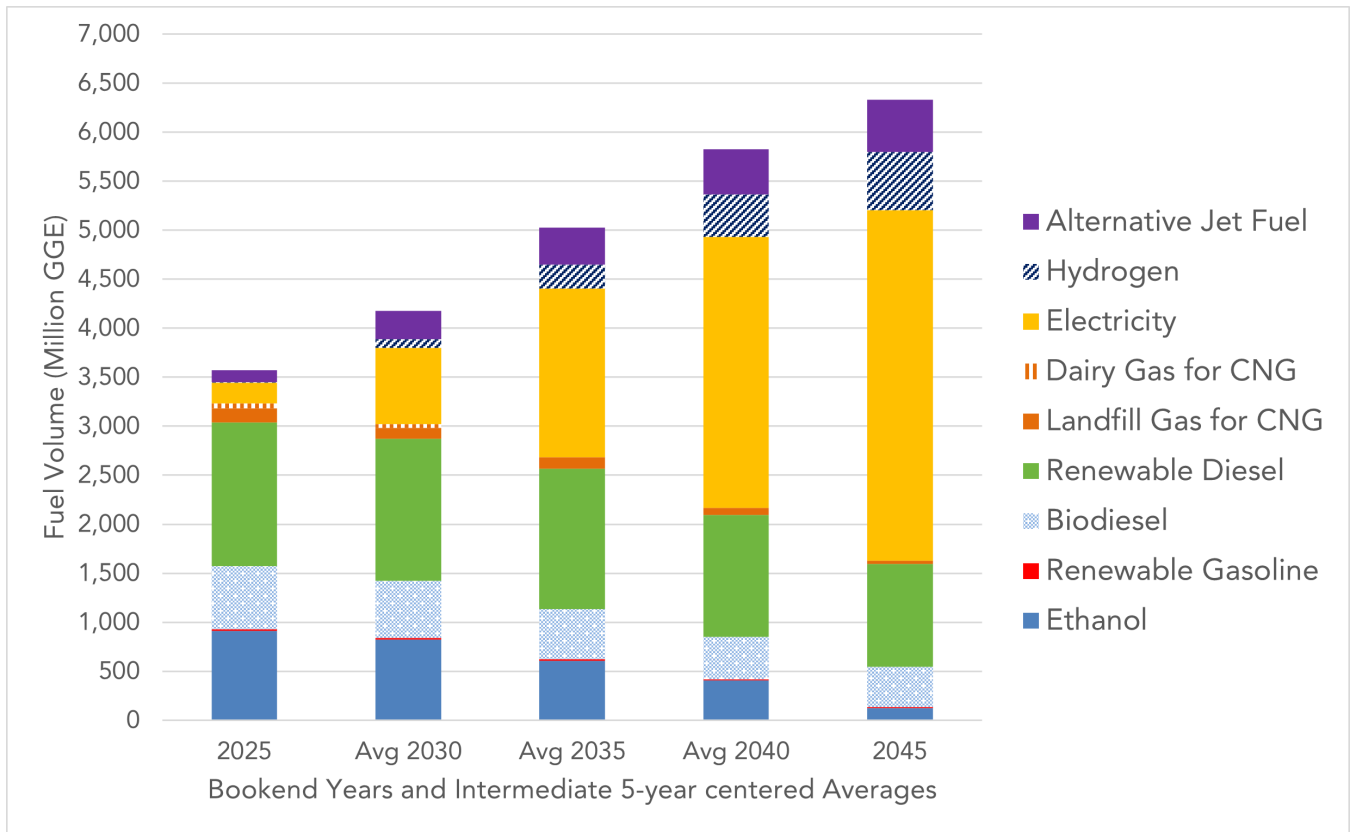
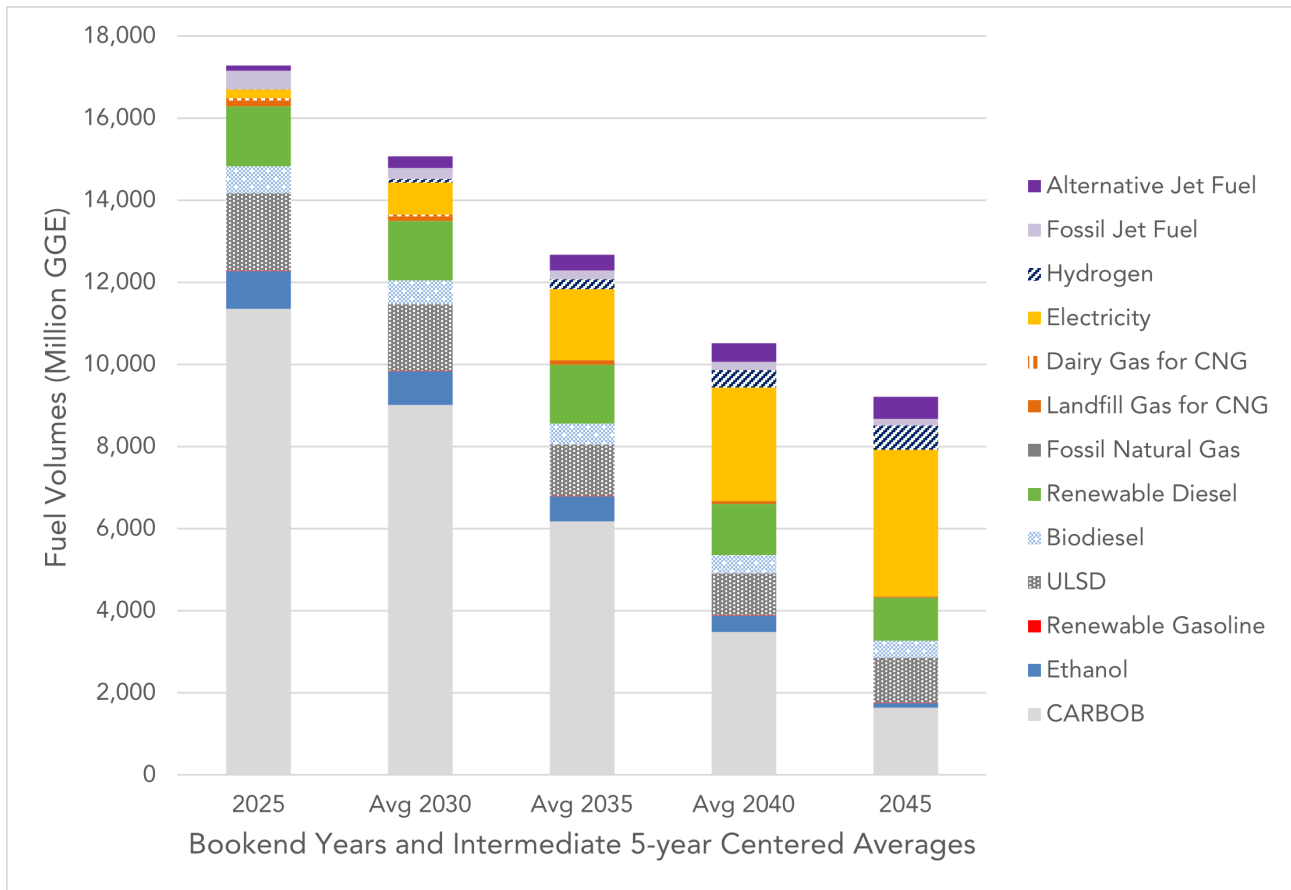


Figure 24: Fuel Mix – Accelerated Decarbonization Scenario



a) Costs

The scenario costs approximately \$194 billion and brings in revenues of about \$149 billion, as compared to the proposed amendment's cost of \$160 billion and revenues of \$128 billion. The net cost is \$45 billion, while the proposed amendment's net cost is \$32 billion. The larger net cost of this scenario is associated with higher credit prices and the demand for 40 billion banked credits by 2030 and 76 billion banked credits between 2024 and 2046, which far exceeds the available quantity even under the credit clearance market.

b) Benefits

This scenario results in NO_x reductions of approximately 27,531 tons (1,945 more tons reduced than the Proposed), PM_{2.5} decreases of 4,233 tons (47 more tons reduced than the Proposed), and GHG reductions of 847 MMT (289 MMT greater reductions than the Proposed). The criteria pollutant emission changes as compared to the proposed amendments are primarily due to higher amounts of renewable fuels used. This scenario results in fewer GHG emissions than the proposed amendments due to higher volumes of renewable diesel and low-CI hydrogen and electricity produced using dairy biomethane.

c) Cost-Effectiveness

The cost effectiveness is \$68/MT GHG reduction, approximately \$10/MT higher than the proposed amendments.

d) Reason for Rejecting

This scenario is rejected because it results in higher costs and increases the risk of LCFS regulatory non-compliance. This scenario also does not align with 2022 Scoping Plan's direction to reduce potential risks of crop-based biofuel impacts to forests and food-crops and to phase out pathways for low-CI combustion fuels used in the transportation sector, like biomethane, away from the transportation sector.

C. Small Business Alternative

The Board has not identified any reasonable alternatives that would lessen any adverse impact on small business, since staff do not expect small businesses to be directly impacted.

D. Performance Standards in Place of Prescriptive Standards

Government Code section 11346.2(b)(4)(A) requires that when CARB proposes a regulation that would mandate the use of specific technologies or equipment, or prescribe specific actions or procedures, it must consider performance standards as an alternative. The LCFS is a performance standard, and therefore this requirement is not applicable.

E. Health and Safety Code section 57005 Major Regulation Alternatives

CARB estimates the proposed regulation will have an economic impact on the State's business enterprises of more than \$10 million in one or more years of implementation. CARB will evaluate alternatives submitted to CARB and consider whether there is a less costly alternative or combination of alternatives that would be equally as effective in achieving increments of environmental protection in full compliance with statutory mandates within the same amount of time as the proposed regulatory requirements, as required by Health and Safety Code section 57005.

X. Justification for Adoption of Regulations Different from Federal Regulations Contained in the Code of Federal Regulations

There are no current federal regulations comparable to the LCFS regulation. The U.S. EPA implements a Renewable Fuels Standard (RFS) regulation that mandates the blending of specific volumes of renewable fuels into gasoline and diesel sold in the U.S. to achieve a specified ratio for each year (i.e., the renewable fuel standard). As defined, “renewable fuels” under the RFS superficially resembles the list of transportation fuels subject to the LCFS. However, there are a number of reasons why the RFS is not comparable to the LCFS.

Congress adopted the RFS in 2005 and recently strengthened and expanded it in June 2022. The RFS requires that 36 billion gallons of biofuels be sold annually by 2022, of which 21 billion gallons must be “advanced” biofuels and the other 15 billion gallons can be corn ethanol. The advanced biofuels are those that achieve at least 50% reduction from baseline life cycle GHG emissions, with a subcategory required to meet a 60% reduction target. These reduction targets are based on life cycle emissions, including emissions from land use changes. With the update to the RFS, standards for cellulosic biofuel, biomass-based diesel, advanced biofuel, and total renewable fuel were added for 2020 through 2022. U.S. EPA also established a 250-million-gallon “supplemental obligation” to the volumes finalized for 2022 and stated its intent to add another 250 million gallons in 2023.¹⁰¹ U.S. EPA is currently proposing volume requirements and percentage standards for 2023 through 2025.¹⁰²

The RFS volumetric mandate alone will not achieve the objectives of the LCFS. The RFS targets only biofuels and not other alternatives; therefore, the potential value of electricity, hydrogen, and natural gas are not considered in an overall program to reduce the carbon intensity of transportation fuels and would not align with the overall transition to zero emission technology defined in California’s regulations. In addition, the targets of 50% and 60% GHG reductions only establish minimum requirements for biofuels, without incentivizing continuous improvements. It assigns biofuels to a small number of fixed categories, without incentivizing innovations within categories. Finally, the GHG requirements do not apply to corn ethanol production plants that were existing and planned at the time of RFS adoption, thus providing no incentive for reducing the carbon intensity from these fuels.

By contrast, the LCFS regulates all transportation fuels, including biofuels and non-biofuels, with a few narrow and specific exceptions. Thus, non-biofuels such as electricity and hydrogen may play important roles in the LCFS program. In addition, the LCFS encourages greater

¹⁰¹ United States Environmental Protection Agency, *Final Volume Standards for 2020, 2021, and 2022*. (Updated on August 31, 2022). <https://www.epa.gov/renewable-fuel-standard-program/final-volume-standards-2020-2021-and-2022>

¹⁰² United States Environmental Protection Agency, *Proposed Renewable Fuel Standards for 2023, 2024, and 2025*. (Updated on February 2, 2023). <https://www.epa.gov/renewable-fuel-standard-program/proposed-renewable-fuel-standards-2023-2024-and-2025>

innovation than the federal program by recognizing and rewarding incremental improvements to the carbon intensity of biofuel supply chains and deployment of innovative technologies and other fuels with very low-carbon intensities.

If California were to solely rely on the RFS, the State would neither achieve the fuel carbon intensity goal called for in Executive Order S-01-07, nor the 2030 GHG reduction targets of SB 32 and AB 1279, nor support its ZEV regulations as the LCFS does, nor stimulate the innovation needed to support future dramatic GHG reductions from the transportation sector. The lack of infrastructure and clean fuels for medium- and heavy-duty vehicles could also put at risk the state's ability to meet its air quality targets under federal regulations. Because of these differences, the federal RFS regulation is complementary, but not comparable to staff's proposal.

Accordingly, the existing LCFS and proposed amendments are authorized by California law; and as explained in Chapter VIII, the cost of the LCFS regulations is justified by the anticipated and potential benefits to human health, public safety, public welfare, and the environment.

XI. Public Process for Development of the Proposed Action (Pre-Regulatory Information)

Consistent with Government Code sections 11346, subdivision (b), and 11346.45, subdivision (a), and with the Board's long-standing practice, CARB staff held public workshops and had other meetings with interested persons during the development of the proposed regulation. These informal pre-rulemaking discussions provided staff with useful information that was considered during development of the regulation that is now being proposed for formal public comment.

In this chapter, CARB staff provides a brief overview of the regulatory process and actions taken to develop the proposed amendments to the LCFS regulation.

Staff has been engaging with the public on potential future changes to the LCFS program for several years. Beginning in October 2020 and ending in August 2023 CARB staff conducted nine public workshops and two LCFS community meetings, in addition to numerous meetings with individual stakeholders to discuss concepts for potential amendments to the LCFS regulation and address various concerns. Notices for the workshops were emailed to subscribers of the "Low Carbon Fuel Standard Program" and "Fuels (General)" listservs at least two weeks in advance to give stakeholders ample time to attend and participate in the workshops. About 11,500 individuals or companies were notified for each workshop/hearing through the existing LCFS subscription lists. Details for public workshops and community meetings, including staff presentations were posted to CARB's LCFS Meetings and Workshop webpage¹⁰³ prior to the workshop. Staff presented concepts for public consideration during the workshops. Staff provided ample opportunity during the workshops for stakeholders to provide oral feedback and additional opportunity for stakeholders to provide written public feedback for at least two weeks following the workshops. This feedback played a key role in informing the proposed amendments and were also posted publicly on the LCFS Meetings and Workshop webpage. All workshops and community meetings were held virtually to allow for remote participation during the COVID-19 pandemic, which also allowed for wider participation. Staff also added community listening sessions, which has not been done before for the LCFS.

Meeting attendees included the following:

- Transportation fuel producers, providers, and importers,
- Environmental justice groups,
- Community members,
- Academia,
- Verification and certification bodies,
- Consultants, and

¹⁰³ California Air Resources Board, *LCFS Meetings and Workshops webpage*. (Accessed on November 30, 2023). <https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard/lcfs-meetings-and-workshops>

- Other interested persons.

These individuals participated by reviewing written material (i.e., preliminary draft regulations and other supporting documentation), providing data, and participating in workshops and meetings. Public input was used to inform and refine staff proposals, such as developing the acceleration mechanism and expanding the infrastructure crediting provision to the MHD sector. Staff also released the CATS model, which was used to evaluate the California fuel market to assess the technological and economic feasibility of bringing low-carbon fuels to California under various scenarios, with associated technical information for public review and input. Because of public input, the pre-rulemaking public process assisted staff in developing a better proposal. This also provided input on developing alternatives, as required under the Standardized Regulatory Impact Assessment (SRIA) process.

Staff's approach to public engagement follows the precedent of previous LCFS rulemakings. Following approval of the previous 2017 Scoping Plan Update set the path of meeting California's 2030 climate goals and was approved in 2017. In 2018, staff updated the LCFS to align with the 2017 Scoping Plan Update and the 2030 climate target. In May 2022, the draft 2022 Scoping Plan Update was released to identify a path and policies to achieve carbon neutrality and was brought to the Board for its first Board Hearing in June 2022. This release provided a concrete goal and initiated a process with which staff could engage to begin considering the pre- and post-2030 targets. Although the 2022 Scoping Plan Update was not complete at the time, staff started exploring what the LCFS could do to support California's long-term carbon neutrality goal with stakeholders through workshops, while working closely with the Scoping Plan team to ensure the LCFS aligned with policy direction provided by the final Scoping Plan. The 2022 Scoping Plan Update was approved in December 2022, which provided high-level direction on where the LCFS program needs to go into the future. This direction played a role in developing and finalizing the potential amendments discussed with stakeholders during public workshops and community meetings.

Table 32 lists dates for the public workshops that were held to apprise the public about potential future changes to the LCFS program and other related developments.

Table 32: LCFS Public Workshops

Workshop	Date	Location	Time	Number of Feedback Letters Received
Workshop to discuss potential regulation revisions	Day 1: October 14, 2020	Virtual via GoToWebinar	Day 1: 9am – 12pm	135
Day 1: Potential amendments to LCFS and potential revisions to OPGEE model	Day 2: October 15, 2020		Day 2: 9am – 1pm	
Day 2: Stakeholder suggestions				

Workshop	Date	Location	Time	Number of Feedback Letters Received
Workshop to discuss guiding principles for potential future changes to LCFS program, including establishing post-2030 targets, phasing out petroleum projects, adding intrastate jet fuel, supporting hydrogen refueling infrastructure for MHD vehicles, and streamlining implementation	December 7, 2021	Virtual via GoToWebinar	9am – 12:30pm	106
Workshop to discuss potential changes to Crude Oil Carbon Intensity Estimation under the LCFS regulation	April 26, 2022	Virtual via GoToWebinar	9am – 10:30am	7
Workshop to discuss potential changes to the LCFS, including considerations for adjustments to compliance targets	July 7, 2022	Virtual via GoToWebinar	9am – 1pm	131
Workshop to discuss potential opportunities to streamline implementation and potential updates to emission factors, verification, and EV base credit methodology	August 18, 2022	Virtual via GoToWebinar	9am – 12pm	76
Workshop to discuss options for increasing stringency of the carbon intensity targets for 2030 and beyond, design of initial modeling scenarios, describe modeling approach, and soliciting alternatives	November 9, 2022	Virtual via GoToWebinar	9am – 1pm	155
Workshop to discuss potential credit generation opportunities that may affect carbon intensity targets, present preliminary fuel mix and cost outputs from CATS model, and present concepts related to streamlining implementation	February 22, 2023	Virtual via GoToWebinar	9am – 12pm (morning session) 12:30pm – 3pm (afternoon session)	154

Workshop	Date	Location	Time	Number of Feedback Letters Received
Workshop to discuss ways to design a mechanism that would accelerate the carbon intensity benchmarks if certain conditions are met.	May 23, 2023	Virtual via Zoom	9am – 12pm	43
Community meetings for community members to hear an overview of the LCFS program and provide input on potential future LCFS changes with CARB staff	May 31 and June 1, 2023	Virtual via Zoom	6pm – 8pm	16
Workshop to discuss LCFS modeling updates	August 16, 2023	Virtual via Zoom	9am – 11am	N/A

In addition, CARB staff participated in numerous stakeholder meetings sponsored by other parties, presenting information on the implementation of the existing program and exploring potential amendments.

During the original 2009 rulemaking process, staff created the LCFS website,¹⁰⁴ which has since been updated and improved, to increase public participation and enhance the information flow between CARB staff and interested parties. Since that time, staff has consistently made available online materials related to this rulemaking, including meeting presentations, preliminary draft regulatory language, and life cycle analysis models and tools used in assessing fuel and feedstock availability to inform the proposed carbon intensity benchmarks. The website also provides background information on the LCFS, workshop and meeting notices and materials, other GHG-related information, and links to other websites with related information. The website also includes feedback letters from stakeholders in response to staff's pre-rulemaking public workshops and community meetings that led to the proposed amendments.

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XIII. Appendices

Appendix A: Proposed Regulation Order

Appendix A-1: Proposed Regulation Order (Proposed Sections for Amendments)

Appendix A-1.1: Alternative Format to Proposed Regulation Order

Appendix A-2: Proposed Regulation Order (Proposed Sections for Adoption)

Appendix B: CA-GREET4.0 Technical Documentation

Appendix C-1: Standard Regulatory Impact Assessment Submitted to the Department of Finance

Appendix C-2: Department of Finance Comment Letter

Appendix C-3: Summary of Department of Finance Comments to the Low Carbon Fuel Standard 2023 Amendments Standardized Regulatory Impact Assessment and CARB Responses

Appendix D: Draft Environmental Impact Analysis

Appendix E: Purpose and Rationale for Low Carbon Fuel Standards Amendments

Appendix F: Estimating Carbon Intensity Values for the Crude Lookup Table

Appendix G: List of References

FOOTNOTE 4
ATTACHMENT

California Low Carbon Fuel Standard Workshop

APRIL 10, 2024



Workshop Overview

- Morning, 9am-12pm
 - EJAC Presentation or Comments
 - Staff Presentation
 - LCFS support for CA climate, air quality, and ZEV goals
 - Rulemaking process and key concepts
 - Modeling updates and renewable diesel volume projections
 - Sustainability guardrails
 - Public comments (in-person and Zoom)
- Break, 12-1pm
- Afternoon
 - Public comments continued (in-person and Zoom)

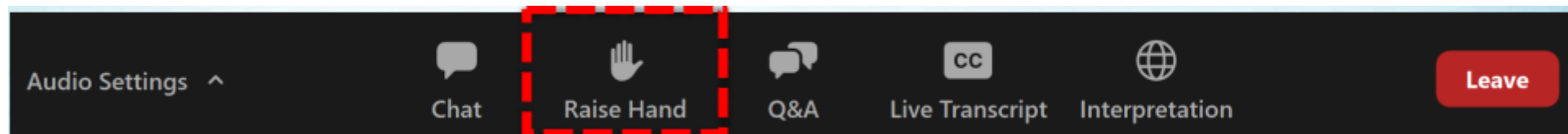
Public Comments

- Process

- Comments will be taken by in-person attendees and virtually through Zoom
- 3 minutes per comment
- Staff will make every effort to call on commenters in the order they signal they would like to comment or raise the hand on Zoom

- Zoom Orientation

- “Raise Hand” to signal that you’d like make a comment
- Zoom phone participants may dial #2 to raise your hand
- Staff will inform Zoom phone participants when they are unmuted during public comment
- Dial *6 to mute or unmute



The Road to Zero Emissions

CARB has put a roadmap in place to drastically reduce our dependence on petroleum in the transportation sector by 2045.

AB
32

Requires we cut GHGs.
To reach goals, fuel use
must be cut by 94%.



How cuts happen?
Zero emission cars, trucks and fuels.



ACT

ACC

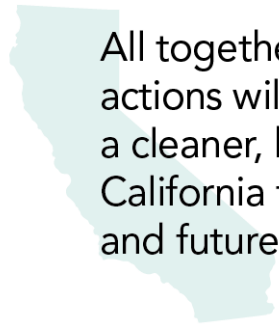
ACF

CARB rules that make that possible:
Advanced Clean Trucks, Advanced
Clean Cars, Advanced Clean Fleets

- ACT: Phases out sale of most fuel-powered trucks by 2035
- ACC: 100% ZEV sales requirement by 2035
- ACF: Requires that trucks in CA be zero emissions by 2045

LCFS

All together, these
actions will help us build
a cleaner, healthier
California for current
and future generations.



Governor Newsom creates
new oversight committee
to monitor oil companies



Makes fuel less polluting and encourages
production of cleaner alternatives

How it
works:

Dirty Fuel



Cleaner Fuel



Regulations Implement State Plans

- CARB's Core Long-term Planning Documents
 - State Implementation Plan (SIP) to achieve federal and state air quality goals
 - AB 32 Scoping Plan to achieve state climate targets
 - 2022 Scoping Plan Update builds on existing SIP to ensure alignment with air quality related actions
- ZEV regulations implement SIP and Scoping Plan
 - LCFS is included in analyses for ZEV regulations as part of economic support for ZEV deployment and operation
 - LCFS amendments proposed in 45-day package designed to support recently adopted ZEV regulations

LCFS Supports ZEV Regulations

- LCFS reduces costs of zero emission fuels, contributing to lower total cost of operation for ZEVs
 - Advanced Clean Cars II
 - Advanced Clean Trucks
 - Advanced Clean Fleets
- Other zero emission regulations
 - Shore power, cargo handling, forklifts, and transportation refrigeration units

LCFS Support for ZEV Regulations

Historical	Total credits (MT) Q1 2011 - Q3 2023	Value (\$) using avg. 2020-22 credit price
Dispensed electricity (non-residential EVSE)	6,300,000	\$1.07B
Dispensed hydrogen	190,000	\$3.98M
Sum of dispensed fuel	6,500,000	\$1.1B
Fast Charging Infra capacity credits	234,000	\$60M
HRI capacity credits	355,000	\$40M
Sum of HRI/FCI*	590,000	\$100M (credits even without dispensing fuel)
Proposed Amendments	Percent of total credits in 2045	Value (\$) using avg. 2020-22 credit price
Dispensed electricity	40%	\$3B
Dispensed hydrogen	5%	\$400M
Dispensed RNG, renewable diesel and biodiesel	0% (generates deficits)	NA

*HRI/FCI credit totals reflect current utilization. If fully utilized at 2.5% caps, ZEV infrastructure credit revenue could be 4-5x larger

LCFS Support for ZEV Infrastructure

Near-term aligned with ZEV Regulations

Proposed Amendments	Max credits (MT) at 2.5% each of deficits	Value (\$) using avg. 2020-22 credit price
HD HRI/FCI credits in 2030	2,100,000	\$357M
HD HRI/FCI credits in 2035	2,600,000	\$441M

Staff estimates that the proposed HD HRI/FCI provisions could pay for 1.5x the capital costs of **all** the fast chargers and hydrogen stations needed to meet the 2022 Scoping Plan vehicle populations, through 2030 and potentially through 2035

LCFS Long-term support for Alternative Fuels Aligned with ZEV Regulations

Proposed Amendments	Total Credits (net credits/deficits) 2025-2045	Value (\$) using avg. 2020-22 credit price
Dispensed electricity	606,000,000	\$103B
Dispensed hydrogen	34,000,000	\$5.8B
Dispensed renewable diesel and biodiesel	4,490,000	\$764M

Fossil fuels (gasoline and diesel) are deficit generators and do not generate credits in the LCFS. **Less than \$1 billion estimated for liquid non-fossil drop-in fuels between 2025 and 2045.**

LCFS Supports Transit & Clean Technology & Aligns with Other CARB Regulations

Historical	Total credits (MT)	Value (\$) using yearly average credit prices
Transit credits 2022	302,000	\$36M
Total transit credits (Q1 2011 through Q3 2023)	2,750,000	\$341M

Historical	Total credits (MT) Q1 2011 through Q3 2023	Value (\$) using avg. 2020-22 credit price
Fixed guideways	1,780,000	\$303M
Shore power for ocean going vessels at berth	1,100,000	\$188M
Cargo handling equipment	200,000	\$34M
Forklifts	5,900,000	\$1B
Transport Refrigeration Units	122,000	\$21M

Historical LCFS Credit and Retail Fuel Prices Counters Fossil Industry Narrative

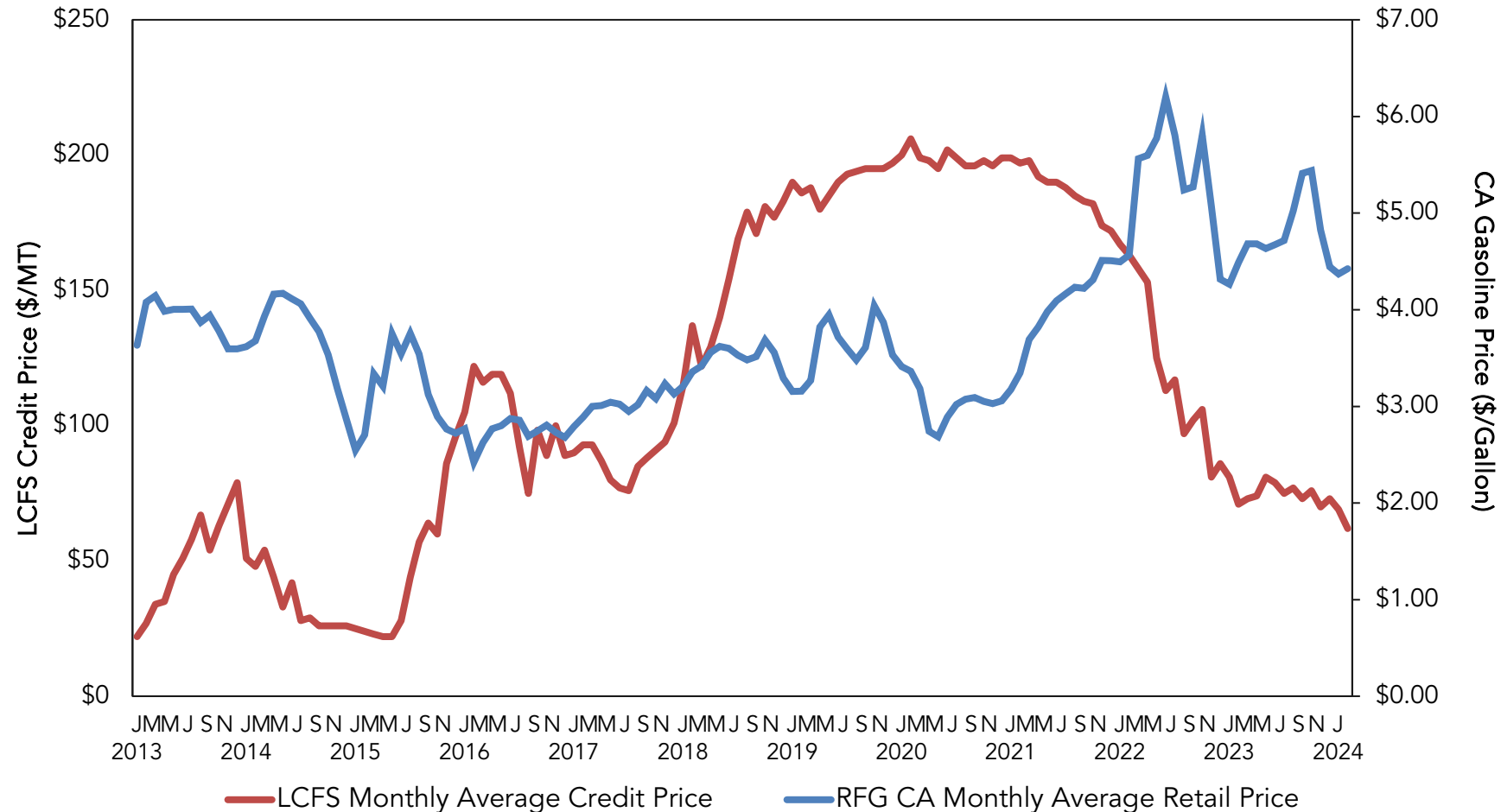


Chart is created by CARB and updates a version provided in the paper referenced below.

"An assessment of observed market prices shows conclusively that the LCFS program price effect at the pump is not a significant driver of retail fuel prices in California."

[Executive Summary \(bateswhite.com\)](https://www.bateswhite.com/insights/publications/2022/06/lcfs-program-price-effect-at-the-pump-is-not-a-significant-driver-of-retail-fuel-prices-in-california)

LCFS Outcomes

12.6% reduction in the carbon intensity of California's transportation fuels

Over 25 billion gallons of petroleum fuels displaced by low-carbon fuels

60% of fossil diesel displaced by biomass-based diesel in 2023, resulting in PM and NOx benefits

\$4 billion annually to support low-carbon investments and \$341M cumulative for public transit

Supports many State programs and goals, including cars and trucks going to zero-emission vehicles

Financial assistance for vehicle purchases at the state and local level

45-day Rulemaking Package Posted

- Initial Statement of Reasons (ISOR) package publicly available on LCFS Rulemaking webpage^{*}
 - Staff Report/ISOR
 - Proposed regulatory text
 - Environmental Impact Analysis
 - Updated Life Cycle Analysis (LCA) modeling tools^{**}
 - Other appendices
- 45-day comment period from Jan 5 – Feb 20, 2024^{***}

^{*} LCFS Rulemaking Webpage: <https://ww2.arb.ca.gov/rulemaking/2024/lcfs2024>

^{**} LCA modeling tools: <https://ww2.arb.ca.gov/resources/documents/lcfs-life-cycle-analysis-models-and-documentation>

^{***} LCFS Comment Docket: https://www.arb.ca.gov/lispub/comm/iframe_bcsbform.php?listname=lcfs2024&comm_period=A

Robust Public Process



9 PUBLIC
WORKSHOPS
OVER PAST THREE
YEARS



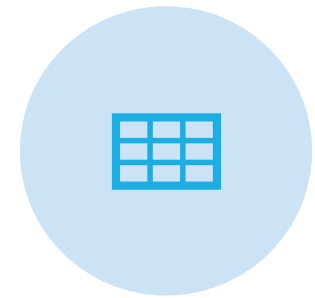
2 COMMUNITY
MEETINGS



2 BOARD
HEARINGS



OVER 800
COMMENT
LETTERS
RECEIVED &
DOZENS OF
MEETINGS WITH
STAKEHOLDERS



SUPPLEMENTAL
MODELING
INFORMATION
POSTED PUBLICLY

Supplemental Information Posted

- Staff has posted supplemental information related to the staff report, as well as additional modeling information reflected in this workshop*
- Summary of items posted:
 - Underlying data for figures in ISOR
 - CATS modeling input sheets for all scenarios in ISOR
 - CATS modeling output sheets for all scenarios in ISOR
 - Air quality workbooks for Proposed scenario and EJAC alternative in ISOR
 - CATS modeling input sheets for scenarios represented in 4/10 workshop presentation
 - CATS modeling output sheets for scenarios represented in 4/10 workshop presentation

*Posted on LCFS webpage: <https://ww2.arb.ca.gov/resources/documents/supplemental-2023-lcfs-isor-documentation>

We Received A Diverse Set of Comments

- Strengthen carbon intensity targets and provide long-term price signals
- Maximize crediting opportunities
- Incentivize development of innovative fuels
- Reduce use of combustion fuels
- Eliminate biomethane from the program
- Continue support for biomethane and prevent stranding assets
- Limit or cap crop-based biofuels
- Expand the use of crop-based biofuel crediting
- Concentrate health and economic benefits in communities burdened by current transportation system
- Provide a mix of low-carbon transportation incentives to communities

Key Concepts for Rulemaking

- Increase the stringency of the program to displace fossil fuels
- Strengthen equity provisions to promote investment in disadvantaged, low-income, and rural communities
- Support electric and hydrogen truck refueling
- Increase the use of alternative jet fuel in the State
- Incentivize more production of clean fuels needed in future, such as low-carbon hydrogen
- Support methane emissions reductions and deploy biomethane for best uses across transportation and other sectors
- Consider guardrails on crop-based fuels

Other Considerations

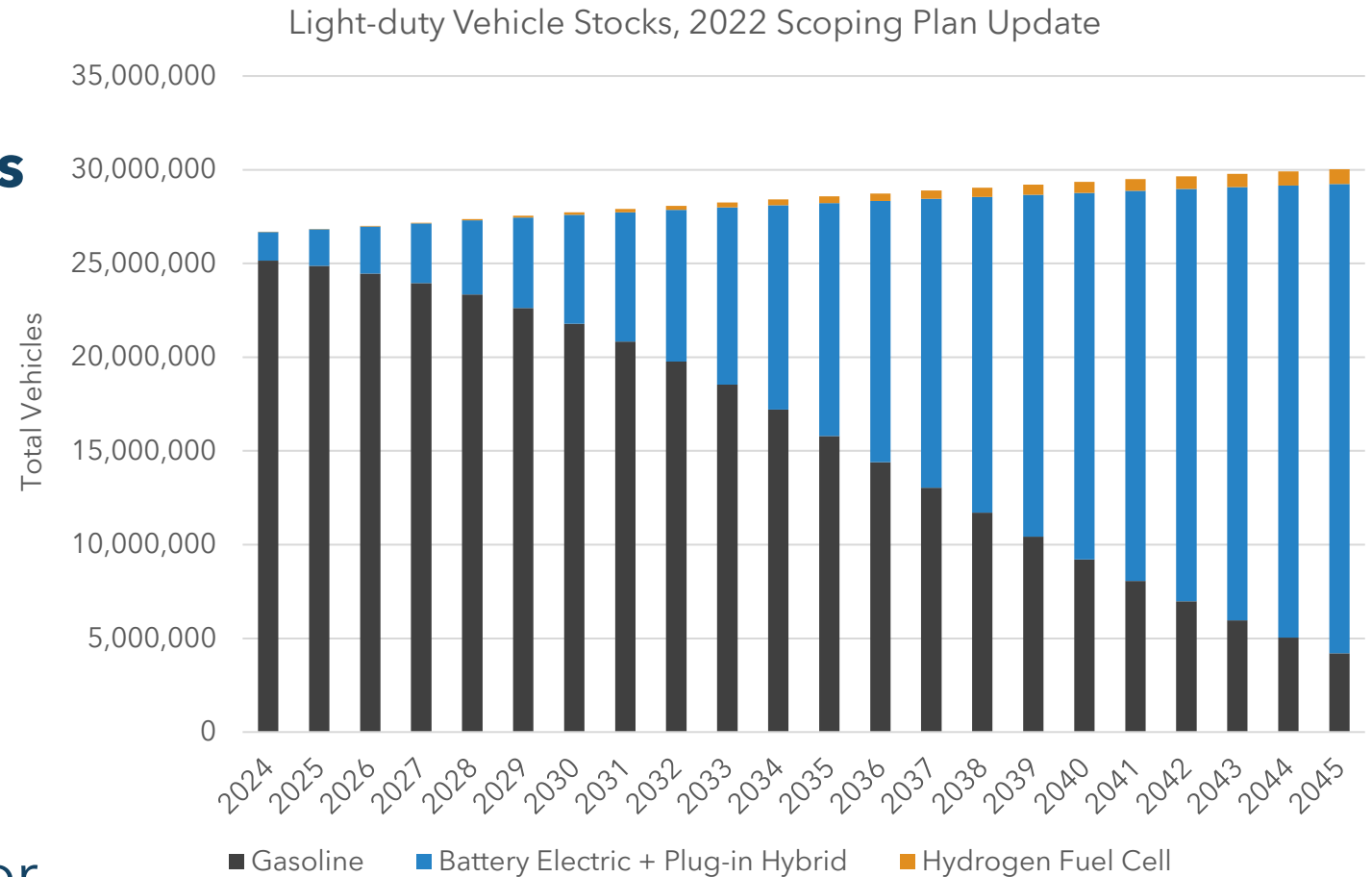
- Needs of light-duty vehicle sector
- Needs of medium/heavy-duty sector
 - Different from LD sector, where VMT reductions can be complimentary
- Federal incentives
- Price-signals for investment
- Near and long-term air quality benefits
- Transportation costs
- Program administration and streamlining

45-day Proposed Regulatory Provisions

- Increase stringency by increasing CI reduction to 30% by 2030 and 90% by 2045 with near-term step-down in stringency
- Implement Automatic Acceleration Mechanism
- Eliminate Exemption for Intrastate Fossil Jet Fuel
- Expand Zero Emission Vehicle Infrastructure Crediting
- Apply Biomethane Deliverability Requirements and Phase Out Avoided Methane Pathways
- Add Crop-Based Biofuels Sustainability Criteria
- Improve Equity Provisions

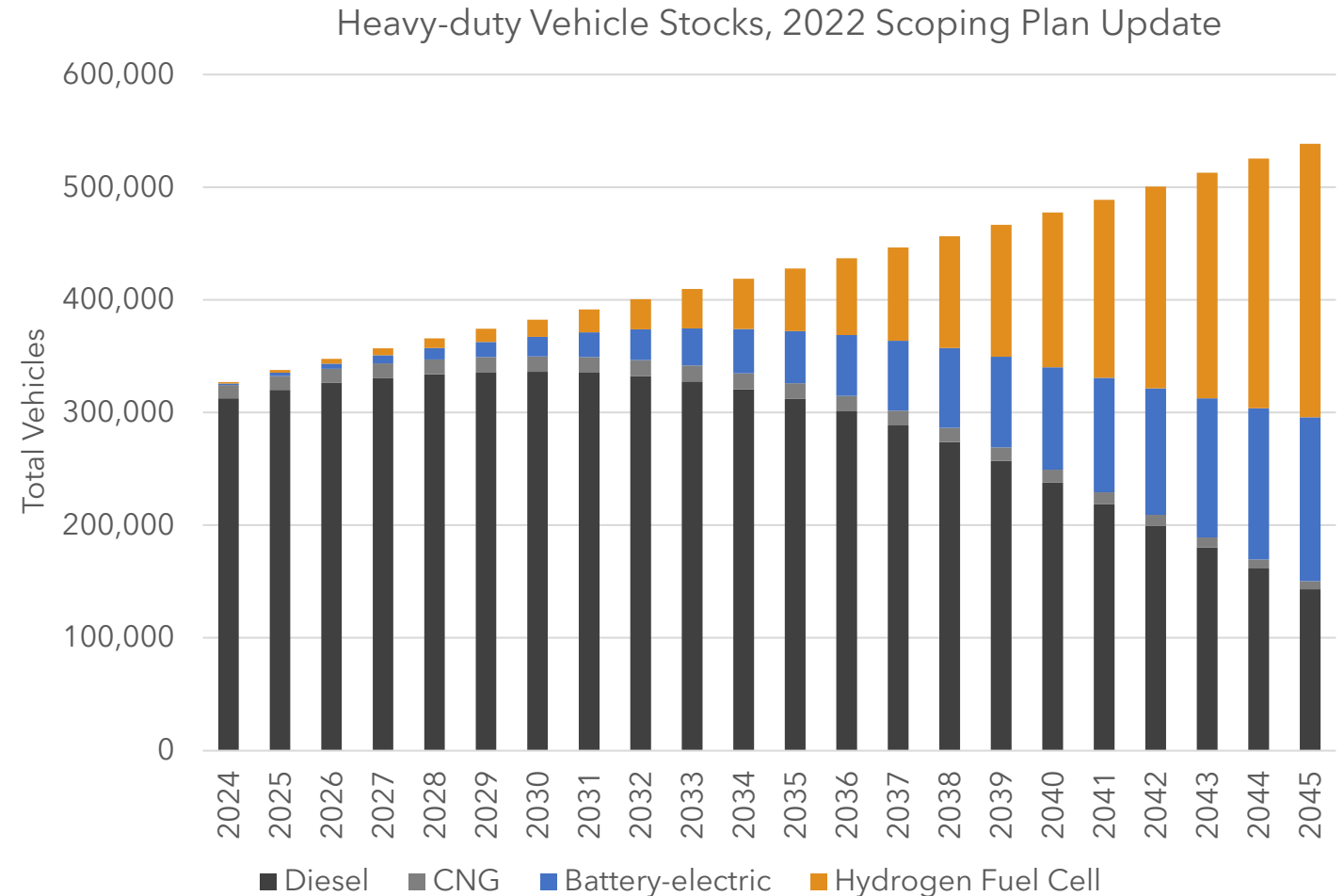
LDVs - Fuel Demand based on Vehicle Population

- Based on implementation of CARB's ACC II regulation, **existing combustion vehicles persist out to 2045**—keeping demand for fossil liquid fuels
- % of combustion vehicles
 - 2025: 93%
 - 2030: 79%
 - 2040: 31%
 - 2045: 14%
- Faster turnover in light-duty sector than with trucking sector

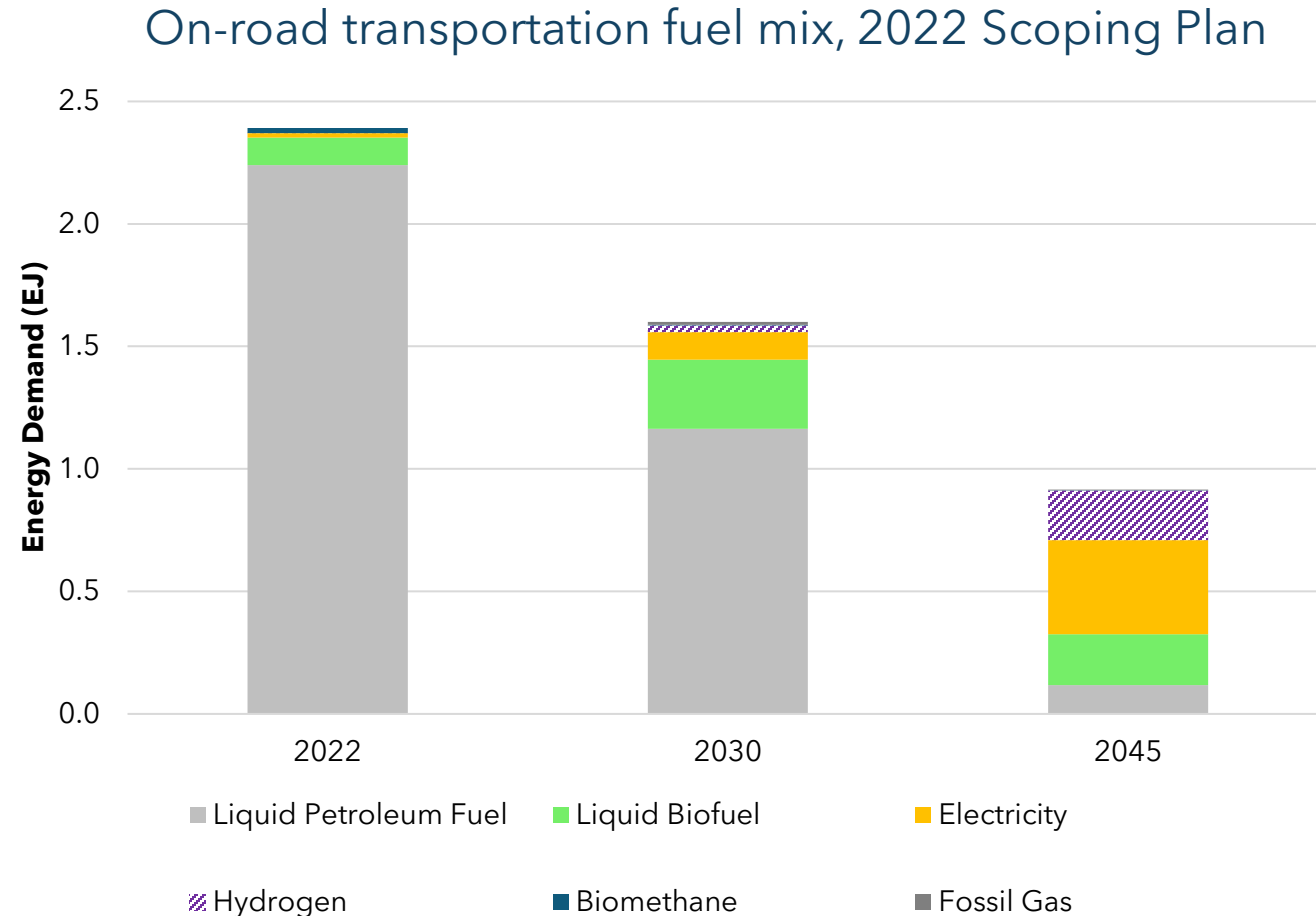


HDFVs - Fuel Demand based on Vehicle Population

- Based on implementation of CARB's ACF/ACT regulations:
- **Existing combustion engines persist for years** due to slow turnover of heavy-duty trucks
- **Fossil diesel backfills biofuels when biofuel volumes are limited**
- % of combustion vehicles
 - 2025: 98%
 - 2030: 92%
 - 2040: 52%
 - 2045: 28%



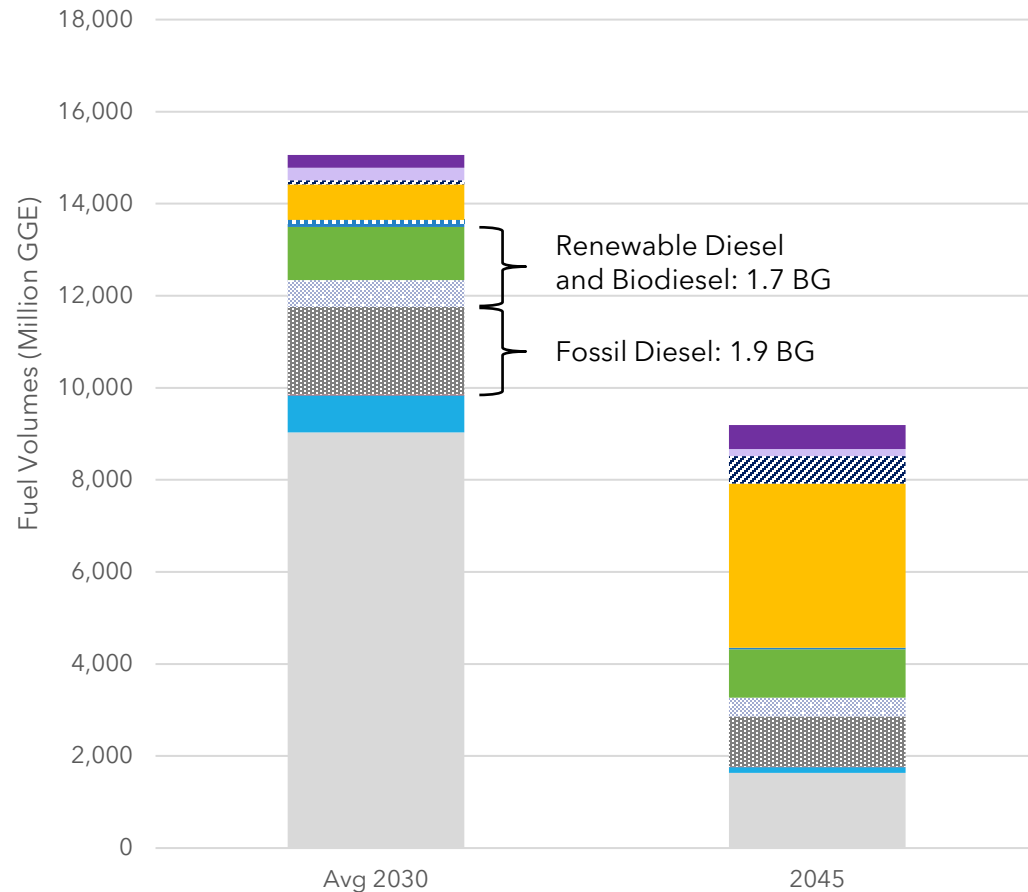
Transportation Fuel Mix, 2022 Scoping Plan



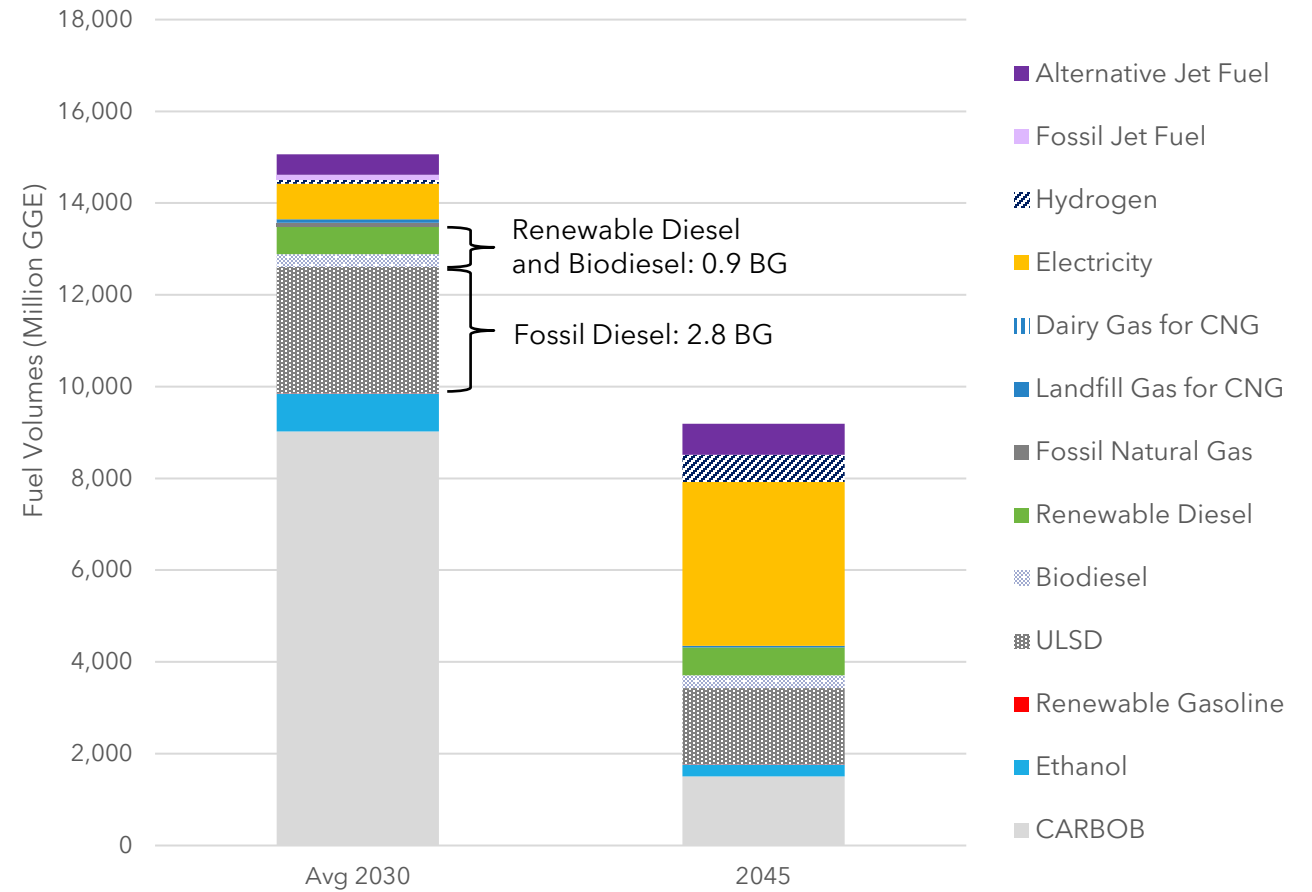
- Fuels transition in 2022 Scoping Plan mirrors the combustion vehicle phaseout in ZEV regulations
- Major transition to electricity and hydrogen, with smaller but persistent role for liquid alternative fuels

Modeling Comparison: Fuel Volumes

Proposed Scenario Fuel Volumes

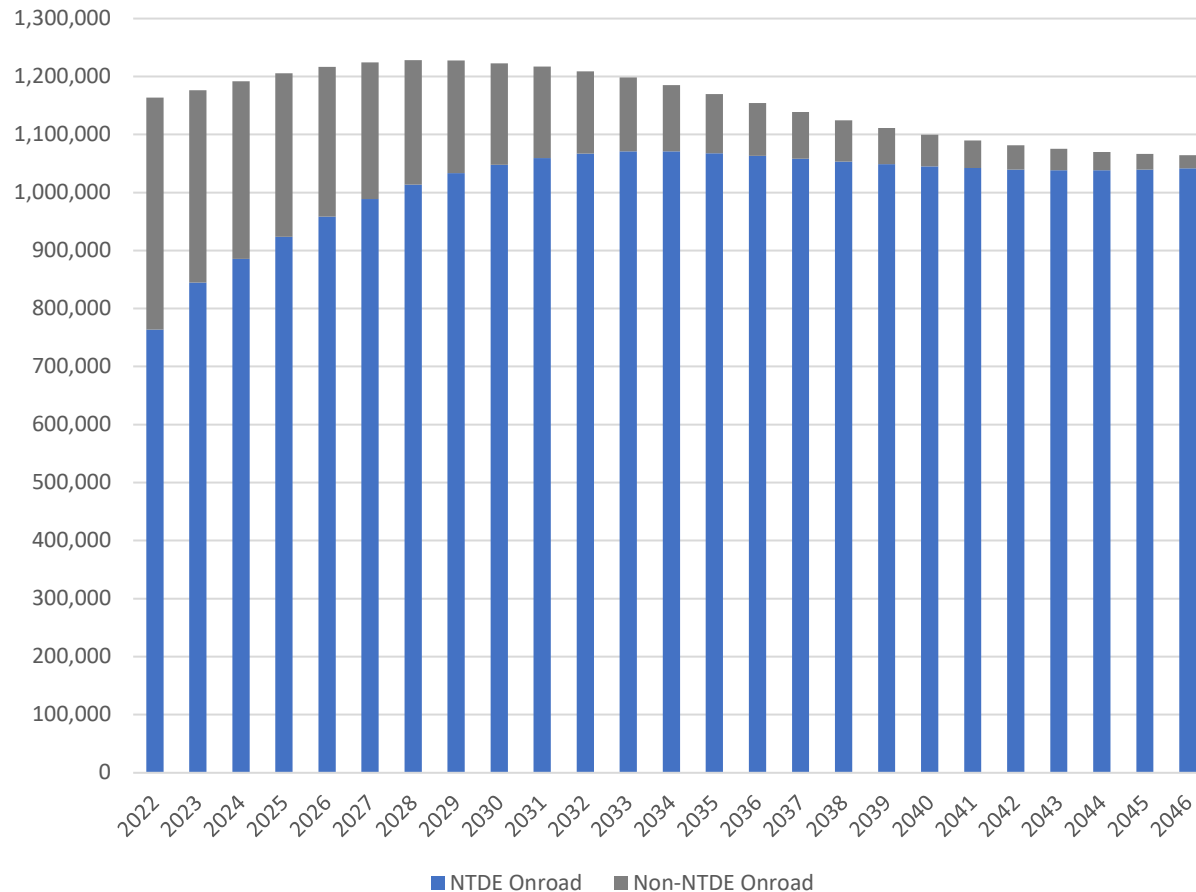


EJAC Scenario Fuel Volumes



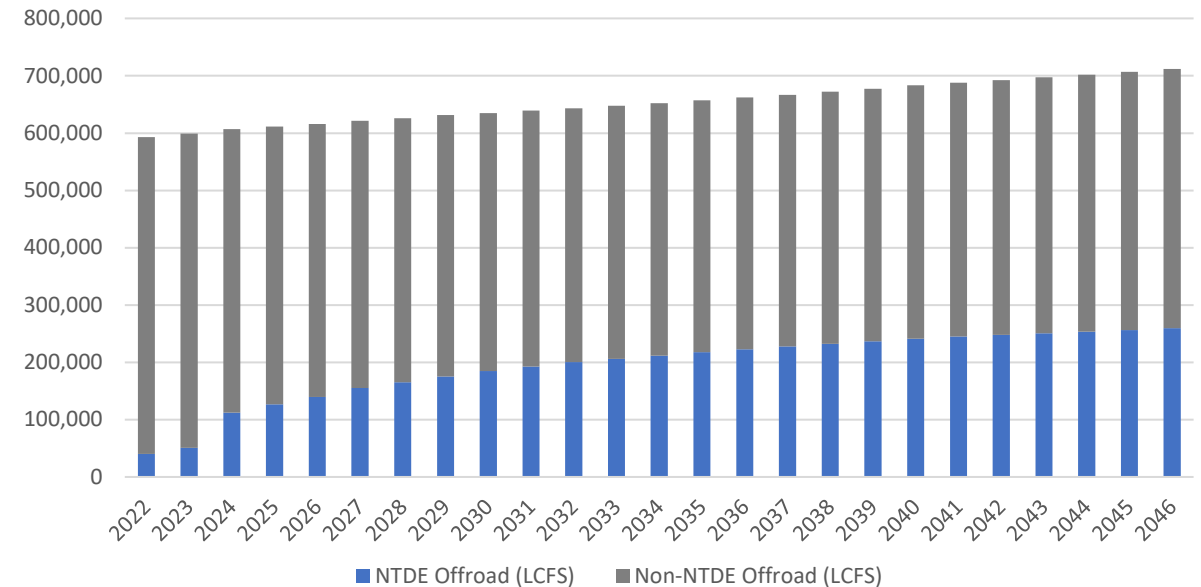
Engine Technology Impacts Emissions

On-Road Vehicle Populations



On-road sector transitioning to cleaner new technology diesel engine (NTDE) vehicles faster than off-road sector

Off-Road Vehicle Populations



Emission Factors Used in AQ Analysis

- Different PM/NOx emission factors for RD and BD between older “legacy” and New-Technology Diesel Engines (NTDE)
- Both fuels reduce PM emissions, which is predominant driver of health analysis
 - Emission Factors based on 2011 Durbin et. al.
 - **2021 LED study confirmed reductions for legacy engines, the study also showed reductions for NTDEs, but were not statistically significant**
- Renewable Diesel
 - Older: NOx decrease
 - NTDE: No additional NOx benefit/impact
- Biodiesel
 - Legacy: NOx increase
 - NTDE: No additional NOx benefit/impact

Table 56: Biodiesel NOx and PM Emissions Relative to Conventional Diesel¹¹⁸

Engine Type	Biodiesel Saturation Level	NOx Emissions Change Relative to Conventional Diesel			PM Emissions Change Relative to Conventional Diesel ¹¹⁹		
		B5	B10	B20	B5	B10	B20
Non- NTDE	Low	1.1%	1.8%	4.0%	-4.7%	-8.9%	-19%
Non- NTDE	High	-0.2%	0.1%	1.5%	-4.7%	-8.9%	-19%
NTDE	Low	0.0%	0.0%	0.0%	-4.7%	-8.9%	-19%
NTDE	High	0.0%	0.0%	0.0%	-4.7%	-8.9%	-19%

Table 57: Renewable Diesel NOx and PM Emissions Relative to Conventional Diesel^{120,121,122}

Engine Type	NOx Emissions Change Relative to Conventional Diesel ¹²³		PM Emissions Change Relative to Conventional Diesel ¹²⁴	
	R20	R100	R20	R100
Non-NTDE	-2.9%	-10%	-4.0%	-30%
NTDE	0.0%	0.0%	-4.0%	-30%

2021 LED Study on RD/BD Blends - PM

LEGACY

- RD: Confirmation of PM **decreases** in legacy engines for RD relative to ULSD
- BD: Confirmation of PM **decreases** in legacy engines relative to ULSD

NTDE

- RD/BD: Confirmation of reduced PM emissions relative to ULSD, but not statistically significant

Table ES-5. Average PM emissions, and Percentage Differences and Statistical Comparisons Between the Test Biofuels and CARB Reference Fuel for the Off-Road Legacy Engine

Cycle	Fuel Type	PM Emissions (g/bhp-hr)	% Diff vs. CARB	p-value (t-test)
NRTC	CARB reference diesel	0.061	-	-
	R100	0.038	-38	0.00
	R65/B35	0.028	-53	0.00
	R50/B50	0.023	-63	0.00
D2	CARB reference diesel	0.052	-	-
	R100	0.038	-27	0.00
	R65/B35	0.025	-51	0.00
	R50/B50	0.022	-58	0.00

Statistically significant results are bolded and their percent differences are shown in red.

For the on-road NTDE, PM mass emissions in general were low and near background levels, and averaged less than 0.001 g/bhp-hr for all tests conditions and both cycles. As the PM standard for heavy-duty on-road engines is 0.01 g/bhp-hr, the PM emissions observed are for the most part at least 20-fold lower than the PM standard. The PM emissions for the different fuels generally did not show statistically significant differences, with the exception of the R50/B50, which had emissions that were lower than those for the CARB reference fuel at a marginally statistically significant level over the FTP cycle.

2021 LED Study on RD/BD Blends - NOx

LEGACY

- RD: Confirmation of NOx **decreases** in legacy engines relative to ULSD
- BD: Confirmation of NOx **increases** in legacy engines relative to ULSD

NTDE

- RD: No statistically significant difference between RD or ULSD for NOx in NTDE
- BD: NOx **increases** in NTDE relative to ULSD
 - SRIA assumes equivalency
 - Staff are conducting additional testing to collect more data

Table ES-2. NOx Emissions, and Percentage Differences and Statistical Comparisons Between Biofuels and the CARB Reference Fuel for the Off-Road Legacy Engine

Cycle	Fuel Type	Ave. NOx Emissions (g/bhp-hr)	% Diff vs. CARB	p-value (t-test)
NRTC	CARB reference fuel	2.09	-	-
	R100	1.98	-5.4	0.00
	R65/B35	2.07	-1.2	0.18
	R50/B50	2.13	1.8	0.05
D2	CARB reference fuel	2.01	-	-
	R100	1.91	-4.9	0.00
	R65/B35	2.01	0.0	0.97
	R50/B50	2.09	4.2	0.02

Statistically significant results are bolded and their percent differences are in red text.

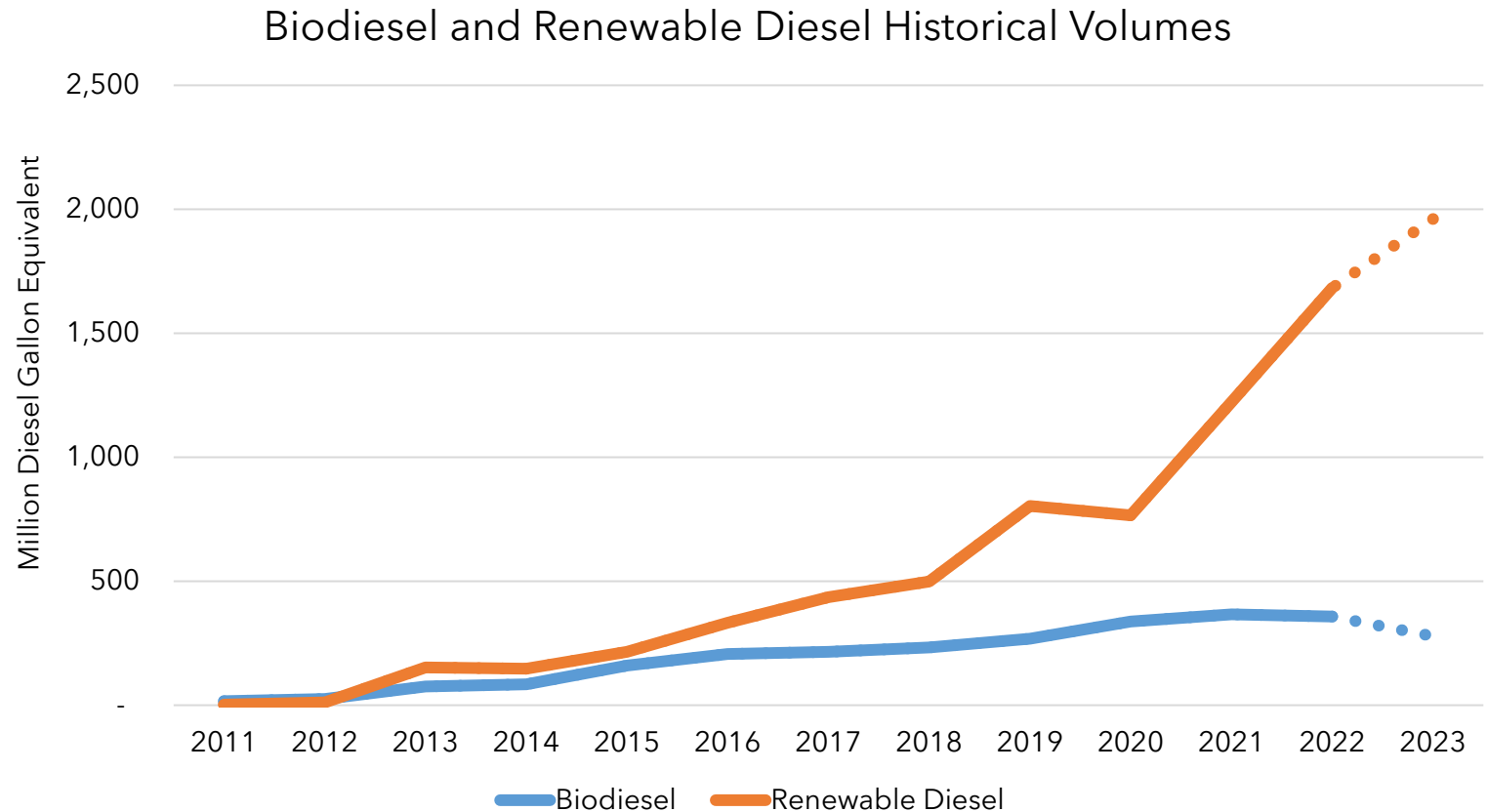
Table ES-3. NOx Emissions, and Percentage Differences and Statistical Comparisons Between Biofuels and the CARB Reference Fuel for the On-Road NTDE

Cycle	Fuel Type	NOx Emissions (g/bhp-hr)	% Diff vs. CARB	p-value (t-test)
FTP	CARB reference fuel	0.11	-	-
	R100	0.12	4.8	0.34
	R65/B35	0.16	46.6	0.00
	R50/B50	0.17	49.5	0.00
RMC	CARB reference fuel	0.13	-	-
	R100	0.14	2.3	0.19
	R65/B35	0.15	14.2	0.00
	R50/B50	0.15	15.4	0.00

Statistically significant results are bolded and their percent differences are shown in red.

Biodiesel and Renewable Diesel Volumes

- Biodiesel and renewable diesel are distinctly different fuels
- Biodiesel volumes have not grown significantly for many years and declined in Q1-Q3 2023
- Renewable diesel makes up almost all of the growth in diesel alternatives



*Note: Q4 2023 volumes estimated using average of Q1-Q3 2023 reported data

45-Day Proposal

- 30% CI reduction by 2030, 90% CI reduction by 2045
- Fossil jet deficits
- Expand Zero Emission Vehicle Infrastructure Crediting
- Biomethane deliverability and pathways phase out
- Sustainability guardrails

GHGs

558 MMT CO₂e
reduction

Health

\$5B decrease in
costs in 2045

Costs

\$32B net cost
increase

Balances need
for investment
signal with need
for compliance

Criteria Pollutant Emissions of Fuels

- PM and associated health benefits of RD and BD use, relative to ULSD.
- NOx emissions depend on fuels and engine types.
 - RD shows NOx reductions, particularly in legacy engines.
 - BD has potential to increase NOx emissions, testing shows emissions depend on fuel blend and engine.
- CARB adopted Alternative Diesel Fuel (ADF) Regulation to ensure NOx equivalency.
 - ADF Regulation requires blends above B5 be mitigated.
- 2021 LED study used higher biodiesel blends than may be used in CA.
- CARB has commissioned further testing on BD and RD.

EJAC (EJ) Scenario

- 30% CI reduction by 2030, 90% CI reduction by 2045
- Fossil jet deficits
- Expand Zero Emission Vehicle Infrastructure Crediting
- End biomethane crediting
- Apply limits on biomass-based diesel
- No direct air capture credits

GHGs

386 MMT CO₂e
increase

Health

\$2B increase in
costs in 2045

Costs

\$85B net cost
increase

Needs more
credits for
compliance than
available

Other Options Staff Also Evaluated

- Less Stringent Near-Term CI Targets
 - 28% by 2030 with 3% step down in 2025
 - Phasing down biomethane crediting
 - Limits on crop-based diesel
- More Stringent CI Targets
 - 35% by 2030 with 5% step down in 2025
 - No additional crediting constraints

Greater need for fossil diesel, more GHG emissions, higher costs after 2030

Highest cost scenario

Questions Raised by External Modeling

- Areas that warrant additional staff evaluation:
 - Availability of non-biofuel credit generating opportunities, in particular prior to 2030.
 - Assumptions on future RD volumes and feedstock types/quantities to meet production needs
 - Effect of Auto Acceleration Mechanism on credit/deficit supply
 - Impact of fuel/feedstock combos switching from credit to deficit generating as CI benchmarks continue to decline and program becomes more stringent
 - Potential other alternative fuels to reduce fossil fuel use in legacy combustion vehicles

Updated Analysis for April Workshop

- Step-downs
- BD/RD tailpipe emission factor (N_2O and CH_4)
- Energy demand from PHEVs
- Updated MDV energy demand to reflect ACF's 15-day revision to vehicle stocks
- Biomethane representation
- Auto-adjustment mechanism
- Renewable diesel volumes
- Feedstock supply assumptions

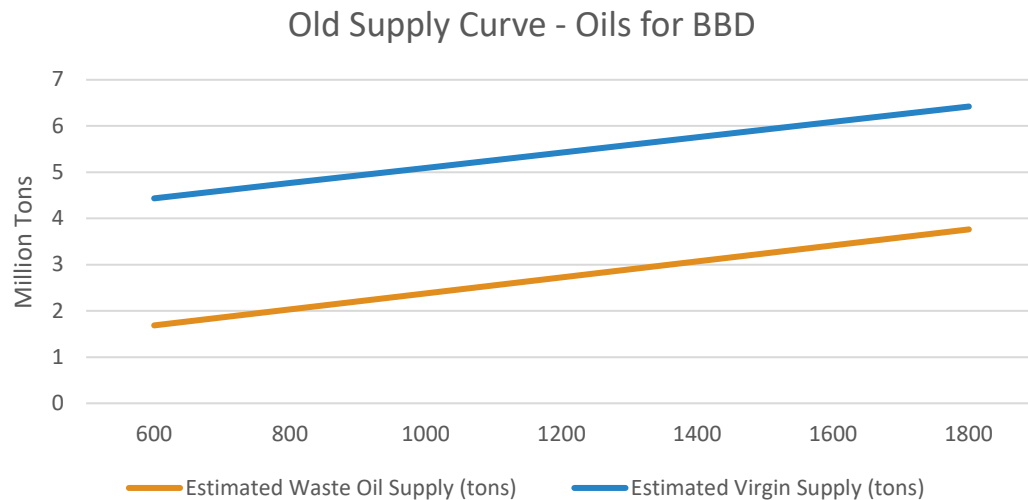
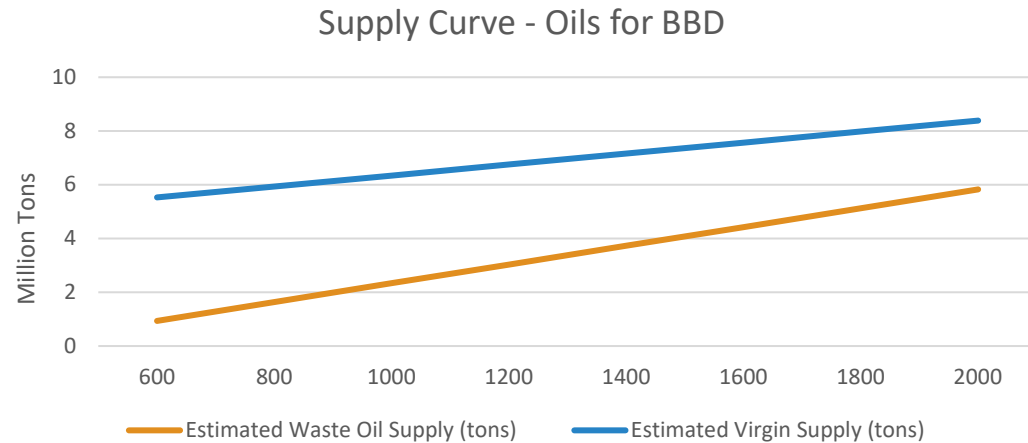
Biofuels availability assumptions and emission factor updates

- Received feedback that staff proposal underestimates renewable diesel supply
- Updates to supply assumptions:
 - Refined supply curves for renewable diesel from virgin oils and waste oils
- CA-GREET4.0 updated to apply tailpipe emission factor for fossil diesel to biodiesel and renewable diesel carbon intensities

Baseline CI for ULSD

- In the ISOR amendment proposal package, staff incorporated a new baseline 2010 CI score for ULSD to reflect the updated value from CA-GREET4.0
- The change reflects increased tailpipe CH₄ and N₂O emissions factors for diesel combustion
- Stakeholders raised concerns that increasing the ULSD baseline 2010 value would result in significant additional crediting for diesel fuel replacements
- An adjustment in the RD/BD CI scores to reflect the same change to both is included in the modeling shown today
- Updating CA-GREET 4.0 to include the additional tailpipe emissions for RD/BD as well as ULSD will reduce the amount of additional crediting introduced from the increased baseline.

CATS Supply vs. Current Trends

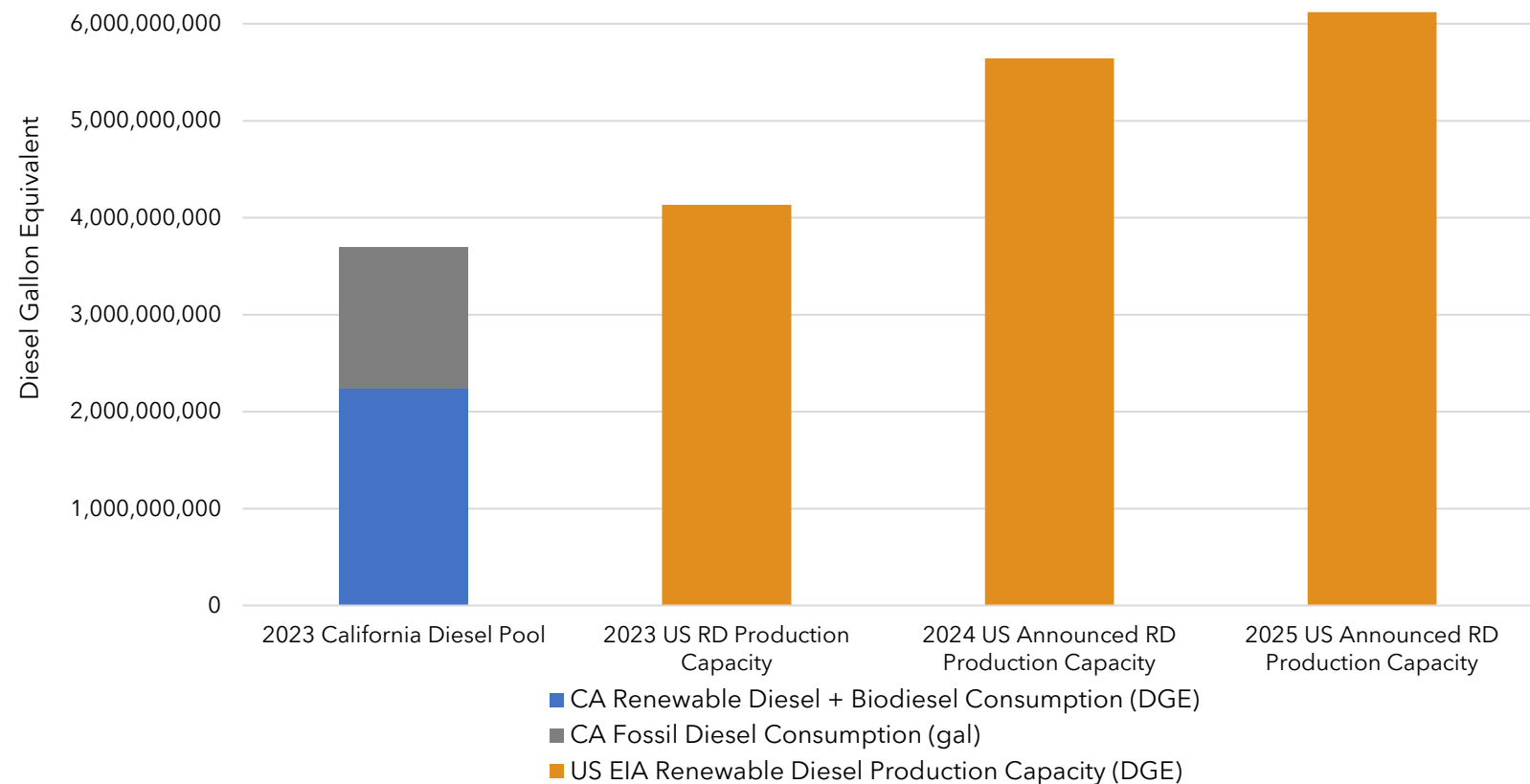


- Total UCO available at \$2000 - 5.8 M tons
- Total Virgin Oil available at \$2000 - 8.4 M tons
- Improvements Shown
 - Tied inputs to trendline values, rather than single month data
 - Matched time period of analysis for waste oils to that of virgin oils

Diesel and Jet Fuel Pools – U.S. Production

- Liquid biofuels have not yet saturated the market
 - Diesel fuel pool: 60% biofuels in Q3 2023
 - Jet fuel pool: 3% biofuels (intrastate only) from most recent year of data
- Significant increases in domestic production capacity may bring more volumes to California

California Diesel Pool vs US Domestic Renewable Diesel Production Capacity



Sources:

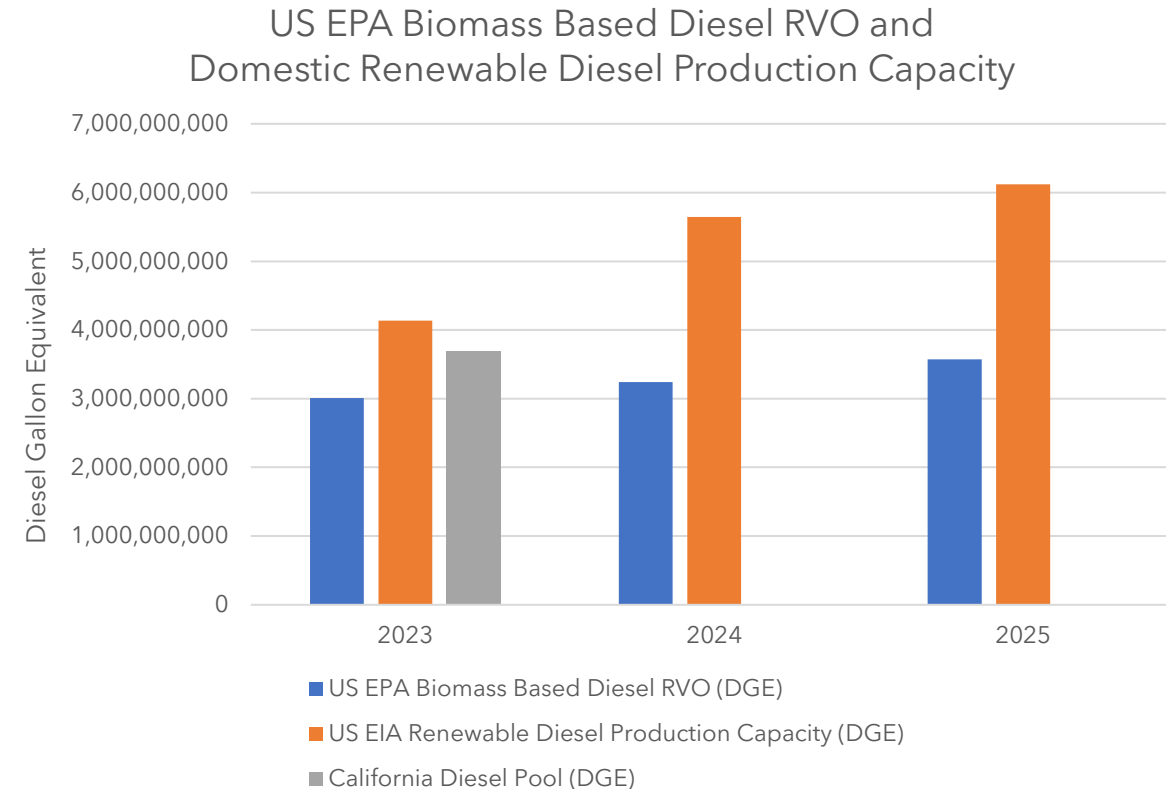
LCFS Data from Quarterly Data Summary Spreadsheet

Domestic capacity data from EIA:

<https://www.eia.gov/todayinenergy/detail.php?id=55399>

Future Renewable Diesel Supply

- Domestic renewable diesel capacity exceeds California diesel pool with significant announced future capacity
- US EPA RVO for 2023-2025 is significantly lower than the announced domestic capacity
- High crude prices can compensate in part for lower RFS support, but are variable
- Creates uncertainty for modeling, given history of supply adjusting toward RVO for other fuels



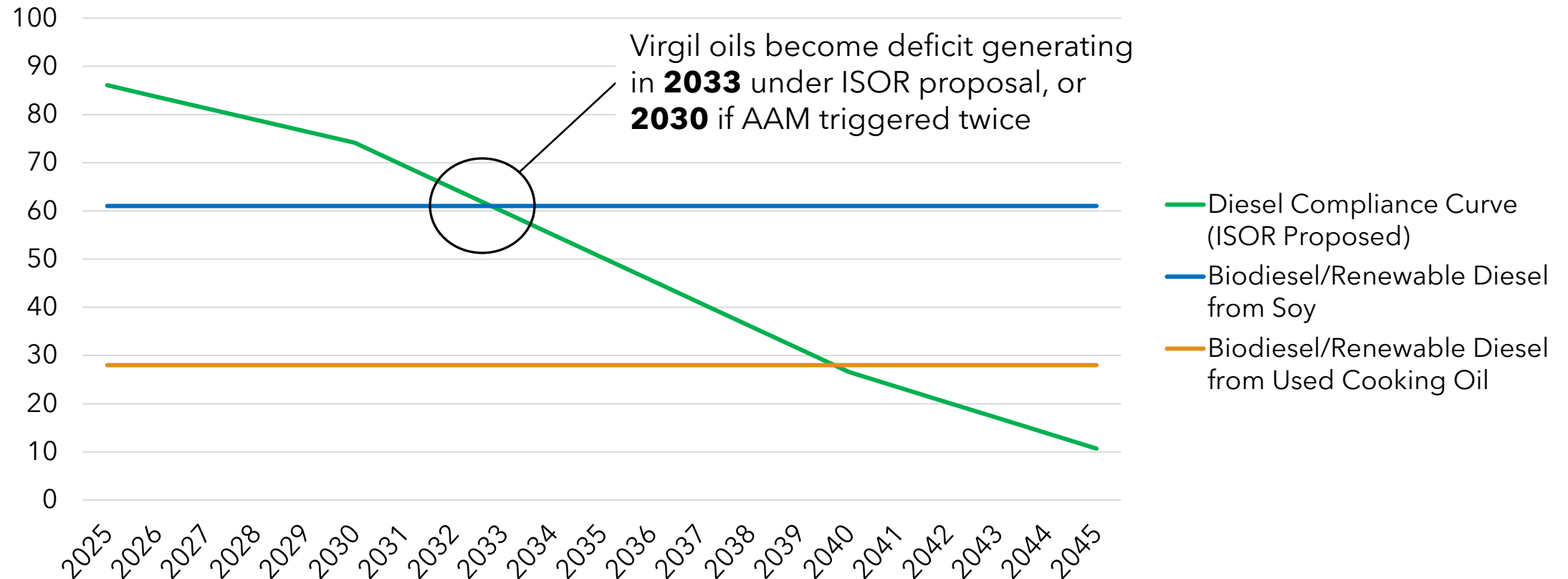
Sources:

EIA, Feb 2, 2023. <https://www.eia.gov/todayinenergy/detail.php?id=55399>

EPA, June 21, 2023. <https://www.epa.gov/renewable-fuel-standard-program/final-renewable-fuels-standards-rule-2023-2024-and-2025>

Credit Generation for Virgin Oil Feedstocks Naturally Phases Out

Biomass-based Diesel Carbon Intensities and Diesel Compliance Targets (ISOR)

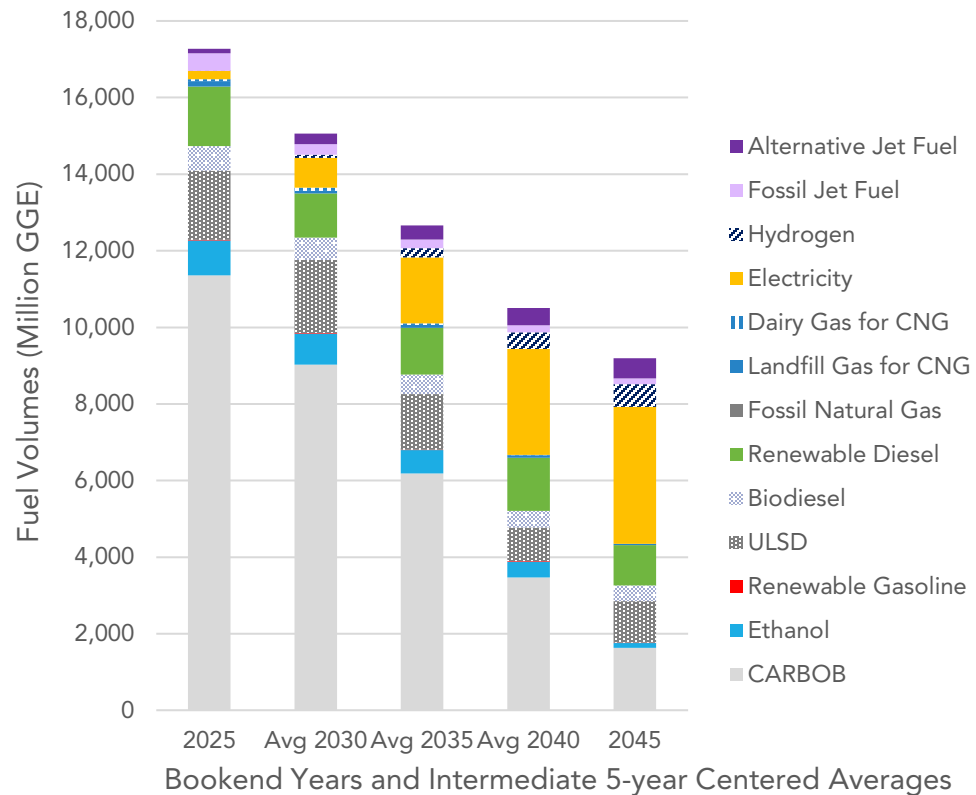


Scenarios Analyzed for Workshop

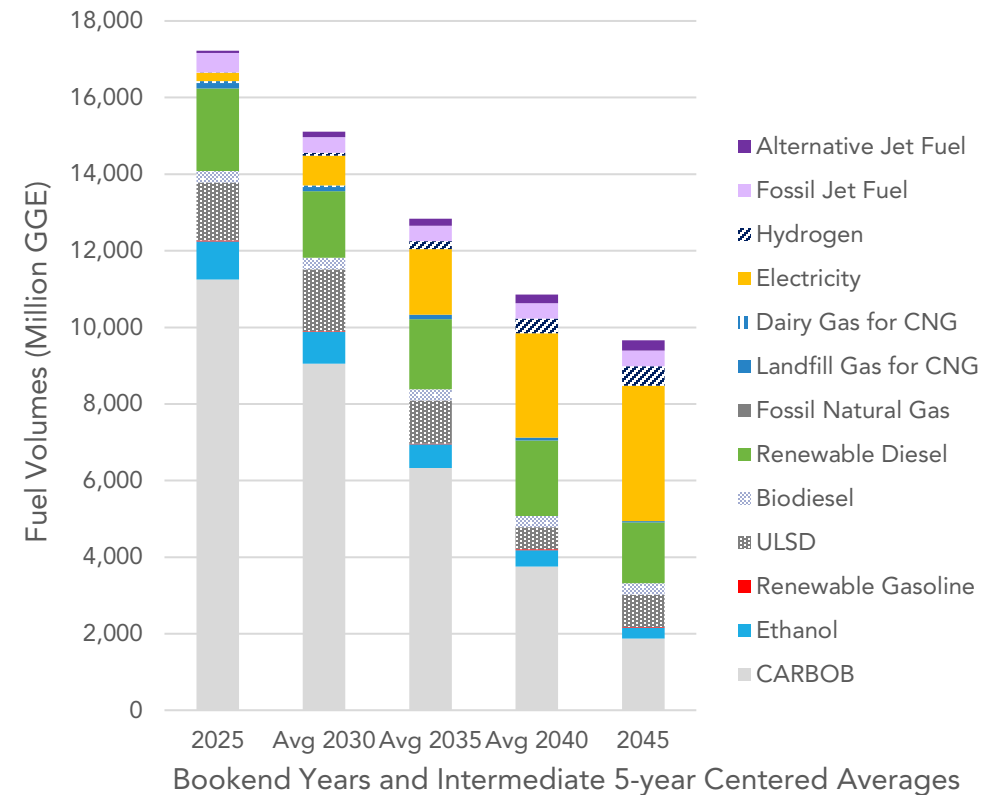
- 5% step-down, 7% step-down, and 9% step-down in 2025
 - All include 30% CI reduction by 2030 and 90% CI reduction by 2045
- 5% step-down in 2025 with Auto-Acceleration Mechanism triggered twice
 - Results in 39% CI reduction by 2030 and 90% CI reduction **two years earlier** in 2043
- All scenarios reflect updated modeling inputs

Updates to 45-Day Proposal

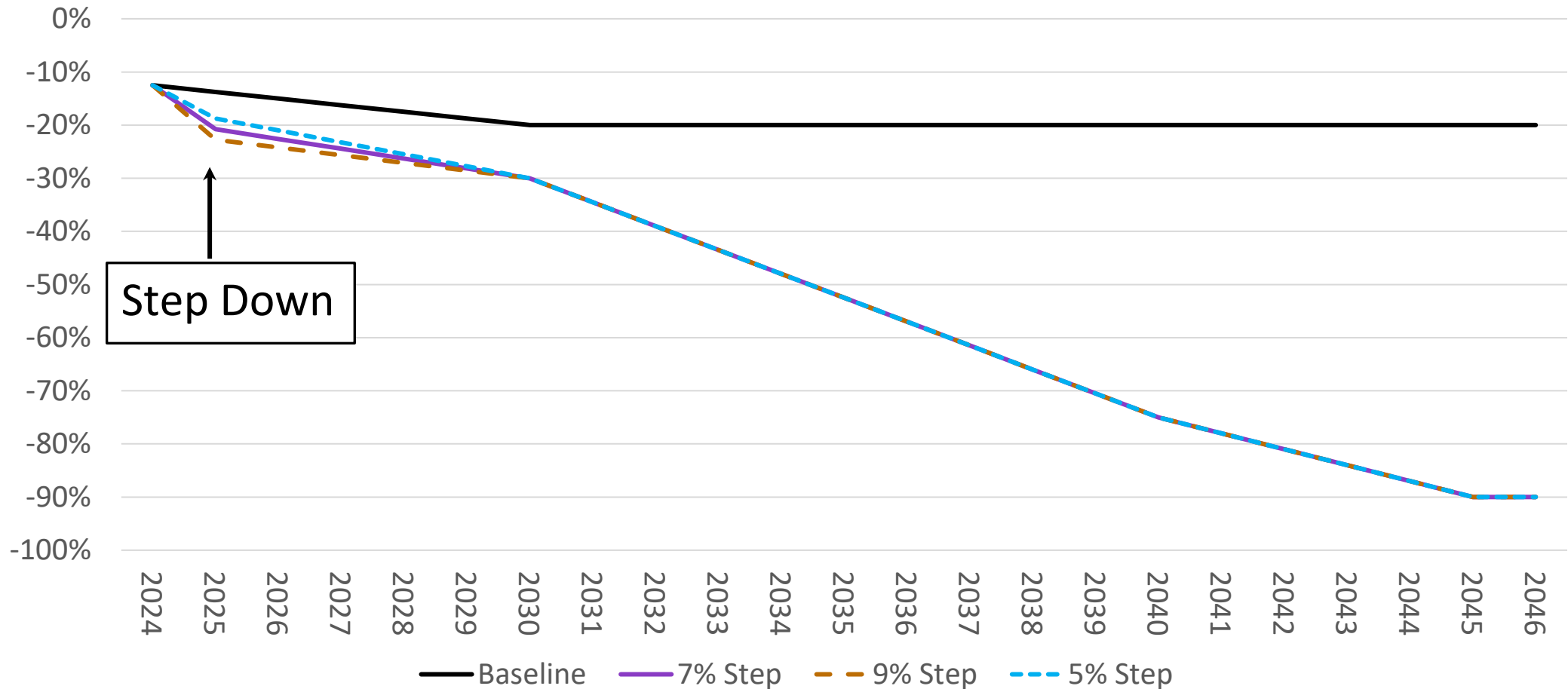
ISOR Proposed
5% Step Down and 30% in 2030



April 2024 Workshop
5% Step Down and 30% in 2030

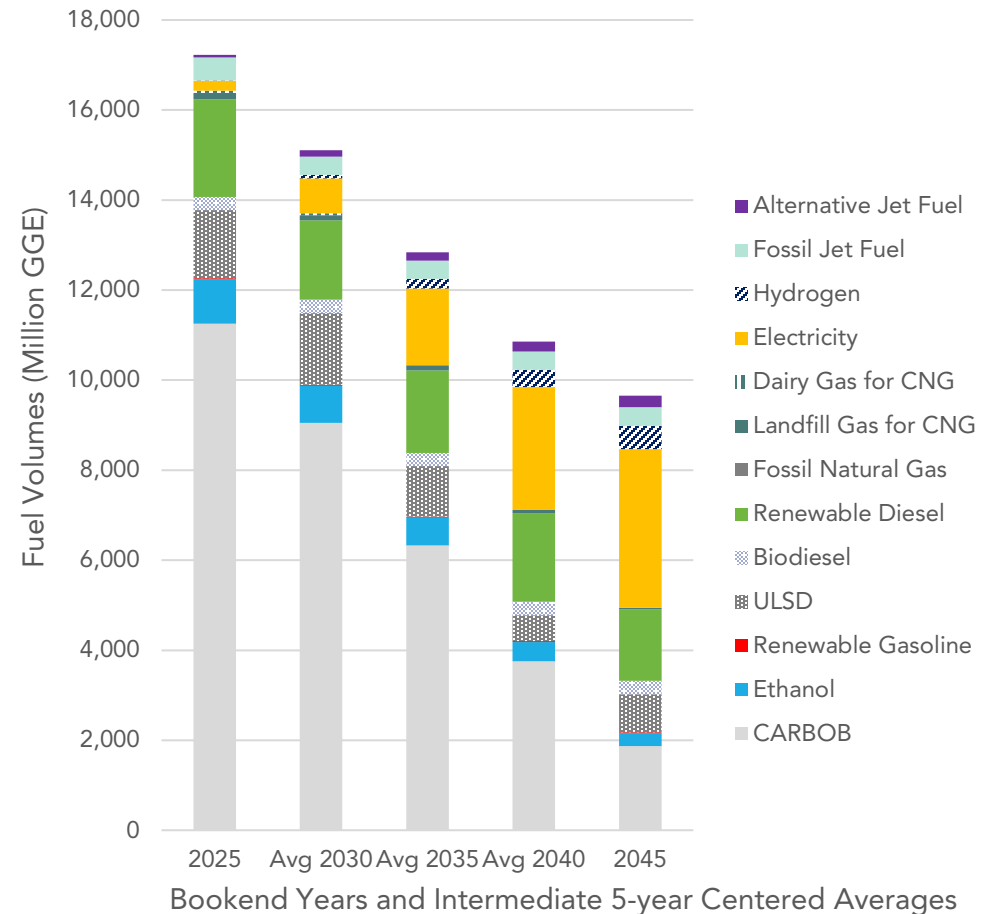


Increased Step-downs



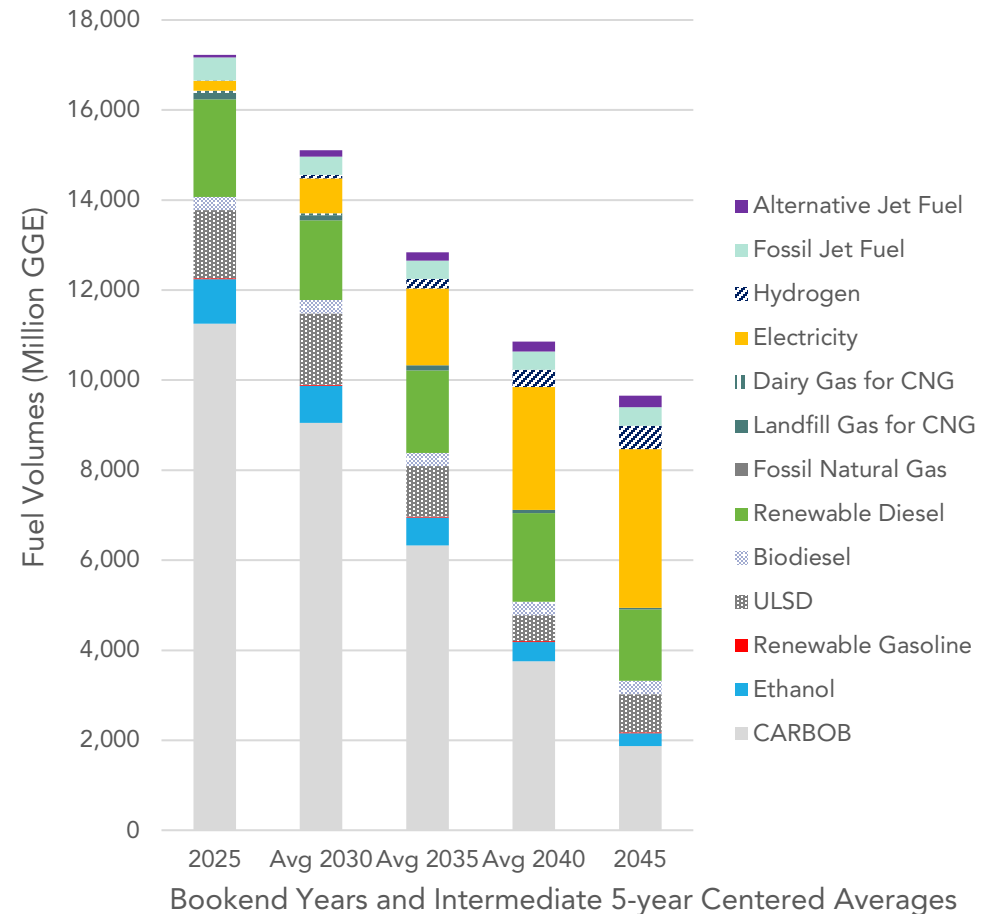
7% Step Down and 30% by 2030

- Bank Drawdown - 17 million between 2025 and 2046
- Total Electricity - 1,367,482 GWh
- Total Hydrogen - 5,367 MM kg
- Total Biofuel Volume - 75,118 MM GGE
- Total Fossil Volume - 212,082 MM GGE



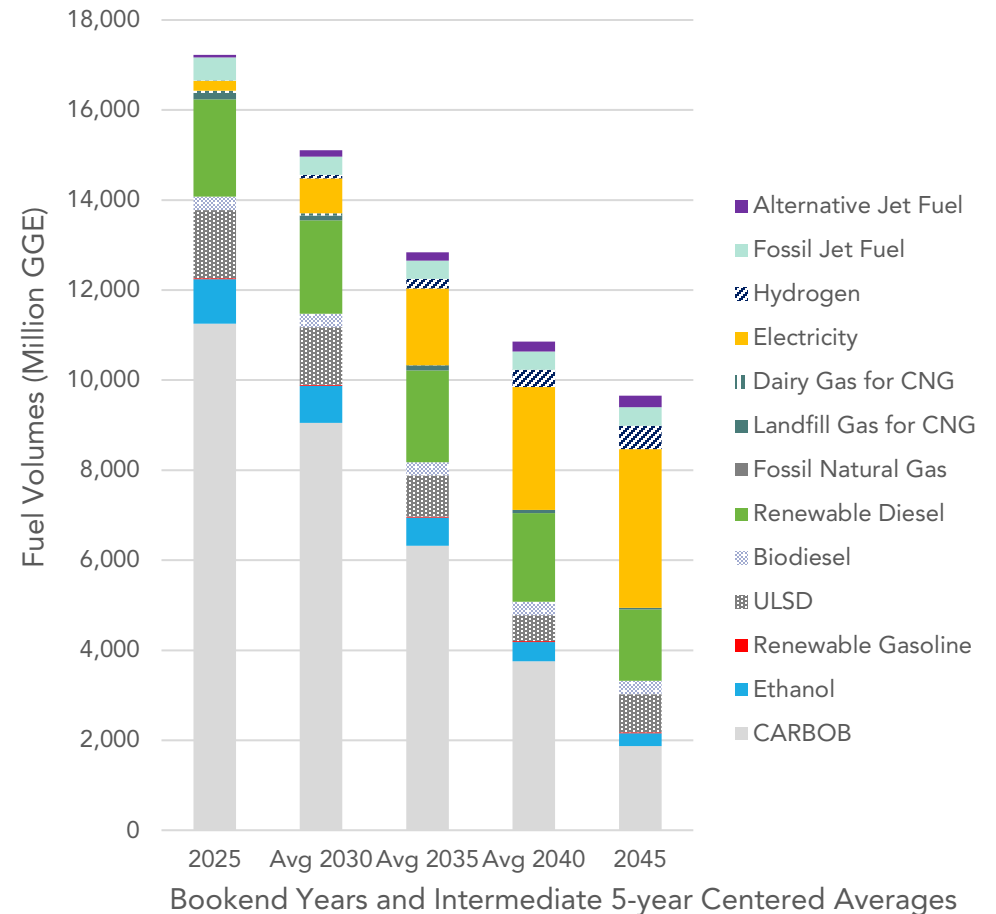
9% Step Down and 30% by 2030

- Bank Drawdown - 27 million between 2025 and 2046
- Total Electricity - 1,367,482 GWh
- Total Hydrogen - 5,367 MM kg
- Total Biofuel Volume - 75,143 MM GGE
- Total Fossil Volume - 212,057 MM GGE



Illustrative Scenario - 5% Step Down with Two Automatic Accelerations

- Modeling doesn't directly simulate situations that would trigger AAM
- Staff "forced" modeling of two AAM triggering to illustrate impact by manually advancing CI benchmarks in 2028 and 2030.
- Minimum Bank Drawdown - 171 million credits
- Total Electricity - 1,367,482 GWh
- Total Hydrogen - 5,367 MM kg
- Total Biofuel Volume - 80,764 MM gallons
- Total Fossil Volume - 196,653 MM gallons



Modeling Comparison

	5% Step Down 30% in 2030*	7% Step Down 30% in 2030	9% Step Down 30% in 2030	5% Step Down Double AAM
Minimum Bank Drawdown**	3 million credits	17 million credits	27 million credits	171 million credits
Total Electricity	1,367,482 GWh	1,367,482 GWh	1,367,482 GWh	1,367,482 GWh
Total Hydrogen	5,367 MM kg	5,367 MM kg	5,367 MM kg	5,367 MM kg
Total Biofuel Volume	74,178 MM GGE	75,118 MM GGE	75,143 MM GGE	77,505 MM GGE
Total Fossil Volume	213,021 MM GGE	212,082 MM GGE	212,057 MM GGE	209,695 MM GGE

*Using updated input assumptions

** Bank Drawdown is cumulative between 2024-2046

Additional Analysis - Discussion

- Impacts of Different Step-Downs
 - 7% step-down increases biofuel availability relative to 5% step-down.
 - Modeling shows much smaller increases in biofuel volumes when moving from a 7% step-down to a 9% step-down
 - Both step-downs reduce credit generation per-gallon of biofuels
- Impacts of Automatic Acceleration Mechanism
 - Significant change in biofuel volumes relative to other options
 - Potential for significant changes in bank drawdown
 - Biofuels become deficit-generating sooner
- All options increase the potential for bank drawdown
 - Creates additional risk of credit shortages, particularly when CI reduction stringency increases in later years

Feedback Requested

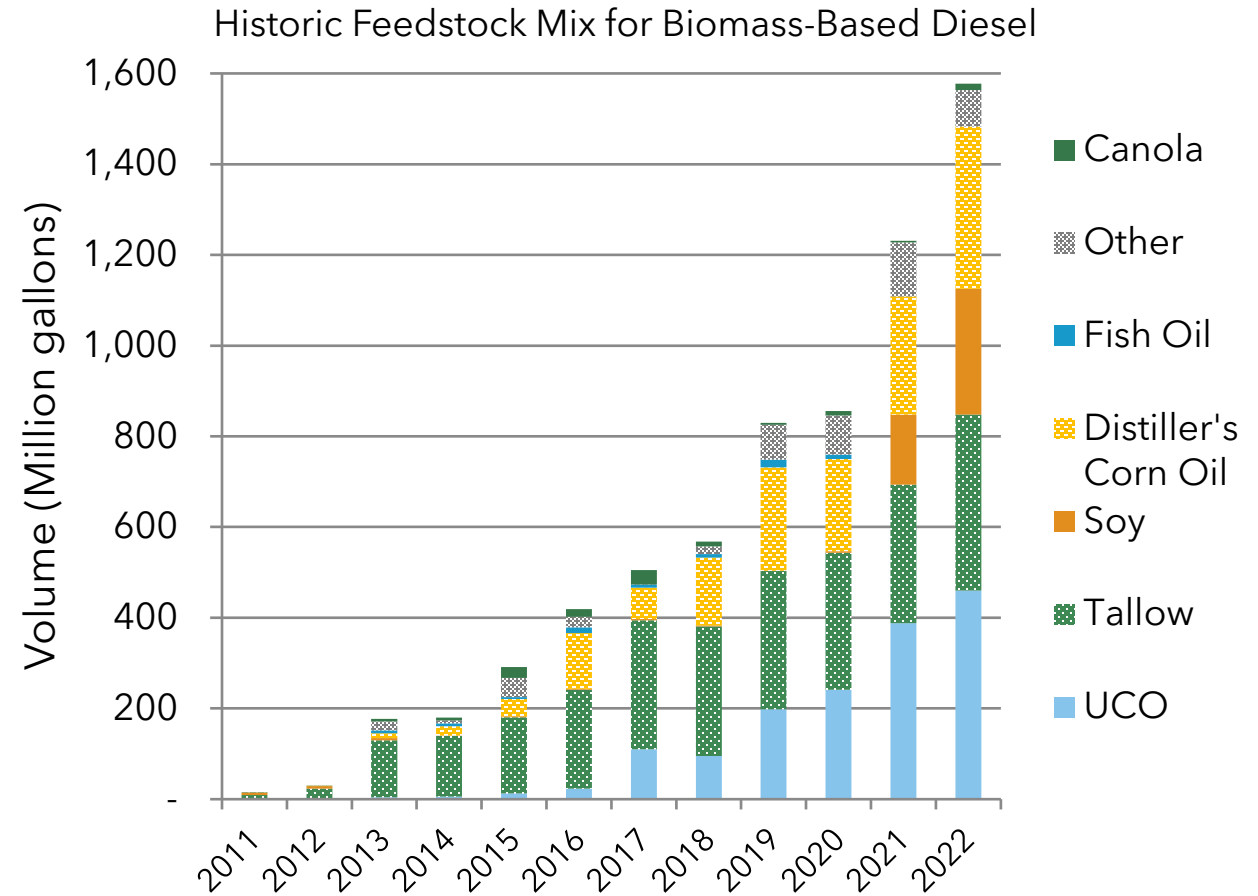
- Short-term vs long-term market conditions – how should staff approach the increased stringency need? Is it a one-time near-term need or do stakeholders anticipate rapid and sustained decarbonization progress through the next 10+ years?
- Which approach can provide a smooth/sustained market signal to support deeper decarbonization in the 2030s?
- Should staff consider any changes to the trigger conditions for the AAM?

Crop-Based Biofuels Sustainability



Crop Sustainability

- Biofuel production must not come at the expense of deforestation or food production.
- CARB staff solicited feedback on crop-based biofuels sustainability concerns during past workshops
- Staff directed to investigate guardrails at the Sept 28, 2023 informational board hearing
- Staff 45-Day Proposal:
 - Require independent feedstock certification by a certification body approved by the Executive Officer
 - Built in timeline to develop those standards and approval processes by third party certifiers
 - Remove palm-derived fuels from eligibility for credit generation
- Also considering other changes

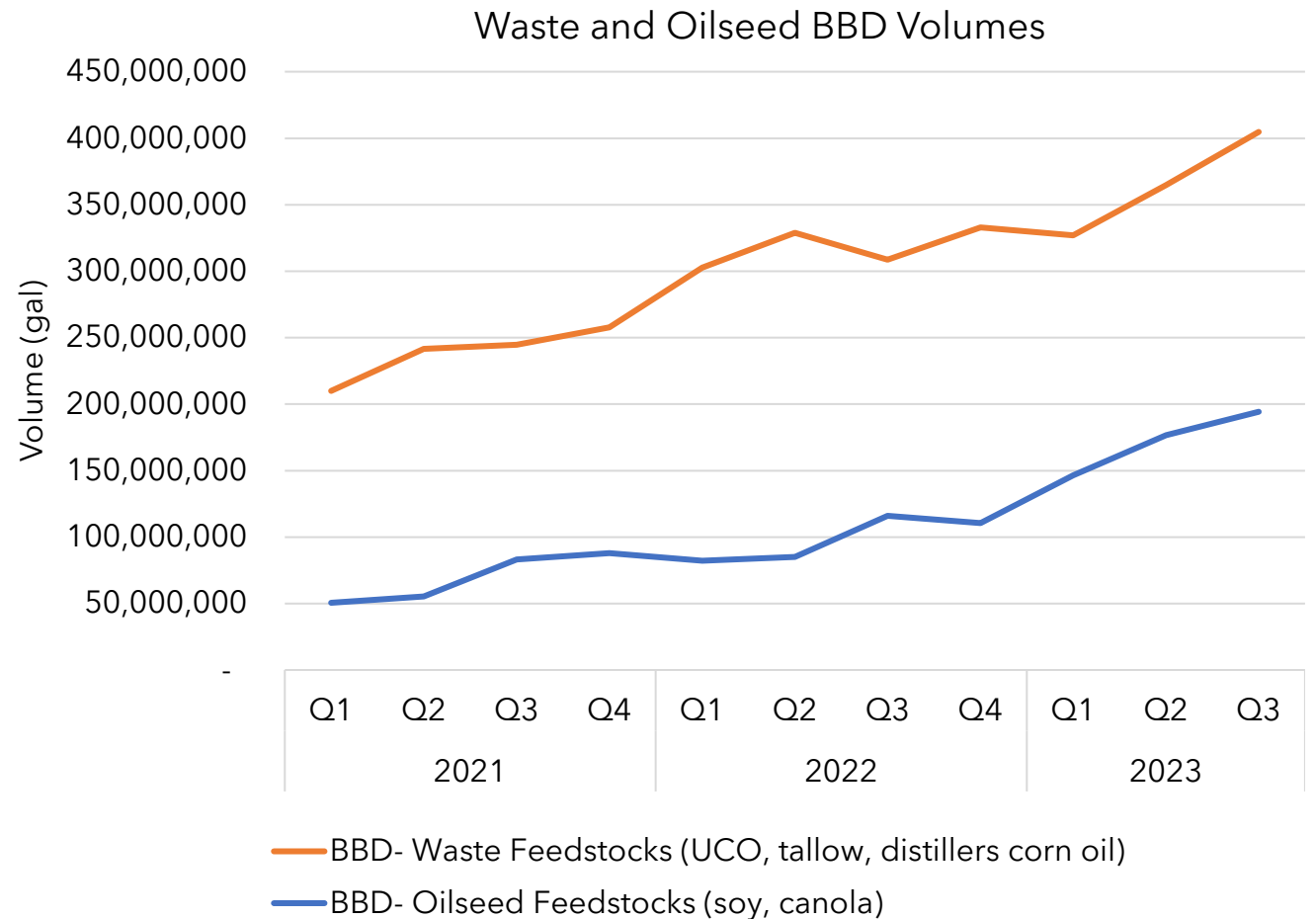


Topics for Discussion

- How has crop-based oil seed demand and production changed as biomass-based diesel (BBD) volumes increased?
- Does evidence show that BBD production is increasing crop-based oilseed demand and/or prices?
- Is the increase in BBD production resulting in deforestation and/or food system impacts?
- What guardrails should be included in the LCFS program?
- Given existing combustion engines persist, what liquid fuel options exist to meet demand and support GHG and air quality needs?
- Should E15 be considered to help reduce retail gasoline costs?

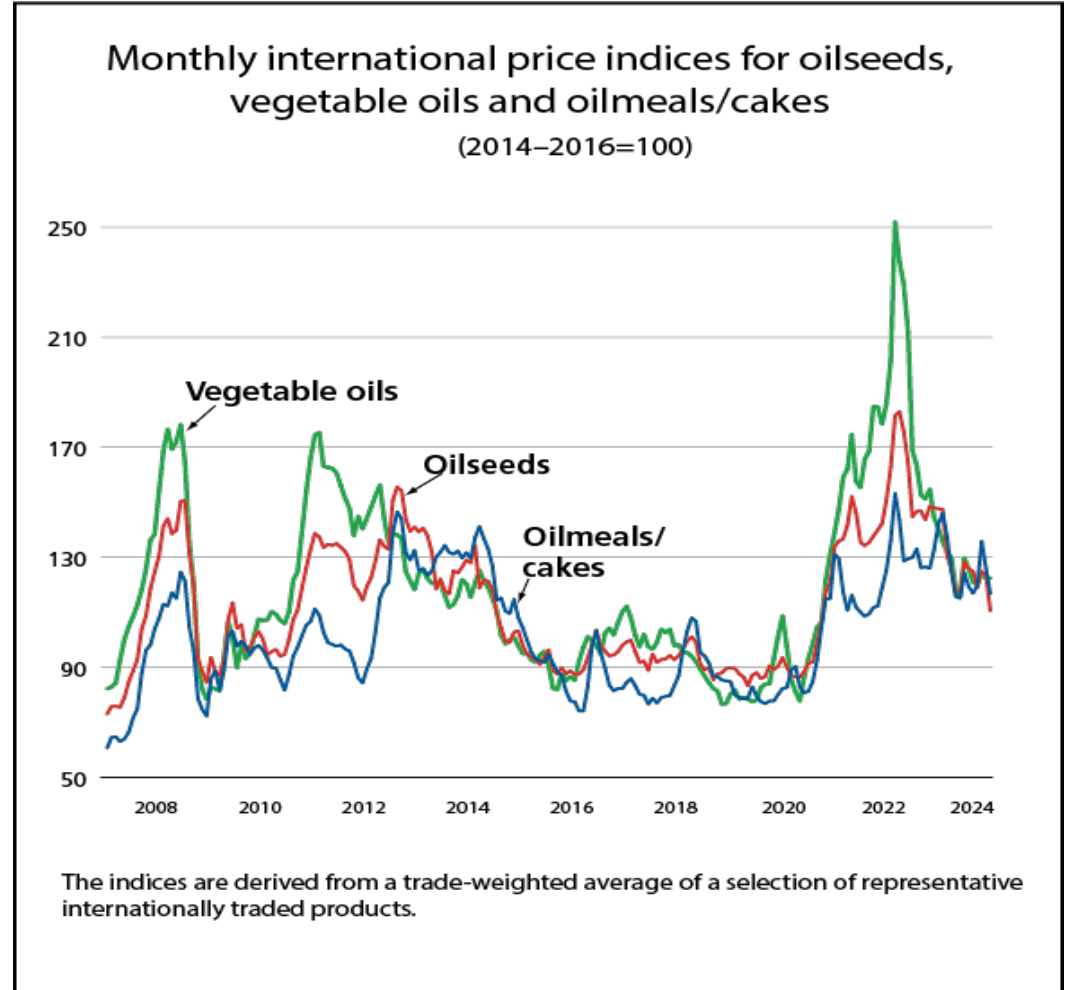
Recent Feedstock Trends in BBD

- Both waste-based and oilseed feedstocks have increased
- Rapid rise in 2021, mainly from increased soy usage
- From 2022-2023, waste-based feedstocks have risen more rapidly than oilseed feedstocks



Crop-based Oil Prices

- Rapid rise in oil prices in 2021 and 2022
- Many factors affected oil prices:
 - Pandemic supply disruptions/inflation
 - Lower production from Canada, US, Europe and Ukraine in 2021 of oilseed crops (canola and sunflower) increased soy demand
 - Russian/Ukraine war began in 2022 impacted sunflower oil supply
 - Increased US and international demand for biofuel production



Sources:

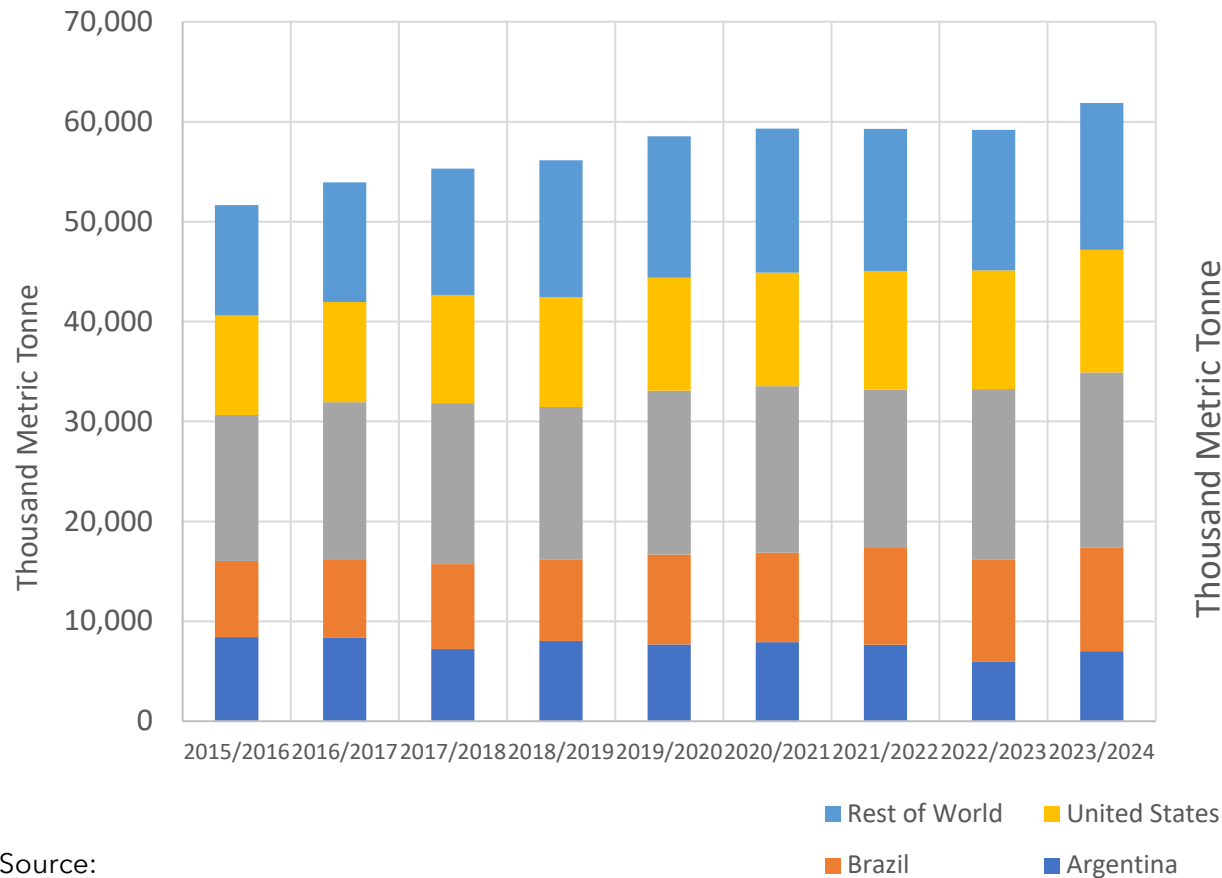
UN Food and Agriculture Organization Vegetable Oil Price Index, Jan 2024

USDA *Examining Record Soybean Oil Prices in 2021–22*

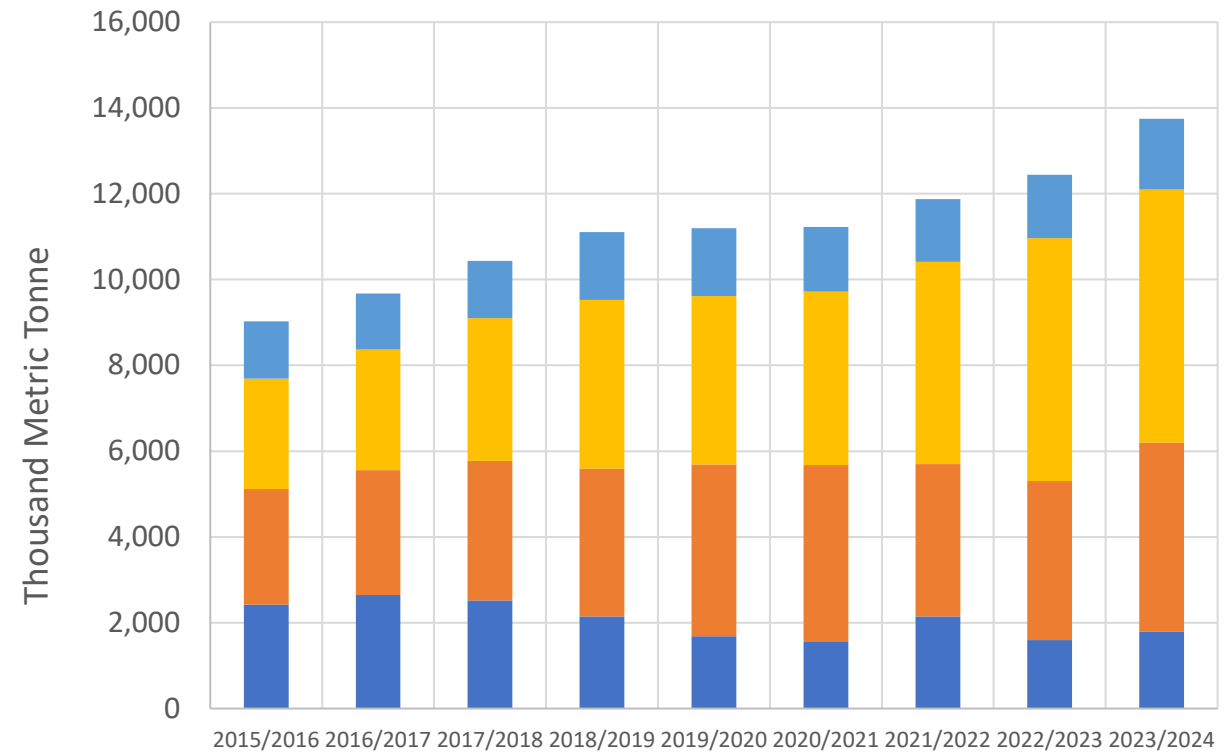
USDA *Oil Crops Outlook: May 2023*

Soy Oil Market Trends – International and U.S.

Soy Oil Production by Country

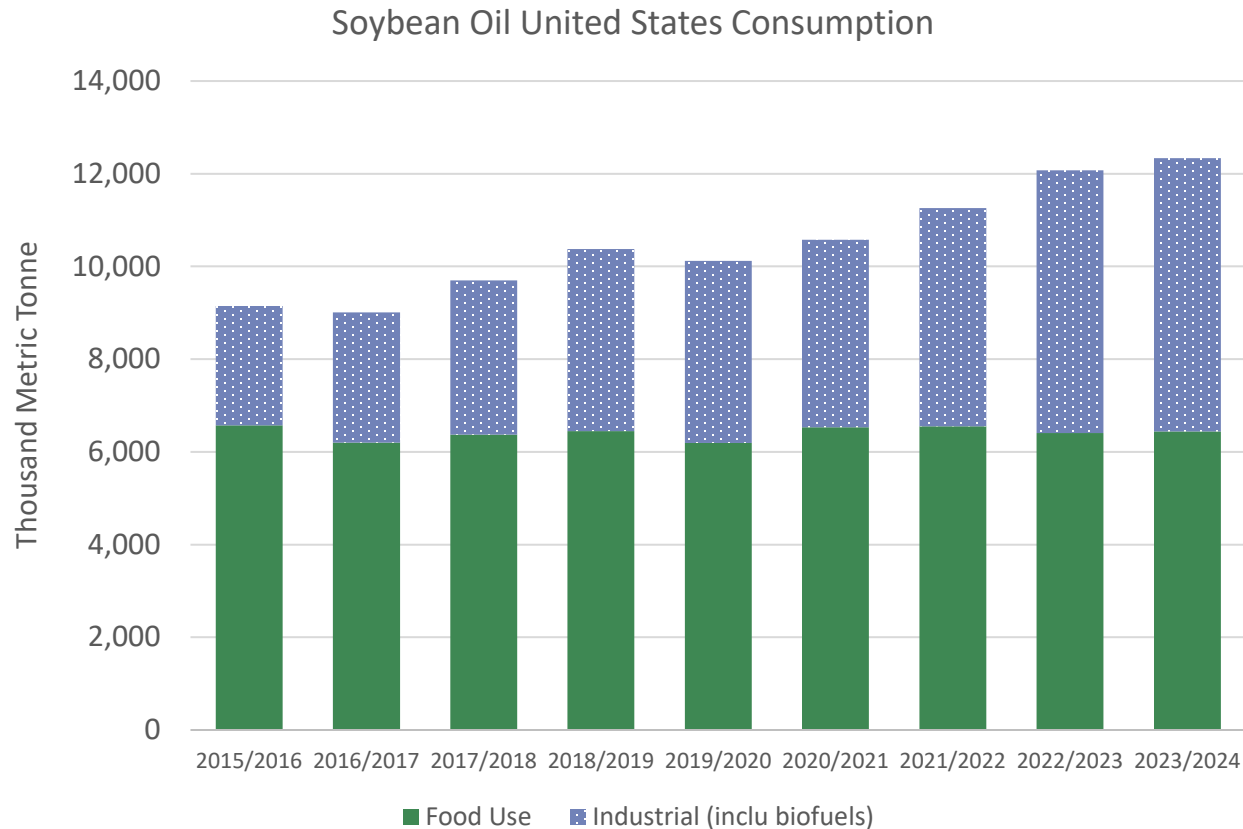


Soy Oil Domestic Industrial Consumption (incl. biofuel production)



Source:
USDA Foreign Ag Service:
<https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery>

Soy Oil Market Trends – U.S. Consumption



- Yield, crush capacity, and acres projected to increase. Exports decreasing.
- Soy oil uses – food (dressing/mayo), fuels (BD, RD, SAF), and bio-plastics
- Soy meal production also increases with oil production.
- Soy meal uses – livestock feed

Source:
USDA Foreign Ag Service:
<https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery>

Data Trends and Guardrails

- CI incentives working to prioritize waste-based feedstocks
- BBD volumes increasing and likely to increase in the future given announced capacities
- Recent virgin oil trends suggest increasing investments and reduced exports are happening to increase virgin oil supply
- Based on current and future understanding of market conditions, it is uncertain if substantial increases in virgin oil fuel use in California will occur over long-term
- Guardrails still warranted to reduce risks of potential impacts from increased demand of virgin oils in CA LCFS and inform other clean fuels program design

Guardrails include multiple mechanisms

Priority	Approach / Strategy
Encourage use of waste-based feedstocks	<ul style="list-style-type: none">• CI scores reflect waste-derived fuels• Feedstock tracking for waste feedstocks• For other non-waste-based feedstocks, include GHG emissions coming from feedstocks production and transport. Also include impacts from potential land-use change (LUC)
Minimize/avoid deforestation risks from feedstock production and risks of impacting food prices/availability	<ul style="list-style-type: none">• Include LUC in CI scores• Eliminate any crediting for Palm Oil*• Require Sustainability Certification*• Prohibit crop or forestry feedstocks from land forested after 2008*• Consider increases in LUC for certain fuel/feedstock combos**• Additional detailed traceability, verification and/or enforcement of waste feedstocks to avoid fraud**
Reduce other impacts of agricultural practices in feedstock production	<ul style="list-style-type: none">• Require Sustainability Certification*

*45-day proposal

**Staff are continuing to evaluate these options

Provisions to Encourage Waste Based Feedstocks

- LCFS program accounts for land use change emissions associated with crop-based biofuels and incentivizes waste- and residue-based feedstocks (for which no indirect effects are assigned in LCFS)
- Majority of biomass-based diesel produced from waste feedstocks
 - Waste based feedstocks require are considered a “specified source feedstock”
 - Specified source feedstocks must provide chain-of-custody documentation, which traces feedstock to point-of-origin
- For non-waste feedstocks, carbon intensity score includes land-use change value
 - Land use change quantified in LCFS since 2011
 - Extensive multi-year land use change expert workgroup informed updates to land use change values in 2015 rulemaking*

Proposed Sustainability Language in 45-Day

- Would provide additional protections against deforestation and habitat loss from fuel feedstocks
- Crop or forestry feedstocks cannot come from land that was forested after January 1, 2008
- CARB would leverage existing certification programs
 - ISCC, RBS, REDcert, Bonsucro, etc. (Most already approved under EU Renewable Energy Directive)
 - Requires CARB approval and continuous oversight
- All crop- and forest-based feedstocks requires certification by January 1, 2028

What Sustainability Certifications Typically Include

- No cultivation occurred on areas that serve the purpose of nature protection
- Damage or deterioration of habitats is avoided
- Crops are grown on suitable soils and have good agricultural practices with respect to soil quality, soil contamination and soil erosion
- Fertilizer application does not contaminate the surface and ground water
- Responsible plant protection practices (insect treatments)
- Responsible waste management practices

Proposed LCFS Process in 45-day

- Feedstock providers interested in participating in the LCFS will select a CARB approved certification system
- Feedstock providers must meet all requirements to become certified under the selected program
 - Select a third-third party auditor
 - Auditor will confirm accuracy of registration information and conformance with certification program's sustainability requirements
- Successful process will result in issuance of traceable certificates
- LCFS pathways holders must provide certificates to CARB-accredited verifiers and CARB upon request

Sustainability Audit Process

- Auditors conduct the following tasks:
 - Perform site visit(s)
 - Confirmation of land use change date (before/after 2008)
 - Ensure cropping practices meet sustainability requirements
 - Review of management systems
 - Review of social practices (e.g., worker treatment)
 - Review compliance with, all applicable regional, national laws and international laws
 - Review economic sustainability of the applicant (e.g., farm)
- Auditor will require correction or changed before certificates are issued

Land-Use Change Values Under Staff Evaluation

- Under current reg language, applicants use LUC values from Table 6 if their feedstock is listed
- Table 6 values were estimated during CARB's 2015 GTAP analysis and reflect region-specific biofuel shocks (e.g., US soy, Brazilian sugarcane)
- Table 6 values may not be accurate for applicants sourcing feedstocks from outside 2015 analysis area
- Staff is looking into a mechanism to assign higher LUC values than Table 6 to high-risk crop-based feedstocks entering the LCFS as part of the pathway process

Biofuel	LUC (gCO ₂ /MJ)	2015 Analysis Area
Corn Ethanol	19.8	U.S.
Sugarcane Ethanol	11.8	Brazil
Soy Biomass-Based Diesel	29.1	U.S.
Canola Biomass-Based Diesel	14.5	North America
Grain Sorghum Ethanol	19.4	U.S.
Palm Biomass-Based Diesel	71.4	Indonesia/ Malaysia

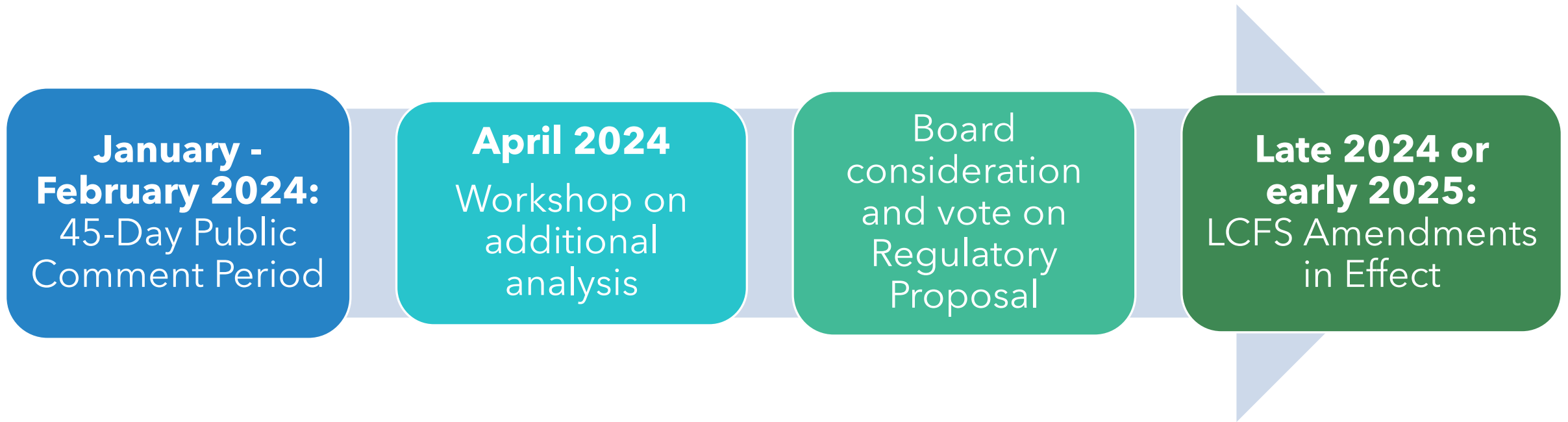
Land Use Change Evaluation – Initial Concept

- As part of an individual fuel pathway, staff would evaluate and provide updated LUC values for a fuel and feedstock combination not covered by a Table 6 value
- LUC evaluation would be based on **empirical** sub-national production data
- Example of potential LUC data sources:
 - Remote sensing studies that attribute LUC to crop feedstock expansion at national or regional scales (e.g., academic research articles)
 - Satellite-based land use monitoring platforms (e.g., Global Forest Watch, Mapbiomas-Brazil) that provide annual tracking of LUC for commodity crop expansion
- Staff is seeking feedback on approach and potential data sources

Staff Summary

- 45-day proposal aligns with implementation needs of existing ZEV regulations
 - LCFS has supported private investment in ZEV infrastructure and fuels
 - It is not a government directed funding source like GGRF
- Transition to MDV/HDV ZEVS will take longer than transition to LDV ZEVs
 - Science supports the use of alternative fuels in the near-term to continue transition away from petroleum fuels and deliver GHG and AQ benefits, especially diesel
 - Reducing VMT does not reduce diesel demand in MDV/HDV and offroad
- Increased stringency brings additional GHG and air quality benefits, particularly for MHD, but need to balance multiple objectives when considering options for increased stringency.
 - Potential role of E15 to reduce costs at the pump for LD fuel use
- Biofuels market undergoing rapid changes and there is uncertainty on future volumes, guardrails to reduce risks are important.

Rulemaking Timeline



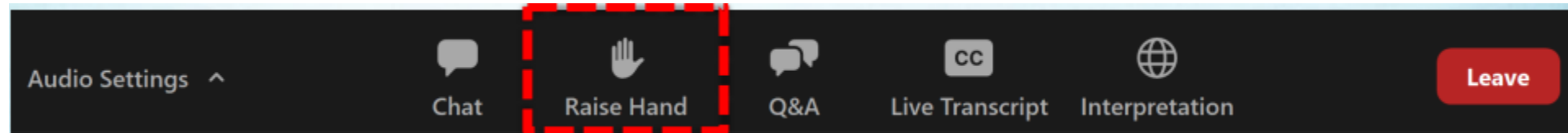
Public Comments

- Process

- Comments will be taken by in-person attendees and virtually through Zoom
- 3 minutes per comment
- Staff will make every effort to call on commenters in the order they signal they would like to comment or raise the hand on Zoom

- Zoom Orientation

- “Raise Hand” to signal that you’d like make a comment
- Zoom phone participants may dial #2 to raise your hand
- Staff will inform Zoom phone participants when they are unmuted during public comment
- Dial *6 to mute or unmute



Written comments can be submitted after the workshop at:

<https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard/lcfs-meetings-and-workshops>

FOOTNOTE 5
ATTACHMENT

Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information

Proposed Low Carbon Fuel Standard Amendments

Public Hearing Date: November 8, 2024
Public Availability Date: August 12, 2024
Deadline for Public Comment: August 27, 2024

CARB has determined that additional modifications are appropriate for the proposed amendments and has developed the proposed modifications (15-Day Changes) as stated below in the “Summary of Proposed Modifications” section of this notice. The Attachments showing the specific proposed modifications to the text of the proposed regulation being made with these 15-Day Changes are shown in multiple ways in order to meet the requirements of the Administrative Procedure Act (APA) while also posting alternate/complementary versions that provide increased accessibility to view the modifications in multiple ways.

The Attachments are as follows:

Attachment A - Amendments to Sections 95481, 95482, 95483, 95483.2, 95484, 95485, 95486, 95486.1, 95486.2, 95486.3, 95486.4, 95487, 95488, 95488.1, 95488.3, 95488.5, 95488.6, 95488.7, 95488.8, 95488.9, 95488.10, 95489, 95490, 95491, 95491.1, 95491.2, 95495, 95500, 95501, and 95503, Title 17, California Code of Regulations

- Attachment A-1: Proposed 15-Day Modifications to Proposed Regulation Order (Proposed Sections for Amendments) (compared to version released for 45-day comments)
- Attachment A-1.1: ~Alternative format to Attachment A-1 (Proposed Sections for Amendments)~
- Attachment A-1.2: Proposed 15-Day Modifications to Proposed Regulation Order (15-Day Modifications and 45-Day Modifications combined and compared to existing regulatory text) in Alternative format
- Attachment A-2: Proposed 15-Day Modifications to Proposed Regulation Order (Proposed Sections for Adoption) (compared to version released for 45-day comments)
- Attachment A-2.1: ~Alternative format to Attachment A-2 (Proposed Sections for Adoption)~

The Attachments showing the specific proposed modifications to the text of the proposed regulation orders available for comment with this Notice are provided in the two formats denoted with the suffixes “-1,” “-1.1,” “-2,” and “-2.1.”

In the version denoted Attachments A-1 and A-2, the 45-Day Changes (proposed regulatory language as posted on December 19, 2023, are shown in “normal type.” The deletions and additions to the 45-Day Changes that comprise the 15-day Changes that are being made public and available for comment with this Notice are shown in ~~strikeout~~ to indicate deletions and underline to indication additions.

In the version denoted Attachments A-1.1 and A-2.1, the 15-Day Changes are provided in a tracked-changes format to meet the requirement for accessible electronic documents. The 45-Day Changes are incorporated into this version as plain, clean text because they are not being made available for public comment by this Notice. The Proposed 15-day Changes are shown in tracked changes and are made public with this Notice and available for comment. To review this document in a clean format, without underline or strikeout to show changes, that shows all the proposed regulations being considered for adoption, please select “Simple Markup” or “No Markup,” or accept all changes in Microsoft Word’s Review menu. You can also change the view to the initially proposed 45-Day Changes (originally proposed regulatory text prior to these proposed modifications) by selecting “Original” or rejecting all tracked changes. Additionally, “Advanced Track Changes Options” will allow for further options regarding color and other markings.

In the version denoted Attachment A-1.2, the existing, original regulatory language currently adopted into the California Code of Regulations (pre-45-Day Changes) is shown as plain, clean text, while the 45-Day Changes and the proposed 15-Day Changes are combined and shown in tracked changes. To review the net proposal in this document in a clean format (no underline or strikeout to show changes), please select “Simple Markup” or “No Markup” in Microsoft Word’s Review menu or accept all changes. You can also change the view to the original (originally proposed regulatory text prior to any proposed modifications, or 45-Day Changes) by selecting “Original” or rejecting all tracked changes. By progressing through the changes and comparing them with the 15-Day Changes, the public can see the net and stepwise changes being proposed in relation to existing law. Please refer to the versions denoted A-1 and A-2 to review the 15-Day Changes available for comment and its companion/alternate version A-1.1 and A-2.1 to view an accessible version showing the 15-Day Changes.

In the Final Statement of Reasons, staff will respond to all comments received on the record during the comment periods. The APA requires that staff respond to comments received regarding all noticed changes. Therefore, staff will only address comments received during this 15-day comment period that are responsive to this notice, documents added to the record, or the changes detailed in Attachments A-1.1 and A-2.1.

Summary of Proposed Modifications

Clarifications and error corrections were made to the Tier 1 calculators and Instruction Manuals in response to public comments.

The following summary does not include all modifications to correct typographical or grammatical errors, changes in numbering or formatting, nor does it include all of the non-substantive revisions made to improve clarity.

Modifications to Section 95481. Definitions and Acronyms.

1. In section 95481(a), staff proposes to add, delete, or modify a number of definitions, including but not limited to: “Alternative Jet Fuel,” “Feedstock First Collection Point,” “Feedstock First Gathering Point,” “Food Scraps,” “LCFS Data Management System,” “Organic Waste,” “Private LMD-FCI Charging Site,” “Private HD-FCI Charging Site,” “Private LMD-HRI Station,” “Private HD-HRI Station,” “Public LMD-FCI Charging Site,” “Public LMD-HRI Station,” “Recovered Organics,” “Renewable Diesel,” “Renewable Gasoline,” “Rural Area,” “Shared HD-FCI Charging Site,” “Shared HD-HRI Station,” and “Fossil Jet Fuel used for Intrastate Flight.”

Modifications to Section 95482. Fuels Subject to Regulation.

1. In section 95482(a), staff proposes to remove “Fossil Jet Fuel” from the list of transportation fuels that the LCFS applies to. Staff initially proposed to eliminate the LCFS exemption for fossil jet fuel as to intrastate fossil jet fuel. Staff estimated that the proposal would result in the generation of deficits for around 10% of fossil jet being used in California. Public commenters noted that the original proposal did not guarantee that airlines would procure and use alternative jet fuel as a compliance response to the deficits generated from fossil jet fuel. Aviation fuel suppliers who would generate deficits under the initial proposal could simply acquire credits to meet that compliance obligation. Staff remains committed to finding effective ways to reduce emissions from the aviation sector through the production and use of cleaner aviation fuels and other low-carbon alternatives to fossil jet fuel. CARB also recently released a [fact sheet](#) on partnering with federal and local agencies to address harmful air pollution at airports.
2. In section 95482(c), staff proposes to restore the existing exemption for all fossil jet fuel. This proposed modification is necessary to maintain consistency with the modification to subsection 95482(a) discussed above.
3. With the proposed addition of subsection 95482(h), staff proposes to remove LCFS credit generation eligibility for hydrogen produced using fossil gas as a feedstock, effective January 1, 2031. The 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan Update)¹ identified a need for low-carbon, renewable hydrogen for the transportation sector (among other sectors) to displace fossil fuels in support of achieving the State’s greenhouse gas emission reduction goals. The 2022 Scoping Plan Update scenario did not include hydrogen produced from fossil fuels, with or without carbon capture as low-carbon, renewable hydrogen. Instead, it identified as low carbon and renewable hydrogen produced through steam methane reformation of biomethane,

¹ California Air Resources Board. 2022 Scoping Plan for Achieving Carbon Neutrality. November 16, 2022. https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp_1.pdf

electrolysis, and biomass gasification. Staff is proposing to remove LCFS crediting eligibility for hydrogen produced from fossil fuels at the end of 2030 to align with the current operational timeline for projects funded under the hydrogen hubs grants, which will expand the supply of renewable hydrogen in California.²

4. With the proposed addition of subsection 95482(i), staff is proposing to provide credits for biomass-based diesel produced from virgin soybean oil and canola oil for up to 20 percent of annual biomass-based diesel reported on a company-wide basis. Biomass-based diesel from virgin soybean and canola oil in excess of 20 percent will be assessed the carbon intensity of the applicable diesel pool benchmark for that year, or the certified carbon intensity of the applicable fuel pathway; whichever is higher. California currently leads the nation in ZEV sales and stocks. As auto manufacturers comply with increasing ZEV sales requirements and as California prioritizes waste feedstocks and advanced decarbonization technologies, the State must ensure that other regions are able to also access increasing volumes of low-carbon alternative fuels. California expects that overall diesel demand will decline in the State over the coming decades due to the State's portfolio of ZEV and clean fuel policies. This proposed addition allows for California to displace up to 100% of the State's current fossil diesel demand with cleaner alternative diesel. The proposed addition also avoids sending a long-term signal for virgin soy or canola oil to serve California demand. For companies that already have a certified fuel pathway prior to the effective date of the amendments and for which the percentage of biomass-based diesel produced from virgin soybean oil or canola oil was greater than 20 percent of combined reported biodiesel and renewable diesel quantities for that company's 2023 LCFS reporting, this provision would take effect starting January 1, 2028, to provide time to adjust feedstock supply contracts as needed. All other companies would be subject to this requirement upon the effective date of the amended regulation.

Modifications to Section 95483. Fuels Reporting Entities.

1. In section 95483(a), staff proposes to remove fossil jet fuel from the list of liquid fuels. This proposed modification is necessary for consistency with the proposed modifications to subsections 95482(a) and 95482(c) discussed above.
2. In subsection 95483(a)(1)(C), staff proposes to remove the initially proposed narrower exemption for fossil jet fuel to be consistent with the proposal to restore the broader exemption in subsection 95482(c) discussed above.
3. In subsection 95483(c)(1), staff proposes modifications to allow the Executive Officer to assign a portion of base credits to Original Equipment Manufacturers (OEM) of electric vehicles, if model year 2024 ZEV sales for vehicle classifications subject to the Advanced Clean Cars regulation are less than 30 percent of new vehicle sales. Continued consumer facing support for the light duty vehicle sector is important to help achieve the state's air quality and climate goals as soon as possible. In subsection (c)(1)(B), staff proposes that the Executive Officer may direct up to 45 percent of base credits to OEMs. OEMs must spend base credit proceeds to support transportation electrification, including a number of eligible project types, such as rebates and incentives for individuals purchasing or leasing new or previously-owned EVs, installing

² ARCHES H2. *California's renewable hydrogen hub officially launches*. July 17, 2024. <https://archesh2.org/arches-officially-launches/>

EV infrastructure, marketing and outreach programs in California, or other projects approved based on specified regulatory criteria. Similar to the holdback equity requirements, OEMs may not spend more than 7% of total base credit funding on administrative costs. If the OEMs receive base credits, utilities will no longer be required to contribute to a Clean Fuel Reward program, and credits available for holdback equity projects are unaffected.

4. In subsection 95483(c)(1)(A)5., staff proposes to remove as unnecessary the specified date of January 1, 2025, for implementation of amendments to the holdback equity program requirements. Any proposed amendments to holdback equity program requirements adopted by CARB and approved by the Office of Administrative Law will be effective starting on the applicable effective date.
5. In subsection 95483(c)(1)(A)5.c., staff proposes to increase the percentage of administrative cost of holdback credit equity projects from 5% to 7%. This increase is necessary in order to ensure utilities have the sufficient staffing to expeditiously use holdback funds for equity purposes.
6. In subsection 95483(c)(1)(C)1.b., staff proposes to remove the demonstration requirement for generating incremental credits for smart charging. The required enrollment in an available Time of Use rate plan with the LSE serving the residence was designed to ensure fidelity for reporting purposes. But telemetries and other data collection methods that are now universally available for reporting to the smart charging pathway make the current requirement unnecessary.

Modifications to Section 95483.2. LCFS Data Management System.

1. In subsection 95483.2(b)(8)(B)6., staff proposes to correct the term “FSE” to “equipment” with regard to the registration requirements for electric forklifts, electric cargo handling equipment, electricity provided to ocean-going vessels at berth, and electric transport refrigeration units.

Modifications to Section 95484. Annual Carbon Intensity Benchmarks.

1. In section 95484(b)(2)(A), staff proposes to add the word “annual” as clarification that the deficit quantity relied upon as part of the auto adjustment mechanism trigger is a full year’s worth of deficits.
2. In sections 95484(d) through (f), staff proposes to modify the average carbon intensity benchmarks for gasoline and fuels used as a substitute for gasoline, diesel fuel and fuels used as a substitute for diesel fuel, and fuels used as a substitute for fossil jet fuel in Tables 1, 2, and 3, respectively, for various years. Specifically, staff is proposing to modify the near-term increase in stringency to a 9% CI reduction in 2025 from the 5% year-to-year increase included in the initial amendments proposal. Staff is proposing this increase in near-term ambition in light of the continued growth in low-carbon fuels and in response to stakeholder feedback requesting an increase in stringency to bring deficits and credits into balance. The compliance targets between 2025 and 2030 are adjusted in the 15-day modifications package to smooth the curve between the more ambitious 2025 compliance target and the originally-proposed 30% reduction in 2030, which staff are proposing to maintain. The proposed compliance target for 2025 will take effect for Quarter 1, 2025 reporting if the Proposed Amendments become effective prior to April 1, 2025, which marks the beginning of the Quarter 1 2025 reporting period. See

Attachment C to this notice for more discussion regarding the proposed compliance targets.

Modifications to Section 95486.1. Generating and Calculating Credits and Deficits Using Fuel Pathways.

1. In subsection 95486.1(a)(1), staff proposes to remove fossil jet fuel from the equation to calculate credits and deficits using fuel pathways. This proposed modification is necessary to maintain consistency with the modifications to subsections 95482(a) and (c) discussed above restoring the broader fossil jet fuel exemption.
2. In section 95486.1(a)(4), staff proposes to remove the pre-2011/post-2010 delineation for Fixed Guideway System crediting. This adjustment provides equal treatment to all fixed guideway systems for the purposes of LCFS crediting and improves LCFS support for transit services in California.
3. In section 95486.1(a), Table 5, staff proposes to update the EER values for electricity forklifts with lift capacity less than 12,000 pounds and hydrogen fuel cell forklifts with lift capacity less than 12,000 pounds. In 2010, the baseline year for the LCFS regulation, the population of forklifts with lift capacity less than 12,000 pounds was already one-half electrified. The proposed updated EER value for electricity forklifts with lift capacity less than 12,000 pounds takes into account both the electrified and non-electrified portions of that baseline forklift population. The revised EER takes the average of 1 (when comparing to electric forklifts) and the original EER of 3.8 (when comparing to combustion engine forklifts), and the analogous approach is applied to fuel cell forklifts.

Modifications to Section 95486.2. Generating and Calculating Credits for ZEV Fueling Infrastructure Pathways.

1. In subsection 95486.2(a)(1), staff proposes to sunset the application eligibility for HRI pathways. Applications for the HRI pathway will not be accepted once applications for the LMD-HRI and HD-HRI pathways are being accepted, starting with the effective date of the 2024 amendments.
2. In subsection 95486.2(a)(3)(A), staff proposes to modify the equation used to calculate whether HRI applications will continue to be approved, using data from the most recent quarter data are available, rather than the prior quarter. As credit generation occurs in the first quarter, is reported in the second quarter, and is issued in the third quarter, decisions in the third quarter are often made using first quarter data, not second quarter data.
3. In subsection 95486.2(a)(4)(E), staff proposes to clarify that an FSE must dispense hydrogen in a given quarter to generate HRI credits, consistent with the intent stated in the 2018 LCFS Final Statement of Reasons.
4. In subsection 95486.2(a)(6)(C), staff proposes to modify the reporting and recordkeeping requirements for HRI applications. Cost and Revenue data will be reported yearly, rather than quarterly, to reduce the reporting burden on HRI applicants without any loss of data.
5. In subsection 95486.2(a)(7), staff proposes to remove the section of the regulation describing the transition to light-duty hydrogen refueling infrastructure pathways. The proposed creation of section 95486.3 replaces this transition of the original HRI pathway

into light-duty HRI pathway. The original HRI pathway and proposed light- and medium-duty pathways will exist concurrently under the same 2.5 percent of deficits cap, as described in section 95486.3(a)(2).

6. In subsection 95486.2(b)(1)(B), staff proposes to sunset the application eligibility for FCI pathways. Applications for the FCI pathway will not be accepted once applications for the LMD-FCI and HD-FCI pathways are being accepted, starting the effective date of the 2024 amendments.
7. In subsection 95486.2(b)(1)(D), staff proposes to reduce the FSE minimum nameplate power rating to 50 kW. 50 kW chargers can more easily provide fast charging services in remote areas and other areas where the distribution system may currently bottleneck total available power for charging.
8. In subsection 95486.2(b)(3)(A), staff proposes to modify the condition for which FCI credits could generate credits. Limiting a single applicant to 20% of available credits ensures significant participation in the program by many applicants, allowing multiple technologies and business methods to benefit from the incentive.
9. In subsections 95486.2(b)(3)(B) and (C), staff proposes to modify the equation used to calculate whether FCI applications will continue to be approved, using data from the most recent quarter data are available, rather than the prior quarter. As credit generation occurs in the first quarter, is reported in the second quarter, and is issued in the third quarter, decisions in the third quarter are often made using first quarter data, not second quarter data.
10. In subsection 95486.2(b)(4)(F), staff proposes to clarify that an FSE must dispense electricity in a given quarter to generate FCI credits, consistent with the intent stated in the 2018 LCFS Final Statement of Reasons.
11. In subsection 95486.2(b)(6)(B), staff proposes to modify the reporting and recordkeeping requirements. Cost and Revenue data will be reported yearly, rather than quarterly, to reduce the reporting burden on FCI applicants without any loss of data.
12. In subsection 95486.2(b)(7), staff proposes to remove the section of the regulation describing the transition to light-duty fast charging infrastructure pathways. The proposed creation of section 95486.3 replaces this transition of the original FCI pathway into light-duty FCI pathway. The original FCI pathway and proposed light- and medium-duty pathways will exist concurrently under the same 2.5 percent of deficits cap, as described in section 95486.3(b)(2).

Modifications to Section 95486.3. Generating and Calculating Credits for ZEV Fueling Infrastructure Pathways for Light- and Medium-Duty Vehicles.

1. In section 95486.3(a), staff proposes to add a new section for HRI pathways for light- and medium-duty (LMD) hydrogen refueling stations. This section replaces previously proposed subsection 95486.2(a)(7) and includes the medium-duty portion of the previously proposed section “Medium- and Heavy-Duty Hydrogen Refueling Infrastructure (MHD-HRI) Pathways”. Combining the light- and medium-duty vehicles into a single HRI program simplifies credit calculation for the pathway and provides additional credit space for the heavy-duty vehicles in the HD-HRI program. The maximum HRI capacity of LMD-HRI stations is proposed to be increased to 2,000 kg/day in recognition of additional demand from medium-duty vehicles.

LMD-HRI stations are proposed to be categorized into public and private stations: public stations continue to be credited at one-half their HRI capacity, while private stations will be credited at one-quarter their HRI capacity. This provision allows private stations to participate in the program, while providing greater incentive to public stations, which likely face larger economic barriers to install and operate given that the refueling demand varies from day to day. Terminology is also updated throughout section 95486.3 to reflect the grouping of MD vehicles with the LD provision.

2. In section 95486.3(b), staff proposes to add a new section for FCI pathways for light- and medium-duty (LMD) charging sites. This section replaces previous proposed subsection 95486.2(b)(7) and includes the medium-duty portion of the previously proposed section “Medium- and Heavy-Duty Hydrogen Refueling Infrastructure (MHD-HRI) Pathways”. Combining the light- and medium-duty vehicles into a single FCI program simplifies credit calculation for the pathway and provides additional credit space for the heavy-duty vehicles in the HD-FCI program. The minimum nameplate capacity for LMD-FCI chargers is proposed to be returned to 50 kW to accommodate different charging demands from light- and medium-duty vehicles. LMD-FCI sites are proposed to be categorized into public and private sites: public stations continue to be credited at 20% of their FCI capacity, while private stations will be credited at 10% their FCI capacity. This provision allows private charging sites to participate in the program, while providing greater incentive to public sites for the same reason listed above for the LMD-HRI program.

Addition of Section 95486.4. Generating and Calculating Credits for ZEV Fueling Infrastructure Pathways for Heavy-Duty Vehicles.

1. In section 95486.4(a), staff proposes to modify the section for HRI pathways to apply exclusively to heavy-duty (HD) hydrogen refueling stations. This section was formerly numbered 95486.3(a) and included both medium- and heavy-duty (HD) hydrogen refueling stations. Several of the other proposed changes in section 95486.4 are designed to better-fit HD refueling needs, now that the MD vehicles are grouped with the LD provisions. Terminology is also updated throughout section 95486.4 to reflect the new grouping of MD vehicles with the LD provision.
2. In section 95486.4(a)(1), staff proposes to modify the HD-HRI pathway eligibility. The gross vehicle weight accessibility is raised to 14,001 lbs, as medium duty vehicles are now in a separate program. The distance requirement is limited to shared HD-HRI stations and extended to five miles from any ready or pending FHWA Alternative Fuel Corridor. Private stations’ distances to corridors are not relevant to the service they provide, while a distance of five miles from a corridor for shared stations provides adequate distance to ensure availability of utility services to stations while still supporting an easily-accessible hydrogen refueling network.
3. In section 95486.4(a)(3), staff proposes to modify the HD-HRI application approval process. Participation in the program by a single applicant is limited to 40% of the available credits, ensuring that multiple applicants can participate in the program. There are currently six participants in the HRI program.
4. In section 95486.4(a)(4), staff proposes to modify the requirements to generate HRI credits. Staff proposes to clarify in the regulation that only stations available to the public are subject to the accessibility requirements listed in section 95486.4(a)(4), and those stations must only accept fuel cards if the applicant accepts those same fuel

cards at other stations that they operate. Private and shared HD-HRI stations can decide the level of access and payment method that satisfies the service the private and shared HD-HRI stations provide. A shared HD-HRI station cannot be reserved for one HDV fleet for more than 12 hours each day, to ensure that private stations cannot be slightly adjusted to meet shared station requirements without meeting the intent of the shared station provisions. A fleet can continue to use the station after its reservation period is over, but not to the exclusion of other fleets sharing the site. An FSE must dispense hydrogen in a given quarter to generate HRI credits, consistent with the intent stated in the 2018 LCFS Final Statement of Reasons. The initial capital expenditure is specified to exclude on-site generation, land, working capital, and off-site facilities. The “Net CapEx” limit in this section is intended to reimburse the essential elements of a hydrogen refueling station.

5. In section 95486.4(b), staff proposes to modify the section for FCI pathways to apply exclusively to HD charging sites. This section was formerly numbered 95486.3(b) and included both MD and HD fast charging stations.
6. In section 95486.4(b)(1), staff proposes to modify the HD-FCI pathway eligibility. The gross vehicle weight accessibility is raised to 14,001 lbs, as medium duty vehicles are now in a separate program. The distance requirement is limited to shared HD-FCI sites and extended to five miles from any ready or pending FHWA Alternative Fuel Corridor. Private sites’ distances to corridors are not relevant to the service they provide, while a distance of five miles from a corridor for shared sites provides adequate distance to ensure availability of utility services to sites while still supporting the HD EV charging network.
7. In section 95486.4(b)(2), staff proposes to modify the HD-FCI application requirements. The limitation on number of chargers is removed, as the limit on total power is sufficient alone to ensure that FCI incentivization is spread across many sites. The total power is increased to 40 MW, as medium-duty vehicles are no longer grouped in this program and heavy-duty charging sites are anticipated to be of this size. Applicants may also use a smaller FCI power rating than the nameplate power capacity for pathway calculation to include more chargers in the program.
8. In section 95486.4(b)(3), staff proposes to modify the HD-FCI application approval process. Participation in the program by a single applicant is limited to 20% of the available credits, ensuring that multiple applicants can participate in the program. There are currently 33 participants in the FCI program.
9. In section 95486.4(b)(4), staff proposes to modify the requirements to generate FCI credits. Staff proposes to clarify in the regulation that only stations available to the public are subject to the accessibility requirements listed in section 95486.4(b)(4), and those stations must only accept fuel cards if the applicant accepts those same fuel cards at other stations that they operate. Private and shared HD-FCI stations can decide the level of access and payment method that satisfies the service the private and shared HD-FCI stations provide. A shared HD-FCI site cannot be reserved for one HDV fleet for more than 12 hours each day, to ensure that private sites cannot be slightly adjusted to meet shared station requirements without meeting the intent of the shared station provisions. A fleet can continue to use the site after its reservation period is over, but not to the exclusion of other fleets sharing the site. An FSE must dispense electricity in a given quarter to generate FCI credits, consistent with the intent stated in the 2018 LCFS Final Statement of Reasons. The initial capital expenditure is specified to exclude

on-site generation, land, working capital, and off-site facilities. The “Net CapEx” limit in this section is intended to reimburse the essential elements of a fast charging site.

Modifications to Section 95488. Entities Eligible to Apply for Fuel Pathways.

1. In subsection 95488(d), staff proposes to give the Executive Officer discretion to stop accepting applications for new fuel pathways for biomass-based diesel starting January 1, 2031, if the number of unique Class 3-8 ZEVs reported or registered with the sources listed exceeds 132,000 ZEVs or near-zero-emission-vehicles (NZEV) on December 31, 2029. This threshold was derived from the CARB Strategy for the State Implementation Plan and reflects full implementation of the State’s MHD ZEV regulations. The proposal does not phase out existing biomass-based diesel fuel pathways, which may still report under their previously-certified CIs.

Modifications to Section 95488.1. Fuel Pathway Classifications.

2. In subsection 95488.1(b)(1), staff proposes to remove Fossil Jet Fuel receiving a Lookup Table Pathway. This proposed modification is necessary for consistency with the proposed modifications to subsections 95482(a) and 95482(c) discussed above.
3. In subsection 95488.1(d)(4), staff proposes to add “alcohol to hydrocarbons” to the illustrative list of drop in fuels, in order to clarify that drop in fuels include hydrocarbon fuels (e.g., sustainable aviation fuel (SAF)) derived from alcohols. An alcohol to hydrocarbon pathway such as converting starch and cellulosic ethanol to jet fuel is one potential method of producing SAF.

Modifications to Section 95488.3. Calculation of Fuel Pathway Carbon Intensities.

1. In section 95488.3(b), staff proposes to specify a process by which the Executive Officer may correct the Tier 1 CI Calculators if necessary to conform the methodological consistency of the calculator to the CA-GREET4.0 model. This proposed change is necessary to facilitate modeling consistency and efficiency in the implementation of the simplified modeling tools.
2. In section 95488.3(d), Table 6, staff proposes to add specification of the geographic region to Table 6 identifying where land use change (LUC) carbon intensity was modeled for specific feedstock/fuel combinations. Table 6 LUC values were estimated through the GTAP and AEZ-EF modeling framework developed by CARB with input from an expert working group in 2010 and were updated during CARB’s re-adoption of the LCFS program in 2015. GTAP uses economic and trade data to model the land requirements—i.e., the amount of forest, pasture, and cropland converted—to meet an increase in biofuel demand. It estimates these market-mediated land conversions within a focal region (i.e., domestic LUC) and elsewhere (i.e., world-wide LUC), which are used as inputs for the AEZ-EF model to estimate the associated GHG emissions based on regional carbon stocks. LUC carbon intensity for feedstocks from regions other than the regions modeled may not be equivalent with the Table 6 values for those feedstocks shown. The LUC carbon intensity of a given crop feedstock may vary widely based on land use practices and local carbon stocks in the region where it is produced.

To reflect this variability, staff proposes to incorporate a mechanism to assign more conservative LUC carbon intensity values to feedstock/fuel combinations from regions with higher LUC risk. This proposal is informed by the increasing number of fuel pathway applications CARB has received involving crop-based feedstocks from regions

other than those previously modeled in 2015 that may not demonstrate equivalency with Table 6 values. Staff's proposal aims to provide more granularity to LUC carbon intensity values. For feedstock/fuel combinations from regions not listed in the updated Table 6, staff proposes to conduct an empirical assessment to determine a conservative LUC value based on historical land conversions for a given feedstock. The empirical/regional LUC carbon intensity of a given feedstock/fuel combination will be compared to its respective modeled/global LUC carbon intensity value in Table 6, and the more conservative value will be assigned, as regional LUC is a subset of total LUC.

Modifications to Section 95488.6. Tier 1 Fuel Pathway Application Requirements and Certification Process.

1. In subsection 95488.6(a)(3), staff proposes to reference sustainability requirements for fuel pathways utilizing biomass feedstocks or process energy. This proposed modification is necessary to support consistency with the proposed modifications to subsection 95488.9(g).

Modifications to Section 95488.7. Tier 2 Fuel Pathway Application Requirements and Certification Process.

1. In subsection 95488.7(a)(4), staff proposes to add a requirement to include documentation that sustainability requirements have been met for fuel pathways utilizing biomass feedstocks or process energy for applicable Tier 2 fuel pathway applications. This proposed modification is necessary to support consistency with the proposed modifications to subsection 95488.9(g).

Modifications to Section 95488.8. Fuel Pathway Application Requirements Applying to All Classifications.

1. In subsection 95488.8(g)(1)(A)3., staff proposes to include forest waste biomass feedstocks as a specified source feedstock. This provides greater specificity on feedstock eligibility requested by stakeholders and helps to promote forest waste biomass use from high-priority wildfire fuel reduction and forest restoration treatments.
2. In subsection 95488.8(g)(1)(A)4., staff proposes to clarify that only the organic portion of municipal solid waste diverted from landfill disposal is considered a specified source feedstock. Organic waste has always been the intent of this provision, and plastics to fuels are not incentivized by the program. Staff also proposes to delete text in the definitions that differentiated plastics from petroleum products. These two changes clarify that the plastic portion of MSW is treated as a fossil feedstock in any pathway analysis and ensures that plastics feedstocks from diverted waste are not incentivized for fuels.
3. In subsection 95488.8(i)(1)(A), staff proposes to remove unnecessary text related to hydrogen. The deleted text is unnecessary because the requirements for book-and-claim of low-CI electricity for hydrogen are covered in subsection (C).
4. In subsection 95488.8(i)(1)(C), staff proposes to add the word "electrolytic" to clarify the type of hydrogen production to which this subsection applies. Staff also proposes to harmonize the matching period for book-and-claim accounting for low-CI electricity for direct air capture projects or electrolytic hydrogen used as a transportation fuel, with the matching period for electricity used as a transportation fuel.

5. In subsection 95488.8(i)(2), staff proposes to modify deliverability requirements for book-and-claim accounting for biomethane. The modification adds a condition that if the Executive Officer approves a gas system map identifying interstate pipelines and their majority directional flow based on specified flow data by July 1, 2026, pathways for bio-CNG, bio-LNG, and bio-L-CNG combustion in vehicles would need to demonstrate physical flow to California after December 31, 2037.

Modifications to Section 95488.9. Special Circumstances for Fuel Pathway Applications.

1. In subsection 95488.9(f)(3)(A), for projects breaking ground before January 1, 2030, staff proposes to reduce the total number of crediting periods for avoided methane emissions crediting periods to two, rather than three. This proposed change aligns more closely with the end-dates for avoided methane pathways that break ground after December 31, 2029, which was proposed in the Staff Report³, while still providing an incentive to develop methane capture projects. The proposed modifications to the proposed credit true-up concept in subsection 95488.10(b) described below ensure sufficient return on investment for fuel pathways reporting using temporary fuel pathways during the pathway certification process.
2. In section 95488.9(g), staff proposes to add details to the proposal on biomass sustainability requirements. Staff proposes a phase-in approach for sustainability requirements that supports reducing any deforestation and other land conversion risks in the near term and increases the use of sustainably sourced biomass in the long term. In response to stakeholder requests for more specific definitions of sustainability criteria, staff propose criteria in subsections 95488.9(g)(1)(A) through (B). Third-party certification will still be required to demonstrate compliance with these criteria.

Staff proposes to require sustainability certification from point-of-origin up to the first gathering point which is now defined in section 95481(a). First gathering points may typically manage data for multiple farms or plots and staff proposes to focus on first gathering points as the point of regulation to make data collection and certification more feasible.

Proposed subsection 95488.9(g)(1)(A) encompasses the initial requirement from the 45-day proposal that crop- and forest-based feedstocks not be sourced on land that was forested after 2008. This requirement has been expanded to include protections for other carbon-rich and biodiverse ecosystems (e.g., native grasslands, wetlands) by requiring that all biomass used in fuel pathways be sourced from land that was cleared or cultivated prior to 2008. Staff's definition of biomass includes crop- and forestry-based feedstocks used for finished fuel or process energy. The other sustainability criteria outlined in subsection 95488.9(g)(1)(B) includes environmental best management practices that are included in many third-party certification schemes.

In response to stakeholder comments about the challenges of supply chain complexity, traceability, and certification requirements, staff proposes a phase-in approach to sustainability requirements as outlined in subsections 95488.9(g)(2) through (4). The first milestone beginning in 2026 is for fuel producers to collect and submit supply chain

³ California Air Resources Board, *Staff Report: Initial Statement of Reasons: Public Hearing to Consider the Proposed Amendments to the Low Carbon Fuel Standard*. December 19, 2023.
<https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>

data including spatial data of farm boundaries where feedstocks are sourced. Additionally, fuel producers must maintain an attestation letter signed by the fuel producer that assures feedstocks have not been sourced from lands that were converted after 2008.

The next milestone beginning in 2028 is for fuel producers to obtain third-party certification that, at a minimum, ensures feedstocks are not sourced on lands converted after 2008. Staff proposes that the list of certification schemes recognized by the European Union Renewable Energy Directive (EU RED), which contain no-deforestation/no-conversion requirements, be accepted for these purposes. Other certification schemes that meet the criteria listed in subsection 95488.9(g)(5) will also be considered for approval by the Executive Officer. The final milestone beginning in 2031 requires full sustainability certification of all biomass feedstocks or process energy by a third-party approved by the EO.

The proposed phase-in approach outlined above will be accompanied by matching consistency changes to recordkeeping and verification requirements in sections 95491.1 and 95501 respectively mentioned below.

Modifications to Section 95488.10. Maintaining Fuel Pathways.

1. In subsection 95488.10(a)(7), staff proposes modifications to the scope of the process when the verified operational CI is found to be greater than the certified CI of a fuel pathway, to specify that verified operational CIs that exceed the CI of temporary fuel pathways are subject to the same requirements and process as Tier1/Tier 2 fuel pathways, including credit invalidation and potential enforcement action.
2. In subsection 95488.10(b), staff proposes to expand the credit true up to include periods using temporary pathway CIs after annual verification. Staff received numerous comments from stakeholders highlighting the benefits of the credit true up of temporary fuel pathways. The proposal enables the eventual recovery of credits based on verified operational data, which may be especially beneficial for pathways which involve a large variation in the CI scores in the normal course of project operation. The modifications are expected to help streamline the application review process, alleviate or mitigate any business impacts associated with a delay in pathway certification and allows for recognition for the full amount of climate benefit of a fuel.

Modifications to Section 95489. Provisions for Petroleum-Based Fuels.

1. In section 95489(a), staff proposes to remove fossil jet fuel from the deficit calculation. This proposed modification is necessary for consistency with the proposed modifications to subsections 95482(a) and 95482(c) discussed above.
2. In section 95489(a), staff proposes to correct the California Baseline Crude Average and the Three-year California Crude Average carbon intensity values. This is a correction of errors in the 45-day package, and no new calculations have occurred.
3. In section 95489(a), staff proposes to update the Annual Crude Average carbon intensity value for 2022. This update is necessary to align the years for the annual crude average with the implementation timeline of these regulatory amendments.
4. In section 95489(b), staff proposes to remove fossil jet fuel from incremental deficits. This proposed modification is necessary for consistency with the proposed modifications to subsections 95482(a) and 95482(c) discussed above.

5. In section 95489(b), Table 9, staff proposes to modify the CI Lookup Table for Crude Oil Production and Transport. This is a correction of errors in the 45-day package, and no new calculations have occurred. This correction also aligns the years for the annual crude average with the implementation timeline of this regulatory amendment.
6. In section 95489(c)(1)(F), staff proposes to update the Emission Factor for the innovative crude credit calculation, aligning with the updated Emission Factors in proposed CA-GREET 4.0 model.
7. In subsection 95489(e)(1)(B), staff proposes to clarify that sequestration sites for CCS do not need to be on-site at the hydrogen production facility within the Refinery Investment Credit Program.
8. In subsection 95489(e)(1)(D)3., staff proposes to clarify that lower-CI process energy must be physically supplied to refineries within the Refinery Investment Credit Program. This is a clarification for eligible lower-CI process energy, and it is consistent with Section 95489(c)(1) in terms of the necessity of using process energy to be physically supplied to production facilities.

Modifications to Section 95491. Fuel Transactions and Compliance Reporting.

1. In section 95491(b)(2), staff proposes to define the process by which an entity that misses the quarterly reporting deadline may receive a percentage of the credits that would have been generated by a timely submission. Since this is a market program that needs timely data, an entity can only miss up to 3 days past the reporting deadline to receive any credits for the previous quarter.
2. In section 95491(d)(1), staff proposes to remove Fossil Jet Fuel from reporting requirements for the Quarterly Fuel Transaction Reports. This proposed modification is necessary for consistency with the proposed modifications to subsections 95482(a) and 95482(c) discussed above.
3. In subsection 95491(d)(3)(B)3., staff proposes to remove the requirement that entities reporting under a smart charging pathway retain records demonstrating that the fuel supply equipment was enrolled in a time of use rate plan during the reporting period, if offered by the load serving entity. This requirement is unnecessary and adds administrative burden to the smart-charging pathway, which has been underutilized since its adoption in 2018.
4. In subsection 95491(d)(3)(E), staff proposes to modify the reporting requirements for electric forklifts. The new metered reporting requirements are delayed to 2026 reporting to allow time for FSE owners to acquire metering equipment and implement metering procedures. Reporters can continue to use existing reporting methodologies for the 2025 reporting period.
5. In subsection 95491(e)(5)(A)4., staff proposes to add reporting requirements for OEMs receiving base credits. These reporting requirements are similar to reporting requirements under the holdback equity spending provisions, and require submission of a report documenting the monetary value of LCFS credit proceeds, detailed information about costs associated with each program, and a report of implemented projects.
6. In section 95491(h), Table 11, staff proposes to remove “Fossil Jet Fuel Blends” from the Quarterly and Annual Reporting Requirements checklist. This proposed modification

is necessary for consistency with the proposed modifications to subsections 95482(a) and 95482(c) discussed above.

7. In section 95491(h), Table 12, staff proposes to correct an error in the deadline for annual reports for Low-Complexity/Low-Energy-Use Refinery from the Annual Compliance Calendar.

Modifications to Section 95491.1. Recordkeeping and Auditing.

1. In subsection 95491.1(a)(2)(I), staff proposes to modify the record retention requirements for fuel pathway holders and applicants that utilize biomass feedstocks or process energy. This proposed modification is necessary to be consistent with the proposed modifications to subsection 95488.9(g).
2. In subsection 95491.1(c)(2), staff proposes to modify the monitoring plan requirements for fuel pathway holders and applicants that utilize biomass feedstocks or process energy. This proposed modification is necessary to be consistent with the proposed modifications to subsection 95488.9(g).
3. In section 95491.1(d), staff proposes to explicitly state that lack of a verification statement submitted by the deadline will result in Executive Officer investigation and possible enforcement action. Staff also proposes to clarify that the verification outcomes apply to all LCFS report types subject to verification.

Modifications to Section 95491.2. Measurement Accuracy and Data Provisions.

1. In subsection 95491.2(b)(2)(B), staff proposes to modify the missing data substitution methodologies to ensure that the methodologies in Table 13 are only used when they result in a reasonable or conservative data replacement; otherwise, an Executive Officer approved alternative method must be used.

Modifications to Section 95495. Authority to Suspend, Revoke, Modify, or Invalidate.

1. In subsection 95495(b)(2), staff proposes to use the term “LCFS data management system” rather than “LRT-CBTS” for sending a notice to a regulated party when determining a credit/deficit calculation, or that a certified CI is invalid. Determinations can be made for various reasons such that notifications may best align with different elements of the functionality designs for the LCFS data management system (AFP and LRT-CBTS). Therefore, it is most appropriate to specify the LCFS data management system instead of the LRT-CBTS.

Modifications to Section 95500. Requirements for Validation of Fuel Pathway Applications; and Verification of Annual Fuel Pathway Reports, Quarterly Fuel Transaction Reports, Crude Oil Quarterly and Annual Volume Reports, Project Reports, and Low-Complexity/Low-Energy-Use Refinery Reports.

1. In subsection 95500(c)(A), staff proposes to remove Fossil Jet Fuel used for intrastate flight for verification of quarterly fuel transaction reports applicability. This proposed modification is necessary for consistency with the proposed modifications to subsections 95482(a) and 95482(c) discussed above.
2. In subsection 95500(c)(F), staff proposes to remove redundant text regarding the requirement that fuel cell vehicle fueling for hydrogen produced from biomethane supplied using book-and-claim accounting be subject to quarterly fuels transactions verification.

Modifications to Section 95501. Requirements for Validation and Verification Services.

1. In subsection 95501(b)(4)(F), staff proposes to add biomass feedstocks or process energy to the verification services sampling plan requirements. CARB verifiers must include in their scope of verification services review of biomass feedstocks or process energy to be consistent with the proposed modifications under subsection 95488.9(g).
2. In subsection 95501(h), staff proposes to remove the condition that growth in total reported electricity reporting be less than 25% year to year to be eligible for less-intensive verification. This proposed change reflects the rapid anticipated growth in electric vehicle charging expected in California.

Modifications to Section 95503. Conflict of Interest Requirements for Verification Bodies and Verifiers.

1. In subsection 95503(b)(2)(A), staff proposes to modify the organizational and individual high potential conflict of interest conditions and expand the exclusion provision for high COI for verifiers who participate in other federal or state low carbon fuel programs. Accordingly, staff proposes to expand the inclusion provision for low COI. Over the past few years, low carbon fuel programs have been created for various states and federal agencies that have utilized, or plan on utilizing, third-party verifiers who have passed California's LCFS verifier accreditation training. For example, the U.S. Department of the Treasury, the State of Oregon, and the State of Washington are using LCFS verifiers for their programs. The regulation is proposed to be updated so that third-party verifiers who do auditing work for regulatory programs by other governmental agencies are not conflicted out and are still able to provide verification services for California's LCFS program.
2. In section 95503(c), staff proposes to modify the low conflict of interest conditions and expand the exclusion provision for high COI for verifiers who participate in other federal or state low carbon fuel programs. Accordingly, staff proposes to expand the inclusion provision for low COI. Over the past few years, low carbon fuel programs have been created for various states and federal agencies that have utilized, or plan on utilizing, third-party verifiers who have passed California's LCFS verifier accreditation training. For example, the U.S. Department of the Treasury, the State of Oregon, and the State of Washington are using LCFS verifiers for their programs. The regulation is proposed to be updated so that third-party verifiers who do auditing work for regulatory programs by other governmental agencies are not conflicted out and are still able to provide verification services for California's LCFS program.

In addition to the modifications described above, additional modifications correcting grammar, punctuation and spelling have been made throughout the proposed changes. These changes are nonsubstantive.

These modifications do not change implementation of the regulation in any way that change the conclusions of the environmental analysis included in the Staff Report because **the modifications consist of provision clarifications, minor revisions removing certain proposals, such as removing jet fuel as a required fuel, and updated modeling, which does not alter the compliance responses such that the significance determinations change.** These revisions have not shown any new, substantial environmental impacts, any substantial increases in the severity of an environmental impact, or any alternative or mitigation measure considerably different from those considered in the Draft EIA. Therefore,

no additional environmental analysis is required. Rather, the revisions update the project description, and in response to public comment, additional information has been added to the Draft EIA to analyze herd size as a compliance response and clarify the air quality and GHG analysis. As a result, CARB has determined this resulted in the addition of substantial new information compared to what was presented in the Draft EIA. Therefore, CARB has determined that recirculation of the project description and the air quality and GHG evaluations is warranted. CARB will be recirculating those sections and accepting new comments on only the portions of the Draft EIA included in this recirculation.

Additional Documents and Incorporated Document(s) Added to the Record

In the interest of completeness and in accordance with Government Code section 11347.1, subdivision (a), staff has also added to the rulemaking record and invites comments on the following additional documents.

Documents Incorporated by Reference

1. California-modified Greenhouse Gases, Regulated Emissions, and Energy use in Transportation version 4.0 (CA-GREET4.0) model, August 12, 2024
2. CA-GREET4.0 Lookup Table Pathways Technical Support Documentation, August 12, 2024
3. Tier 1 Simplified CI Calculator for Biodiesel, August 12, 2024
4. Tier 1 Simplified CI Calculator for Biodiesel Instruction Manual, August 12, 2024
5. Tier 1 Simplified CI Calculator for Corn or Sorghum Ethanol, August 12, 2024
6. Tier 1 Simplified CI Calculator for Corn or Sorghum Ethanol Instruction Manual, August 12, 2024
7. Tier 1 Simplified CI Calculator for Dairy and Swine Manure Biomethane, August 12, 2024
8. Tier 1 Simplified CI Calculator for Dairy and Swine Manure Biomethane Instruction Manual, August 12, 2024
9. Tier 1 Simplified CI Calculator for Hydrogen, August 12, 2024
10. Tier 1 Simplified CI Calculator for Hydrogen Instruction Manual, August 12, 2024
11. Tier 1 Simplified CI Calculator for Hydroprocessed Ester and Fatty Acid Fuels, August 12, 2024
12. Tier 1 Simplified CI Calculator for Hydroprocessed Ester and Fatty Acid Fuels Instruction Manual, August 12, 2024
13. Tier 1 Simplified CI Calculator for Landfill Biomethane, August 12, 2024
14. Tier 1 Simplified CI Calculator for Landfill Biomethane Instruction Manual, August 12, 2024
15. Tier 1 Simplified CI Calculator for Organic Waste Biomethane, August 12, 2024
16. Tier 1 Simplified CI Calculator for Organic Waste Biomethane Instruction Manual, August 12, 2024
17. Tier 1 Simplified CI Calculator for Sugarcane Ethanol, August 12, 2024
18. Tier 1 Simplified CI Calculator for Sugarcane Ethanol Instruction Manual, August 12, 2024
19. Tier 1 Simplified CI Calculator for Wastewater Sludge Biomethane, August 12, 2024
20. Tier 1 Simplified CI Calculator for Wastewater Sludge Biomethane Instruction Manual, August 12, 2024
21. Hydrogen Fueling Capacity (HyCap) Model. August 12, 2024

22. ISO 14064-3:2019(E), *Greenhouse gases – Part 3: Specification with guidance for the verification and validation of greenhouse gas statements*
23. ISO 14065:2020(E), *General principles and requirements for bodies validating and verifying environmental information*
24. ISO 14066:2023(E), *Environmental information – Competence requirements for teams validating and verifying environmental information*
25. ISO/IEC 17065:2012(E), *Conformity assessment – Requirements for bodies certifying products, processes and services*

Additional References and Supplemental Documents

1. Ansar, Jasmin Ph.D. and Roger Sparks, Ph.D. 2014. *Increasing Market Competition to Reduce the Level and Variability of Transportation Fuel Prices: A Case Study on California's Low Carbon Fuel Standard*. Natural Resources Defense Council. Available at https://www.nrdc.org/sites/default/files/ene_14040101a.pdf
2. ARCHES H2. *California's renewable hydrogen hub officially launches*. July 17, 2024. Available at <https://archesh2.org/arches-officially-launches/>
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These documents are available for inspection at the California Air Resources Board, 1001 I Street, Sacramento, California, 95814, between the hours of 9:00am to 4:00pm, Monday through Friday (excluding holidays). To inspect these documents please contact Chris Hopkins, Regulations Coordinator, at (279) 208-7347.

Agency Contacts

Inquiries concerning the substance of the proposed regulation may be directed to Dillon Miner, Staff Air Pollution Specialist, Alternative Fuels Section, at (279) 208-7437 or (designated back-up contact) Jordan Ramalingam, Manager, Alternative Fuels Section, at (916) 277-0499.

Public Comments

Written comments will only be accepted on the modifications identified in this Notice. Comments may be submitted by postal mail or by electronic submittal no later than the due date to the following:

Postal mail: Clerks' Office, California Air Resources Board
1001 I Street, Sacramento, California 95814

Electronic submittal: <https://ww2.arb.ca.gov/lispub/comm/bclist.php>

Please note that under the California Public Records Act (Gov. Code § 6250 et seq.), your written and verbal comments, attachments, and associated contact information (e.g., your address, phone, email, etc.) become part of the public record and can be released to the public upon request.

In order to be considered by the Executive Officer, comments must be directed to CARB in one of the two forms described above and received by CARB no later than the deadline date for public comment listed at the beginning of this notice. Only comments relating to the above-described modifications to the text of the regulations shall be considered by the Executive Officer.

If you need this document in an alternate format or another language, please contact the Clerks' Office at (916) 322-5594 or by facsimile at (916) 322-3928 no later than five (5)

business days from the release date of this notice. TTY/TDD/Speech to Speech users may dial 711 for the California Relay Service.

Si necesita este documento en un formato alterno u otro idioma, por favor llame a la oficina del Secretario del Consejo de Recursos Atmosféricos al (916) 322-5594 o envíe un fax al (916) 322-3928 no menos de cinco (5) días laborales a partir de la fecha del lanzamiento de este aviso. Para el Servicio Telefónico de California para Personas con Problemas Auditivos, ó de teléfonos TDD pueden marcar al 711.

California Air Resources Board



Steven S. Cliff, Ph.D.,
Executive Officer

Date: August 12, 2024

Attachment

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see [CARB's website](http://ww2.arb.ca.gov) (ww2.arb.ca.gov).

Comment Log Display

Here is the comment you selected to display.

Comment 88 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	David
Last Name	Bonelli
Email Address	dmbonelli@venable.com
Affiliation	
Subject	Powering America's Commercial Transportation Comments
Comment	<div></div>
Attachment	www.arb.ca.gov/lists/com-attach/7415-lcfs2024-VCRXMARmWX4FXAJh.pdf
Original File Name	PACT Comments on CARB LCFS 15-Day.pdf
Date and Time Comment Was Submitted	2024-08-27 12:33:30

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

August 27, 2024

Chair Liane M. Randolph
California Air Resources Board
1001 I Street
Sacramento, CA 95815

Comments of Powering America’s Commercial Transportation (“PACT”) on the Proposed Amendments to the Low Carbon Fuel Standard

Chair Randolph:

Powering America’s Commercial Transportation (“PACT”) appreciates the opportunity to provide comments in response to the California Air Resources Board (“CARB”) proposed 15-day changes to the Low Carbon Fuel Standard (“LCFS”) program, published August 12, 2024.

PACT stands ready to work with CARB and its sister agencies to support the industry in achieving the State’s Advanced Clean Trucks (“ACT”) and Advanced Clean Fleets (“ACF”) goals, through the accelerated rollout of M/HD fleets and its attendant infrastructure.

I. Introduction

PACT is encouraged to see CARB’s focus on medium- and heavy-duty (“M/HD”) charging, and its recognition of the unique nature of power, location, and site design of such charging stations. PACT strongly supports the creation of the MHD-FCI program and appreciates that the amended language reflects proposed changes that will serve to strengthen the program.

II. About PACT

PACT is a coalition dedicated to accelerating the development and deployment of reliable nationwide charging infrastructure for medium- and heavy-duty zero emission vehicles (“M/HD ZEVs”).¹ Our membership comprises stakeholders across the transportation electrification ecosystem, including leading truck manufacturers, charging infrastructure technology providers and developers, commercial fleets, fleet management companies, and utilities.² PACT is

¹ M/HD defined as...

² PACT membership comprises ABB E-mobility, Alpitronic, Amazon, BC Hydro, Burns & McDonnell, Chateau Energy Solutions, Daimler Truck North America, EV Realty, Forum Mobility, Geotab, Greenlane, InCharge, InductEV, J.B. Hunt Transport, Inc., Mortensen, Navistar Inc., Penske, Pilot Flying J, PittOhio, Prologis, Voltera, WattEV, Volvo Group North America, and Zeem Solutions.

committed to promoting productive cross-sector collaboration to advance policies and regulations that improve access to and reduce barriers for M/HD charging infrastructure.

PACT is engaged in multiple regulatory settings that have touchpoints to this LCFS rulemaking.

PACT's regulatory engagement includes:

- Party status to the California Public Utilities Commission ("CPUC") proceeding on the Rulemaking Regarding Transportation Electrification Policy and Infrastructure³ through which PACT submitted reply comments.⁴ Notably, utilities are responsible for implementing LCFS holdback credit programs which are the dual jurisdiction of CARB and the CPUC. PACT is exploring opportunities to provide LCFS strategy recommendations within this rulemaking, and envisions opportunities to further explore M/HD infrastructure investments.
- Party status to the CPUC proceeding on the Rulemaking to Establish Energization Timelines,⁵ through which PACT submitted opening and reply comments to the rulemaking,^{6,7} and opening comments⁸ on the Scoping Memo.⁹ PACT will also be submitting comments to the Proposed Decision to demonstrate continued engagement.¹⁰ Moreover, PACT is evaluating further engagement with state agencies, including with the California Energy Commission, on issues such as EV charging reliability and interoperability, as well as data collection (e.g., capacity mapping).

III. Summary of PACT's Comments on Proposed 45-Day Changes

PACT submitted comments during the 45-day period, encouraging CARB to improve the MHD-FCI provision of the LCFS program and maximize the potential benefits by:

³ Order Instituting Rulemaking Regarding Transportation Electrification Policy and Infrastructure (R. 23-12-008) Issued Dec. 20, 2023.

⁴ Reply Comments of PACT on Order Instituting Rulemaking Regarding Transportation Electrification Policy and Infrastructure (Served and Filed Feb. 5, 2024)

<https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M524/K929/524929719.PDF>

⁵ Order Instituting Rulemaking to Establish Energization Timelines (R. 24-01-18) Issued Jan. 25, 2024.

⁶ Opening Comments of PACT Order Instituting Rulemaking to Establish Energization Timelines (Served and Filed Feb 20, 2024) <https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M525/K574/525574167.PDF>

⁷ Reply comments of Powering Americas Commercial Transportation on Order Instituting Rulemaking to Establish Energization Timelines (Served and Filed Mar. 1, 2024)

<https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M526/K553/526553989.PDF>

⁸ Opening Comments of PACT on the Assigned Commissioner's Scoping Memo and Ruling in the Order Instituting (Served and Filed May 3, 2024) <https://efile.cpuc.ca.gov/FPSS/0000206073/1.pdf>

⁹ Assigned Commissioner's Scoping Memo and Ruling (R. 24-01-19) Filed Mar. 28, 2024.

¹⁰ Proposed Decision Establishing Target Energization Time Periods and Procedure for Customers to Report Energization Delays (R. 24-01-18) Issued Aug. 12 2024.

<https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M537/K633/537633346.PDF>

- ***Increasing the overall size of the MHD-FCI program.*** PACT recommended that the program be adjusted to increase the cap from 2.5% of previous quarter deficits to a minimum of 5% of previous quarter deficits and to provide equal treatment for public and private charging infrastructure.
- ***Expanding opportunities for utilities to use holdback credits for M/HD investments.*** PACT supported the staff proposal to expand LCFS rebates for drayage vehicles to include other M/HD or off-road vehicles and investments in grid-side distribution infrastructure and the staff proposal to require that at least 75% of such credits be invested in transportation electrification.
- ***Eliminating the geographical restrictions for crediting eligibility.*** PACT recommended that the 1-mile requirement be removed from the MHD-FCI program. PACT noted that should the Board find this proposal unacceptable, adjusting the requirement to 5 miles would be sufficient.
- ***Eliminating the FSE cap.*** PACT recommended eliminating the 10 FSE-per site cap in order to promote market flexibility and innovation.
- ***Adjusting the minimum nameplate power rating.*** PACT recommended removing the minimum nameplate rating to promote market flexibility and better align with existing and future business operations. PACT noted that should the Board find this proposal unacceptable, lowering the minimum requirement to 150 kW would be sufficient.

IV. Comments on Proposed 15-Day Changes

PACT appreciates that CARB has duly considered and incorporated several of the adjustments proposed in our 45-day comments, specifically:

- 088.1 ● ***Adjusting the geographical restrictions for crediting eligibility.*** PACT appreciates CARB's decision to adjust the distance requirement for HD-FCI sites. PACT is receptive to CARB's rationale that a distance of five miles from an FHWA Alternative Fuel Corridor for shared sites is relevant to the service these sites are intended to provide and that this is an adequate distance to ensure availability of utility services to sites while still supporting the HD EV charging network. Further, PACT appreciates CARB's decision to limit the distance requirement to shared HD-FCI thereby awarding developers and fleets the flexibility to select locations that accommodate their unique business needs
- 088.2 ● ***Eliminating the FSE cap.*** PACT is pleased to see that CARB has eliminated the 10 FSE-per site cap. This adjustment will promote market flexibility and innovation.
- 088.3 ● ***Adjusting the minimum nameplate power rating.*** PACT appreciates the adjustments that CARB has made regarding power requirements. Specifically, PACT supports CARB's decision to remove the limitation on the number of chargers and supplement that with a site-wide power cap. PACT supports the increase to 40 MW total power per-site and the flexibility for applicants to use a smaller FCI power rating than the power capacity for pathway calculation to include more chargers in the program. These amendments will

ensure, as CARB notes, that HD-FCI is incentivized across many sites and that individual sites can be designed in a manner that reflects the needs of the customer(s) they are built for or anticipate serving.

- 088.4
- **Updated definition of “rural.”** PACT supports CARB’s adjusted definition of “rural.” While the updated definition does not reflect the specific changes presented by CalETC and endorsed by PACT,^{11, 12} this revised definition is improved from the language that was originally proposed. PACT reiterates that this revised definition will create more opportunities for potential equity benefits as M/HD ZEVs operate in a variety of communities—not just urban areas—depending on the vehicle use case. In addition to potentially building a stronger alignment with the state’s overarching disadvantaged communities policies, this broader definition of “rural” may provide more “territorial” flexibility to the Electrical Distribution Utilities (“EDUs”) to use holdback credits (to invest in, for example, grid-side distribution infrastructure for M/HD ZEVs) in the areas where the EDUs anticipate the potential for the greatest equity impact.

088.5

PACT continues to support CARB’s decisions regarding holdback credits investments in M/HD ZEVs. This expanded list will encourage wider and more diverse utility investments in the transportation electrification sector. With respect to M/HD fleets and infrastructure, PACT continues to support the staff proposal to expand LCFS rebates for drayage vehicles to include other M/HD or off-road vehicles and investments in grid-side distribution infrastructure. PACT also continues to support the staff proposal to require that at least 75% of such credits be invested in transportation electrification.

PACT strongly supports several of the updates CARB is proposing in this 15-day comment period, and appreciates the responsiveness to PACT’s comments.

088.6

PACT continues to encourage CARB to consider increasing the overall size for the HD-FCI program. Specifically, PACT continues to encourage CARB to consider increasing the HD-FCI program cap from 2.5% of previous quarter deficits to a minimum of 5% of previous quarter deficits.¹³ As noted by the Joint MHD EV Infrastructure Parties, the 2.5% cap would not support the modest load projection of 2,900 MW of M/HD charging estimated by 2025. To meet California’s ambitious targets, fleets and FSE providers will need certainty that the available incentives will adequately scale to support the deployment of sufficient infrastructure. Increasing the cap will act as a means to further incentivize the buildout of infrastructure needed to support future M/HD ZEV adoption.

¹¹ CalETC, SUPPORT Proposed Amendments to the Low Carbon Fuel Standard Regulation, page 7

¹² Comments of Powering America’s Commercial Transportation (“PACT”) on the Proposed Amendments to the Low Carbon Fuel Standard, page 6

¹³ Comments of Powering America’s Commercial Transportation (“PACT”) on the Proposed Amendments to the Low Carbon Fuel Standard, page 4. Additional parties expressing support include Joint M/HD EV Infrastructure Parties, NRDC, Voltera.

088.7

Additionally, PACT continues to encourage CARB to consider creating credit parity between private and public infrastructure investments by equalizing the credits earned for both private refueling infrastructure and public refueling infrastructure, per charging station. To meet California's regulatory mandates, trucks refueling at private depots and trucks refueling at public stations will both need the necessary infrastructure to continue operations. Furthermore, with respect to meeting regulatory and air quality targets, the benefits provided by electric trucks do not depend on whether the charging infrastructure used is public or private. Whereas lowering credit eligibility for private charging would ultimately hamper California's ability to meet its own regulatory targets, establishing this suggested parity will help set uniform market signals, which in turn will better help achieve these goals. Additionally, offering equal crediting eligibility for private as public charging will bring the LCFS more in line with current operational needs, which are diverse across the M/HD sectors, and vary across many use cases and business needs. Equal treatment for public and private charging infrastructure will expand the anticipated climate and revenue benefits of the LCFS program and incentivize maximum participation.

V. Conclusion

PACT appreciates CARB's updates and its demonstrated commitment to considering public feedback. PACT stands ready to work with CARB on this and other matters.

Sincerely,
PACT

/s/
David Bonelli
Partner, Venable LLP
DMBonelli@Venable.com

On behalf of PACT

Comment Log Display

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Comment 89 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name Ethan

Last Name Elkind

Email elkind@berkeley.edu

Address

Affiliation

Subject Obligating jet fuel in the LCFS does not necessarily risk federal preemption

Comment

089.1

These new proposed amendments no longer obligate jet fuel as part of the low carbon fuel standard, a change from the original proposal to include jet fuel burned in flights that take off and land in California.

A subtext of this decision is that there is a risk of litigation due to possible federal preemption. As I blogged yesterday on Legal Planet

(<https://legal-planet.org/2024/08/26/california-pulls-back-on-sustainable-aviation-fuels/>), the airline industry has asserted that California is wholly preempted by various federal laws from mandating any sort of decarbonization of jet fuel.

But the industry overstates the risk of preemption, as a forthcoming CLEE legal analysis will document. There are three federal statutes at issue when it comes to aviation and federal preemption, which our report will detail. Despite their existence, California still has runway (ahem) to regulate jet fuel.

First, the Clean Air Act governs regulation of airplane engines and associated emissions. But in this case, California would not require airlines to change their engines or meet specific emissions standards. Instead, the low carbon fuel standard solely regulates the fuels as inputs. And when low-carbon biofuels blend with fossil jet fuel (the most common type of sustainable aviation fuel), no engine modifications are necessarily required.

Second, the Airline Deregulation Act prevents states and local governments from interfering with the national aviation market, if they take action "related to" prices, routes and services. A

mandate for blending lower-carbon fuels into fossil jet is on its face not "related" to these specific economic features of a national aviation market. But if the fuels requirement became stringent enough to significantly affect the prices consumers pay or where airlines schedule refueling or routes, there is likely an outer limit to what California can require on fuels without risking preemption. As a result, the board would need to craft the regulation carefully to avoid these significant impacts.

Finally, the Federal Aviation Act could preempt state laws on jet fuel if the agency set forth national requirements for low-carbon jet fuel, but to date it has not yet finalized any such rule. And in that absence, California has leeway to regulate.

(And if the concern relates to a separate potential challenge based on the "dormant" commerce clause of the U.S. constitution, where state action creates an unjustified and significant barrier to free trade among states, such a challenge to the low carbon fuel standard program was already rejected by the Ninth Circuit in 2019, with the US Supreme Court declining to review.)

The Air Resources Board's recent change in policy matters because aviation is arguably the hardest-to-decarbonize sector in our economy, and policy could help jumpstart solutions. No single technology otherwise currently exists to cover all of our aviation needs in the long term, despite progress on batteries, hydrogen, and potentially "e-fuels," which combine captured carbon with zero-emission hydrogen to create a synthetic, carbon-neutral fuel that can combust in current engines just like fossil fuel.

So in the short run, the Air Resources Board has an opportunity to

require airlines to blend in more low-carbon biofuels with fossil jet fuel, lowering the carbon content while sending a clear policy signal to the industry that research and investment must begin now on these longer-term solutions. This is what Governor Newsom required when he directed the Board in 2022 to "adopt an aggressive 20% clean fuels target for the aviation sector."

With its low carbon fuel standard, California is well positioned not just to offer more carrots to the airline industry to achieve these targets, but an actual stick to ensure compliance. At the same time, a legal pathway to achieve this goal and avoid preemption remains open, as our forthcoming report will discuss in more detail. Instead, by reversing course with this decision, the state now risks a delayed departure when it comes to more sustainable air travel.

Attachment

Original File
Name

Date and Time
Comment
Was
Submitted

2024-08-27 12:51:20

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Comment 90 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Allen
Last Name	Schaeffer
Email Address	aschaeffer@enginetechnforum.org
Affiliation	
Subject	Engine Tech Forum Comments to CARB on 15 day amendments LCFS
Comment	<div>Thank you for considering the attached comments regarding the 15 Day Amendments to the LCFS</div>
Attachment	www.arb.ca.gov/lists/com-attach/7417-lcfs2024-VzJVPQNIWWMEbFI3.pdf
Original File Name	Engine Tech Forum _ CARB LCFS comments Aug 272024.pdf
Date and Time Comment Was Submitted	2024-08-27 13:08:00

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Comments

Before the California Air Resources Board

on the

Proposed 15 day Amendments to the Low Carbon Fuel Standard Regulation

The Engine Technology Forum (“ETF”) is an educational association in the Washington DC area representing engine and equipment makers, fuel producers and suppliers. Members of ETF are leaders in advanced internal combustion engines, vehicles and equipment and their components as well as petroleum and renewable fuels. More information about us is available at www.enginetechforum.org.

We appreciate the opportunity to file these comments regarding the above captioned matter affecting the Low Carbon Fuel Standard (LCFS). As these comments were prepared under the extraordinary time constraints imposed by CARB, they are thus limited in scope and detail.

090.1 Given the complexity and substantial alteration of the original 45-day proposal late in this rulemaking process, CARB should provide for a minimum of an additional 15-day comment period. The current 15 day comment period effectively denies the public adequate opportunity to develop meaningful comments *and* reasonably assess the new and extensive proposals, including the proposed cap on the use of soy and canola oils and the proposed 2031 prohibition on hydrogen produced from fossil gas feedstocks. This could substantially impact the availability of hydrogen for use in both fuel cells and heavy-duty internal combustion engines.

CARB’s climate change goals are aggressive in both the level of reduction of greenhouse gases and accelerated time frame. The state is explicit in its view and policies that envision and effectively dictate nearly the entire transportation sector shifting from the use of internal combustion engines (ICE) and liquid and gaseous fuels to electrification.

Internal combustion engines (ICEs) running on gasoline, diesel or natural gas are the dominant power behind California’s economy today and are expected to continue to serve trucking and other sectors as the majority fuel type for decades to come, even as the state implements its policies that seek to transition only to zero emission vehicles (ZEVs). Even if most vehicles do shift to electric, there will be many heavy-duty vocational applications that will not transition to BEVs for a long time, if at all.

Asevidenced by consumer response, delaying, or downgrading electric vehicle investments and deferring introduction of new models announced by a number of vehicle manufacturers, the pace of electrification of the transportation sector (light, medium and heavy-duty vehicles) is proving to be uneven and uncertain. This elevates the importance and significance of having an effective and affordable low carbon fuels policy available for all sectors.

By most measures, California’s low carbon fuel program has been a success in reducing carbon emissions from the transportation sector through gradually reducing carbon intensity of the fuel pool. However, the proposed feedstock caps and “sustainability guardrails” on biofuel production impart a greater burden than benefit to Californians. Renewable fuel producers, petroleum

suppliers and fleets that must rely on ICEs using low carbon fuels to comply with the spirit of California's ZEV/near-ZEV transition will be most impacted.

The use of low carbon renewable fuels across this vast population of vehicles has contributed substantially to California's progress and current success in reducing greenhouse gas emissions. According to CARB's own data ([See](#) Figure 1, LCFS Dashboard), the program in its present form is exceeding expectations in reducing carbon intensity from transportation fuels.

However, these proposed amendments seem certain to deter further progress from renewable fuel producers and their suppliers while undermining the viability of transportation fuel providers. and driving up the cost of producing and supplying California's unique transportation fuels.

The proposed amendments disrupt the predictable and orderly transition of the fuels industry in a way that unnecessarily increases costs to the economy and discourages investment in renewable low carbon fuels. In its present form, it discourages improvements that could help California accelerate achievement of the continued progress toward the state's climate goals, and through its leadership, the contribution of other states in helping to achieve national climate goals.

The proposed amendments' increased stringency and diminished compliance tools will likely compromise technology neutrality by the elimination of pure market signals that incentivize the production of lower-CI fuels.

090.2

Acceleration of reduction in carbon intensity (CI) from 20% to 30% by 2030 with a 9% reduction for 2025.

On the one hand, the accelerated CI reduction would appear to support greater investment by renewable fuel producers. However, when combined with the proposed feedstock caps (see II below) raises concerns about the ultimate impact of the amendments on costs and adequate supply of low carbon fuels into the transportation fuel pool. It also seems to unfairly diminish the potential for ICEs using low carbon fuels against other decarbonization strategies.

We urge CARB to weigh the ability to implement more aggressive CI reduction targets with the actual feasibility of achieving them considering the proposed caps on soy and canola feedstocks as noted below.

090.3

ARB proposes to cap LCFS credits at 20 percent for biomass based diesel produced from soy and canola oils (Section 95482 (i)).

These caps on LCFS credits unfairly disadvantage biodiesel and renewable diesel fuel; the only viable, large-scale cost effective alternatives for the most difficult to decarbonize sectors like heavy-duty vocational trucks, off road equipment and marine and rail. [According](#) to CARB, biodiesel, and renewable diesel now account for 73% of California's diesel pool.

The proposed credit caps on biomass-based diesel produced from soy and canola oils inserts CARB influence into an otherwise market-driven approach. The net result is likely to be arbitrarily limiting the use of these more accessible and affordable feedstocks (soy and canola). According to the American Soybean Association, biofuel sourced from soybean and canola oil accounted for about 30% of the renewable diesel used in California in the first quarter of 2024.

CARB has not provided an ample explanation as to why a cap is needed. According to CARB's own estimate, under the more aggressive proposed CI reduction target, soybean oil based biofuel will become a deficit generating fuel as early as 2033. If instituted, the Automatic Adjustment Mechanism (AAM) soybean oil based biofuel will become a deficit generating fuel as early as 2030. An arbitrary cap is not needed as the program is designed to transition away from biofuels made from soybean oil.

In addition, the anticipated transition from the federal blender's tax credit to the clean fuel production credit will provide further financial incentives to expand the supply of waste-based biofuels. Reduced availability of tax credits for domestic produced soy and canola based biofuels will send a strong market signal to invest in waste-based biofuels as soon as early 2025.

There are likely to be unintended consequences of the proposed amendments. First, a time differentiation at this time between primary oilseed crops and oilseed crops of renewable biomass cultivated as an intermediate crop is needed. As an example, growers are already cultivating winter canola that is planted as an intermediate crop and not a primary crop. Intermediate crops, including winter canola provide lower carbon feedstocks to produce renewable biofuels and should not be subject to a cap. Second, by capping the LCFS credits for soy and canola at 20%, this may discourage investments in producing both biodiesel and renewable diesel fuel more sustainably. Given the close linkage of renewable diesel (feedstocks and production) with sustainable aviation fuel (SAF), it may also have the perverse effect of negatively impacting the cost of (SAF) if renewable diesel production is negatively impacted by the new limits.

Unfortunately, this truncated timeline prevents a more thorough and thoughtful analysis of these and other potential consequences of the proposed amendments.

ICEs will continue to play a dominant role in California and the US for decades to come and providing more time to assess the role of renewable fuels in reducing emissions is prudent as the state struggles with delays in meaningful penetration of ZEVs among the state's commercial fleet.

Thank you for the opportunity to provide these comments.



Allen Schaeffer
Executive Director
Engine Technology Forum
aschaeffer@enginetechnologyforum.org
301.668.7230

Comment Log Display

Here is the comment you selected to display.

Comment 91 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name Matt

Last Name Dias

Email Address mattd@calforests.org

Affiliation

Subject RE: 15 Day Comment letter - LCFS 2024

Comment

To whom it may concern,

Please see uploaded comment letter submitted on behalf of concerned organizations, including representatives of landowners, professional foresters, Resource Conservation Districts, energy innovators, and Counties. Thank you.

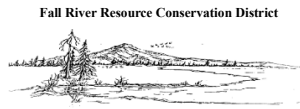
Attachment www.arb.ca.gov/lists/com-attach/7418-lcfs2024-AjAHNQMyVzwFMQcw.pdf

Original File Name	240827 LCFS 15_Day Comment FINAL.pdf
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Date and Time Comment Was Submitted	2024-08-27 13:06:38
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If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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August 27, 2024

Clerk's Office
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Submitted via electronic mail to: <https://ww2.arb.ca.gov/lispub/comm/bclist.php>

RE: Public Comment on Proposed Amendments to the Low Carbon Fuel Standards – 15 Day Public Notice

Executive Officer Cliff,

The undersigned organizations are writing to provide comments in response to the 15-day public notice for the proposed amendments to the Low Carbon Fuel Standards (LCFS). We appreciate the opportunity to offer our perspective on these amendments, particularly as they pertain to the treatment of forest biomass as a feedstock for low carbon fuels as provided in Title 17, CCR Sections 95488.8 and 95488.9, respectively. We have significant concerns regarding the proposed definitions and exclusions within the regulatory language.

091.1 **Narrowing of Feedstock Availability**

The proposed definitions notably narrow the scope of feedstock material availability by excluding industrial lands, which remain undefined, and limiting the sources of material to those derived solely from fuel reduction or restoration projects. These terms, "fuel reduction" and "restoration projects," are themselves undefined, further complicating their application. By excluding other silvicultural treatments, the proposed language unnecessarily restricts the types of forest management practices that can contribute to low carbon fuel production.

091.2 **Lack of Clear Definitions for "Non-Industrial" and "Industrial" Forestlands**

The absence of a definition for "non-industrial forestland" in the proposed amendments creates ambiguity, which conversely leaves all other sectors forestlands across the state undefined as well. Without a clear understanding of which lands would be considered "non-industrial", other public, private, NGO, or tribal landowners and managers do not have the ability to determine if material generated from these landscapes could also be considered acceptable feedstock. The lack of a clear definition hinders stakeholders' ability to understand and comply with the regulations, potentially leading to inconsistent application and enforcement.

091.3 **Limitation on Treatment Type**

Beyond the challenge of simply allowing participation to an undefined cohort of "non-industrial" forest landowners, additional challenges are brought forth by limiting the types of allowable forest treatments where feedstock could be derived. It is unclear whether the term "reduce risk" would encompass the broad suite of treatments being pursued across the landscape as we work toward achieving the established million-acre strategy, or only some subset of treatments that are considered risk reduction treatments. This ambiguity will further limit feedstock availability, notwithstanding the previous confusion cited due to the reference to nonindustrial landowners, despite a projects potential role in reducing wildfire risk and/or hazard.

091.4 **Exclusion of Timberlands from Wildfire Risk Reduction Efforts**

While the Initial Statement of Reasons suggests that these standards are intended to reduce wildfire risk, the exclusion of large portions of timberlands where innovative solutions could be employed contradicts this objective. Timberlands, especially those prone to wildfires, present a significant opportunity for the use of biomass feedstock, which could contribute to both fire hazard reduction and low carbon fuel production.

Misalignment with Deforestation and Conversion Concerns

The Initial Statement of Reasons also cites the need to avoid deforestation and land conversion as a justification for the proposed standards. However, lands excluded by these

amendments are primarily “timberland” (Ref. PRC section 4527) and are governed by the California Forest Practice Act and Rules. This regulatory framework ensures that timberlands cannot be deforested, as they must be restocked or meet stringent stocking standards following commercial activities or treatments. Excluding these lands from the scope of the LCFS program overlooks their potential contribution to low carbon fuel production while maintaining environmental sustainability.

Sustainable Management and Regulatory Oversight

The timberlands in question are managed sustainably under strict regulatory requirements. Excluding these lands from the scope of the LCFS amendments overlooks their potential contribution to low carbon fuel production while maintaining environmental sustainability.

091.5

Confusion Regarding Third-Party Certification Requirements

The Initial Statement of Reasons, along with the proposed amendments provided in the 15-Day rule text lack clarity on whether woody feedstocks must originate from lands that are third-party certified. Conflicting language within the rulemaking documents raises concerns about whether non-industrial landowners, who are less likely to hold third-party certifications, would be excluded from participating in the program. If this is the case, constriction on availability of feedstocks and reduce participation from non-industrial landowners would be a certainty given that very few non-industrial timberland owners hold and maintain third party certification.

091.4 cont

Conflict with the Governor’s Wildfire and Fire Resilience Task Force Goals

Finally, the proposed amendments appear to conflict with the goals of the Governor’s Wildfire and Fire Resilience Task Force, which seeks to find ways to utilize low-value materials from timberlands to reduce wildfire threats. By excluding significant portions of timberlands, the proposed amendments undermine efforts to address the critical issue of wildfire risk through the utilization of biomass feedstocks.

In conclusion, we urge the California Air Resources Board to reconsider the proposed amendments to the Low Carbon Fuel Standards in light of these concerns. The inclusion of industrial timberlands, clearer definitions, and a more inclusive approach to feedstock sourcing will be essential to achieving the dual goals of reducing wildfire hazard and promoting sustainable low carbon fuel production. Without careful consideration and addressing of these above concerns, these regulations would severely hinder the development of the necessary innovative infrastructure that may represent the scale of outlets for forest material that contribute to wildfire hazard across the state, thereby perpetuating the cycle of extraordinarily destructive impacts from wildfire, and continually contributing to airshed impacts across the state and beyond.

091.2 cont A recommended approach to taking a more inclusive approach to woody feedstock procurement to support Low Carbon Fuel would be to include the below recommended definition within Title 17, CCR 95488.8(g)(1)(A)3.

“Forest Biomass Waste” means residues that are 1) removed for wildfire mitigation, forest restoration projects, or the protection of public safety, or 2) small-diameter, non-merchantable residues, limited to forest understory vegetation, ladder fuels, limbs, branches, and logs that do not meet regional minimum marketable standards for processing into wood products.”

We appreciate the consideration of these comments and look forward to working with the California Air Resources Board on developing an LCFS program that will assist in ameliorating the wildfire and forest health issues within California.

Sincerely,

The California Forestry Association
Matt Dias, President and CEO

Allotrope Partners
Robert Hambrecht, Partner

California Licensed Foresters Association
Brita Goldstein, President

Forest Landowners of California
Joe Smailes, Board President

Pioneer Community Energy
Sam Kang, Chief Operating Officer

Velocys
Jeff McDaniel, VP New Projects

Fall River Resource Conservation Districts
Todd Sloat, Project Manager
Sharmie Stevenson, Executive Director

Tehama County Resource Conservation District
Jon Barrett, District Manager

Associated California Loggers
Eric Carleson, Executive Director

California Biomass Energy Alliance
Julee Malinowski-Ball, Executive Director

California Forest Carbon Coalition
Mikhael Škvarla, Executive Director

Mendocino Humbolt Redwood Companies
John Andersen, Director, Forest Policy

Rural County Representatives of California
Staci Heaton, Senior Policy Advocate

The Redding Chamber
Todd Jones, President & CEO

Pit River Resource Conservation District
Todd Sloat, Project Manager
Sharmie Stevenson, Executive Director

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Comment 92 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Rosalie
Last Name	Barcinas
Email Address	Rosalie.Barcinas@sce.com
Affiliation	SCE
Subject	SCE recommends amendments to the proposed LCFS 15-day changes.

Comment	092.1
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SCE supports the LCFS regulation, but requests edits to the Proposed 15-day changes to improve clarity, address operational challenges, and provide certainty to the market and utilities.

Attachment

Original File Name

Date and Time Comment Was Submitted 2024-08-27 13:11:20

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Comment 93 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Margaret
Last Name	Campbell
Email Address	margaret.c.campbell@delta.com
Affiliation	Delta Air Lines
Subject	Comments on Proposed LCFS Amendments
Comment	Attached please find comments from Delta Air Lines on the proposed LCFS amendments. Thank you for your consideration.
Attachment	www.arb.ca.gov/lists/com-attach/7420-lcfs2024-BmlCYQBtVnECZVAP.pdf
Original File Name	Delta Air Lines Comments on CARB LCFS Amendments August 27 2024.pdf

**Date and Time Comment Was
Submitted**

2024-08-27 13:07:24

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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Margaret Campbell
Assistant General Counsel

Delta Air Lines, Inc.
Law Department 981
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Submitted electronically at:
<https://ww2.arb.ca.gov/applications/public-comments>

August 27, 2024

Clerks' Office
California Air Resources Board
1001 I Street
Sacramento, California 95814

Re: Support for California Air Resources Board Proposal to Retain Jet Fuel Exemption in Low Carbon Fuel Standard Program

093.1

In response to the revised Proposed Low Carbon Fuel Standard Amendments posted August 12th, 2024, we are writing to share our support for the recent California Air Resources Board (CARB) proposal to retain the jet fuel exemption under its Low Carb Fuel Standard (LCFS) Program. Delta Air Lines supports the withdrawal of the proposal to eliminate the jet fuel exemption and retain the existing opt-in approach for SAF under the CARB LCFS Program.

Delta is committed to reducing its climate impact and achieving net zero carbon emissions by 2050, and transitioning to SAF is core to this commitment. We have long recognized that scaling up the supply of SAF and achieving net-zero carbon emissions by 2050 can only happen by working collaboratively with governments and other stakeholders across sectors. Achieving this ambition for SAF will require new and additional policy incentives, streamlined permitting processes, and close collaboration among governments, the aviation industry, the fuels industry, environmental organizations, and others.

Aviation accounts for 2.6% of the U.S. greenhouse gas emissions but 5% of U.S. Gross Domestic Product (GDP) and 4.1% of California's GDP, thus exerting outsize economic impact relative to its share of emissions. U.S. civil aviation firms employ more than 380,000 California-based employees, with an overall economic impact of \$194 billion.¹ Aviation is critical to driving California's economy and its rank as the 5th largest economy in the world, enabling \$114 billion in annual trade flows and underpinning many of California's other significant economic drivers such as agriculture, tourism, manufacturing, banking, technology and small business.

California has established itself as an early leader in attracting investment, production, and use of SAF through the existing LCFS Program, which provides an opt-in credit for SAF that helps reduce the price difference between SAF and conventional jet fuel. Ensuring a healthy and vibrant aviation industry is essential to California's future, and leveraging CARB's early leadership on

¹ [The Economic Impact of Civil Aviation on the U.S. Economy, State Supplement, US Department of Transportation, November 2020](#)

SAF can enable California leadership in the emerging SAF production industry, creating new jobs and economic development opportunities.

In its April 10th, 2024 workshop, CARB re-stated that a principal objective of its regulatory proposal is to “Increase the use of alternative jet fuel in the State”. We share that objective as reflected in our company’s goals of utilizing 10% SAF by the end of 2030, meeting our SBTi medium term carbon intensity improvement target by 2035 and achieving net zero carbon emissions by 2050. Of course, as part of the US airline industry we also support the US government’s SAF Grand Challenge. Since 2019, we have executed numerous SAF offtake agreements, both short- and long-term, to help us achieve these goals. Delta and our fellow airlines have clearly demonstrated a strong, enduring market signal for affordable SAF. The challenge remains the supply of affordable SAF, not the absence of a market signal by airlines. We strongly believe that maintaining the existing exemption for jet fuel along with the opt-in model for SAF provides a strong foundation to achieve our mutual objectives.

The primary impediment to increased SAF production and availability in California remains the higher cost of SAF for producers and buyers relative to conventional jet fuel and renewable diesel. Whether or not jet fuel becomes a deficit generating fuel has no direct impact on whether SAF is produced or used. Eliminating the exemption on jet fuel would have no material impact on the availability or use of alternative jet fuel in California.

Our mutual interest is to increase SAF production, availability, and use, and the most effective way to accomplish this is to continue the positive, collaborative approach represented by the existing “opt-in” mechanism developed by CARB and the aviation community. We support CARB’s decision to withdraw the proposal to remove the exemption for jet fuel for intrastate flights, preserve the existing opt-in approach for SAF. We look forward to the opportunity to work with CARB and other stakeholders across the SAF ecosystem to explore solutions which build on the existing opt-in model of the LCFS Program. We recommend that CARB establish a joint CARB-industry working group with stakeholders across the emerging SAF ecosystem to explore alternative policy and voluntary proposals to rapidly increase SAF production, availability and use in California. We look forward to working with CARB on such measures to accelerate SAF deployment.

Sincerely,

A handwritten signature in blue ink that reads "McC Campbell". The signature is stylized with a large, flowing "M" and a cursive "Campbell".

Margaret C. Campbell
Assistant General Counsel



August 27, 2024

VIA ELECTRONIC FILING

Matthew Botill
California Air Resources Board
1001 I Street
Sacramento, California 95814

**Re: SJI Renewable Energy Venture's Comments on the Low Carbon Fuel Standard (LCFS)
15-Day Amendments**

Dear Mr. Botill:

SJI Renewable Energy Ventures focuses on clean energy development and decarbonization via renewable energy production and energy management activities. Through these activities, we are committed to the nation's transition to a carbon-free economy and, accordingly, has developed a comprehensive clean energy plan that includes being a leader in the development of dairy digester projects in the United States. SJI works closely with the Environmental Protection Agency (EPA), California Air Resources Board (CARB), local dairy farmers, utilities, and surrounding communities to directly reduce greenhouse gas (GHG) emissions.

SJI Renewable Energy Ventures thanks CARB for the opportunity to take part in the many workshops and conversations during the development of the Proposed Amendments (Proposed Rule) and the Initial Statement of Reasons (ISOR). We respectfully submit the following comments on the 15-Day Amendments. Through the enhancement of the program's goals, CARB will be best suited to address GHG reductions from transportation fuels. The following comments will focus on increased program ambition and deliverability.

Increased Program Ambition

- 094.1 SJI Renewable Energy Ventures appreciates CARB's change from 5% to a more aggressive 9% stepdown in the 15-day package. This should move should help alleviate the current over supply in the credit bank. As mentioned in previous comments, stronger CI reduction targets is an essential element to driving down GHG emissions. Given the current LCFS credit surplus, seen over the last few years, we respectfully suggest an even larger step-down in the carbon intensity benchmark. This is critical to signal market support and increase investments.
- 094.2 Additionally, we respectfully recommend that CARB target at least a 35% CI reduction by 2030 and allow for the Auto Acceleration Mechanism (AAM) to be triggered based on 2025 data.
- 094.3



Deliverability Requirements

Book-and-Claim has allowed the LCFS to become one of the most successful decarbonization programs in the country. California has benefitted from the use of indirect accounting through national investments and participation in the LCFS. In return, the program has been highly successful at reducing GHGs, a goal we all support. SJI Renewable Energy Ventures respectfully requests CARB hold a separate process to address deliverability as it pertains to gas maps and the adoption of the California Renewable Portfolio Standard (RPS) language. Greater stakeholder engagement on the specific topic will produce the best possible policy.

Conclusion

SJI Renewable Energy Ventures appreciates the opportunity for continued participation throughout this rulemaking process. We remain committed to providing RNG to the California LCFS market and helping to reduce methane emissions, improve animal manure management in agricultural communities, and decarbonize California's transportation sector. We thank CARB for your continued work toward this end and look forward to any possible updates prior to November.

Sincerely,

Kyle Nolan

Kyle Nolan
Chief Operating Officer
SJI Renewable Energy Ventures

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Liane Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA, 95814

095.1 The unprecedented speed and magnitude of the expansion of renewable diesel used in California, increasingly made from soybean oil, is harming people, accelerating tropical deforestation, and undermining California's climate policies. **We call on the California Air Resources Board (CARB) to immediately cap the use of vegetable oil-based biofuels and to strengthen safeguards within the Low Carbon Fuel Standard (LCFS) to ensure that the use of biofuels does not directly or indirectly contribute to global food price shocks, agricultural expansion, and deforestation.** Capping the use of crop-based biofuels is neither radical nor unprecedentedⁱ, and is urgently required to align the LCFS with California's focus on transportation electrification and to ensure that California remains a leader in effective and responsible climate policies.

Fifteen years ago, in the midst of rapid expansion of corn ethanol, more than 170 scientists urged CARB to "include indirect land use change in the lifecycle analyses of heat-trapping emissions from biofuels and other transportation fuels."ⁱⁱ The Board listened to the science, and for more than a decade this and other policy decisions effectively prevented large increases in the use of crop-based biofuels in California. But these safeguards are no longer functioning effectively.

In the last few years California's consumption of renewable diesel has outstripped the sustainable sources of waste oils and fats, and is increasingly produced from soybean oil, some of it imported directly from South America.ⁱⁱⁱ California is on pace to consume 1.3 million metric tons of soybean oil for fuel in 2023, equivalent to 10 percent of global trade in soybean oil.^{iv} As California consumes more of the world's supplies of soybean oil, palm oil cultivation is expanding to replace soybean oil diverted from food to fuel use.

Three primary reasons the California LCFS requires an immediate cap on the use of vegetable oil-based fuels are:

095.2 **The global poor are at risk:** Use of vegetable oil for fuel contributed to a global food crisis in 2022. That year the World Food Price Index, published by the Food and Agriculture Organization of the United Nations, reached its highest level in a quarter century. Oils were the component of the index with the largest increase, with real prices up 84 percent compared to the 2014–2016 reference. Other factors were primarily responsible for this price spike, but despite the global food crisis, California consumption of renewable diesel increased by 47 percent in 2022 and more than 900

ⁱ Amendments to the Renewable Energy Directive of the European Union. 2023. [Link](#).

ⁱⁱ Scientists and Economists Letter on Indirect Land Use Change, 2009. [Link](#)

ⁱⁱⁱ Phillips 66 LCFS Tier 2 Pathway Application No. B0520. 2023. [Link](#)

^{iv} Soybean oil consumption projected based on data from CARB covering the first three quarters of 2023. Data on soybean oil trade from United States Department of Agriculture Foreign Agricultural Service. Oilseeds: World Markets and Trade. [Link](#).

thousand metric tons of soybean oil were used to produce renewable diesel for consumption in California. California should not be bidding against the global poor to fuel its trucks.

095.3 **Cropland continues to expand into sensitive ecosystems:** The expansion of soybean and palm oil (to replace soy oil used as fuel) is a major driver of tropical deforestation. Recent analysis finds that annual forest carbon loss in the tropics doubled during the early twenty-first century^v and that oil palm and soybeans are, respectively, the second and third largest drivers of deforestation after cattle.^{vi}

095.4 **Support for renewable diesel is diverting resources from transportation electrification:** Renewable diesel generated 40 percent of LCFS credits reported in the most recent quarter, and the large increase in credits from renewable diesel has depressed LCFS credit prices. Capping the use of renewable diesel and other fuels made from vegetable oil will focus more of the support provided by the LCFS on transportation electrification, which can be scaled up with clear climate benefits and without the harsh tradeoffs associated with vegetable oil and other crop-based fuels.

We therefore urge CARB to cap vegetable oil–based biofuels immediately in this rulemaking. Nothing short of a cap will effectively stem the widespread harms caused by the rapidly growing use of these fuels.

095.5 **Meaningful safeguards must effectively ensure that the use of vegetable oil or other crops for biofuels does not divert food to fuel uses or expand the footprint of agriculture.** California’s existing land-use safeguards within the LCFS rely on an estimation of land use change emissions developed using complex economic and land-use models. More than 15 years of research has not led to a consensus estimate of these emissions. A 2022 study from the National Academy of Sciences^{vii} describes the methodological problems arising from combining an attributional life cycle for fuel production with a consequential assessment of the climate impacts of fuel pathways or policies. A recent Model Comparison Exercise^{viii} conducted by the US Environmental Protection Agency highlights the deep uncertainty underlying the modeled climate benefits attributed to soybean oil–based biofuels. *In light of the methodological and modeling challenges with the current approach, more direct safeguards against excessive and damaging diversion of food to fuel use are required to effectively prevent bad outcomes.*

The data make clear that there is no surplus vegetable oil available in the United States, which is projected by the US Department of Agriculture to become a net importer of soybean oil.^{ix} In the global marketplace, as more soybean oil is redirected from food uses to fuel production, palm oil is the largest and fastest-growing source of vegetable oil substituting for it in global food markets.^x Because of this substitution, tracking the chain of custody of the oils used for fuel in California or banning the use of palm oil–based fuels is not an adequate safeguard. A cap on the total quantity of vegetable oil used for fuel is the most effective way to ensure California’s LCFS does not contribute to harmful outcomes. While the rapid growth of vegetable oil–based fuels in California is the immediate concern, policymakers in all jurisdictions should develop comprehensive safeguards to ensure current and future biofuel production does not harm people or the planet.

^v Feng, Y., *et al.* 2022. Doubling of annual forest carbon loss over the tropics during the early twenty-first century. *Nat Sustain* 5, 444–451. doi.org/10.1038/s41893-022-00854-3

^{vi} World Resources Institute. 2021. Global Forest Review. [Link](#)

^{vii} National Academies of Sciences, Engineering, and Medicine. 2022. *Current Methods for Life-Cycle Analyses of Low-Carbon Transportation Fuels in the United States*. Washington, DC: The National Academies Press. [Link](#).

^{viii} US Environmental Protection Agency. 2023. Biofuel Greenhouse Gas Model Comparison Exercise. [Link](#).

^{ix} Bukowski, M., & Swearingen, B. 2023. *Oil crops outlook: December 2023* (Report No. OCS-231). U.S. Department of Agriculture, Economic Research Service. [Link](#).

^x United States Department of Agriculture Foreign Agricultural Service. Oilseeds: World Markets and Trade. [Link](#).

Signed,

(affiliations listed for identification purposes only)

Dr. Holly Gibbs, PhD

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University of Wisconsin-Madison

Dr. Joseph Glauber, PhD

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Additional Signatures,

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Bloomington, IN

Dr. Roselie Bright, Other
Rockville, MD

Form Letter 1 for Comment 96 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name: Devin

Last Name: Mogler

Email Address: devin.mogler@gpreinc.com

Affiliation: Green Plains Inc.

Subject: LCFS Amendment Comments

Comment:

Dear Board Members;

Green Plains Inc. (NASDAQ:GPPE) is a leading biorefining company focused on the development and utilization of fermentation, agricultural and biological technologies in the processing of annually renewable crops into sustainable value-added ingredients. This includes the production of cleaner low-carbon biofuels and renewable feedstocks for advanced biofuels. Green Plains is an innovative producer of Ultra-High Protein and novel ingredients for animal and aquaculture diets to help satisfy a growing global appetite for sustainable protein.

In general, Green Plains supports the LCFS program and these proposed amendments, with some notable exceptions. We support CARB's increase in the stringency of the program to reduce emissions and decarbonize the transportation fuel sector. Reduced credit values in recent years due to over-compliance with the program have to some extent slowed investments in renewable fuel production and research into new fuels. Greater certainty around credit values being supported would encourage investment from companies like ours, and improve access to and terms for credit to execute on these investments. We support both the near-term step-down in the CI benchmark in 2025, as well as the Automatic Accelerator Mechanism (AAM) as a means to drive continued innovation and development in the biofuels sector, and urge CARB to consider even more aggressive reductions, which we believe are achievable.

We oppose capping vegetable oil feedstocks for biodiesel and renewable diesel production, and strongly oppose including inedible distillers corn oil with other virgin vegetable oils. The renewable corn oil we produce is a low carbon intensity feedstock that is not fit for human consumption without further refining, and should not be included in any consideration of limiting these feedstocks. The recent surge in the importation of so-called "Used Cooking Oil" from China and elsewhere would likely be exacerbated if sustainable, traceable domestic feedstocks are limited, and there are questions around the authenticity of the "UCO," which some have alleged could include some quantities of virgin palm oil.

We oppose the continued exemption for intrastate fossil jet fuel, and urge CARB to reconsider the original proposal to eliminate this exemption. Airlines need to decarbonize and we are helping them to transition to new clean fuel alternatives. Today, our inedible distillers corn oil is a low-CI feedstock for producing SAF and

renewable diesel, and when carbon capture and sequestration of our biogenic carbon dioxide is deployed beginning in 2025, our decarbonized ethanol will be a scalable feedstock for airlines to utilize.

We applaud CARB rejecting an arbitrary cap on crop-based fuels. Regarding suggested changes to sustainability certification for crop-based fuels, we ask the board to carefully consider the reporting burdens and costs that could result from a new verification scheme. In general, we do not agree with the premise that U.S. crops displace grasslands, forests and wetlands, but recognize concerns of stakeholders and the desire for greater certainty.

The crops we process into low carbon biofuels and feedstocks for advanced biofuels, primarily corn, is all grown on cropland that was not converted from wetlands, forests or grasslands in accordance with federal Renewable Fuels Standard requirements. Productivity of corn in particular on a bushel per acre basis has increased dramatically, so fewer acres of cropland are required each year to generate the same or greater volumes of production. Additionally, efficiency of crops has greatly improved, so necessary inputs of fertilizer and water on a per bushel basis continue to decline, benefitting soil health, water quality, and ultimately reducing the carbon-intensity of the feedstock and by extension the finished biofuels. Likewise, advances in agronomic practices and enhanced understanding of plant and soil ecosystems have expanded the adoption of climate smart agricultural practices such as conservation tillage and cover crops, ultimately keeping more carbon in the soil and reducing the carbon-intensity of the feedstock and finished biofuels.

That being said, we are not opposed to pathway holders being required to track our crop-based feedstocks to their point of origin, and have independent certification of same, so long as the tracking requirements are not too onerous or costly. As noted above, all of the corn we process into ethanol and inedible distillers corn oil has had to comply with prior converted cropland requirements under the federal Renewable Fuels Standard. Likewise, we urge CARB to review and revise the quantification methods for crop-based biofuels to better reflect yield, cultivation and land use practices of crops used to produce fuels that accurately accounts for advances already made and recognizes the potential climate benefits of field-based agronomic practices.

We appreciate CARB's consideration of these comments, and commend you for your ongoing commitment to strengthening the LCFS.

Regards,

Devin Mogler
SVP Corporate & Investor Relations
o/b/o Green Plains Inc.

Attachment: www.arb.ca.gov/lists/com-attach/7425-lcfs2024-UzAHYF0uWGkLUIQ3.pdf

Original File Name: CARB Comments - 08272024-1.pdf

Date and Time Comment Was Submitted: 2024-08-27 13:33:23

August 27, 2024

California Air Resources Board
1001 I Street
Sacramento, CA 95814

Submitted Electronically via <http://ww2.arb.ca.gov/applications/public-comments>
Re: Proposed Low Carbon Fuel Standard Amendments

Dear Board Members;

Green Plains Inc. (NASDAQ:GPRE) is a leading biorefining company focused on the development and utilization of fermentation, agricultural and biological technologies in the processing of annually renewable crops into sustainable value-added ingredients. This includes the production of cleaner low-carbon biofuels and renewable feedstocks for advanced biofuels. Green Plains is an innovative producer of Ultra-High Protein and novel ingredients for animal and aquaculture diets to help satisfy a growing global appetite for sustainable protein.

In general, Green Plains supports the LCFS program and these proposed amendments, with some notable exceptions. We support CARB's increase in the stringency of the program to reduce emissions and decarbonize the transportation fuel sector. Reduced credit values in recent years due to over-compliance with the program have to some extent slowed investments in renewable fuel production and research into new fuels. Greater certainty around credit values being supported would encourage investment from companies like ours, and improve access to and terms for credit to execute on these investments. We support both the near-term step-down in the CI benchmark in 2025, as well as the Automatic Accelerator Mechanism (AAM) as a means to drive continued innovation and development in the biofuels sector, and urge CARB to consider even more aggressive reductions, which we believe are achievable.

096.1

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096.2

096.3

096.4

We oppose the continued exemption for intrastate fossil jet fuel, and urge CARB to reconsider the original proposal to eliminate this exemption. Airlines need to decarbonize and we are helping them to transition to new clean fuel alternatives. Today, our inedible distillers corn oil is a low-CI feedstock for producing SAF and renewable diesel, and when carbon capture and sequestration of our biogenic carbon dioxide is deployed beginning in 2025, our decarbonized ethanol will be a scalable feedstock for airlines to utilize.

096.5

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Green Plains

Ingredients that matter

The crops we process into low carbon biofuels and feedstocks for advanced biofuels, primarily corn, is all grown on cropland that was not converted from wetlands, forests or grasslands in accordance with federal Renewable Fuels Standard requirements. Productivity of corn in particular on a bushel per acre basis has increased dramatically, so fewer acres of cropland are required each year to generate the same or greater volumes of production. Additionally, efficiency of crops has greatly improved, so necessary inputs of fertilizer and water on a per bushel basis continue to decline, benefitting soil health, water quality, and ultimately reducing the carbon-intensity of the feedstock and by extension the finished biofuels. Likewise, advances in agronomic practices and enhanced understanding of plant and soil ecosystems have expanded the adoption of climate smart agricultural practices such as conservation tillage and cover crops, ultimately keeping more carbon in the soil and reducing the carbon-intensity of the feedstock and finished biofuels.

- 096.6 That being said, we are not opposed to pathway holders being required to track our crop-based feedstocks to their point of origin, and have independent certification of same, so long as the tracking requirements are not too onerous or costly. As noted above, all of the corn we process into ethanol and inedible distillers corn oil has had to comply with prior converted cropland requirements under the federal Renewable Fuels
- 096.7 Standard. Likewise, we urge CARB to review and revise the quantification methods for crop-based biofuels to better reflect yield, cultivation and land use practices of crops used to produce fuels that accurately accounts for advances already made and recognizes the potential climate benefits of field-based agronomic practices.

We appreciate CARB's consideration of these comments, and commend you for your ongoing commitment to strengthening the LCFS.

Regards,

Devin Mogler

Devin Mogler
SVP Corporate & Investor Relations
o/b/o Green Plains Inc.



August 27, 2024

Steven S. Cliff, Ph.D.
Executive Officer
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Comments on Proposed 15-Day Changes to Proposed LCFS Regulation Order

Dear Dr. Cliff:

097.1

As the largest producer of renewable diesel in the United States and the single largest generator of credits under the California Low Carbon Fuel Standard (LCFS), Diamond Green Diesel LLC (DGD) strongly supports the increased step-down in the carbon intensity benchmarks as proposed in the August 12, 2024 15-day comment package.

As CARB staff have recognized, LCFS credit prices have plummeted in recent years, undermining investments necessary to stimulate continued expansion of the clean technology sector. Having recently invested approximately \$315MM to develop production facilities for sustainable aviation fuel (SAF), we are reassured to see CARB's increased commitment to setting targets that are realistic and attainable, yet ambitious enough to reenergize the LCFS credit market. This increase in ambition is particularly welcome in light of the current 15-day proposal, which eliminates the obligation on jet fuel.

097.2

We strongly urge CARB to approve the regulation on November 8th without further delay. Additionally, we request that once the rulemaking process is finalized, CARB staff provide clear guidance to address practical issues related to implementation of the sustainability guardrails and crop cap measures. We encourage staff to collaborate closely with the regulated community post-adoption to develop comprehensive guidance, ensuring that these new measures are implemented in a practical, efficient, and transparent manner.

Thank you for your continued work on the LCFS program and for considering our views on this important issue. If you should have any questions, please feel free to contact me at any time.

Sincerely,

Sandra Dudley
President

Comment Log Display

Here is the comment you selected to display.

Comment 98 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Chris
Last Name	Gould
Email Address	Chris.Gould@CRC.com
Affiliation	Carbon TerraVault
Subject	Comments on the August 12, 2024 CARB Low Carbon Fuel Standard 15-Day Changes

Comment

Carbon TerraVault Holdings, LLC ("CTV") appreciates the opportunity to comment on the California Air Resources Board's ("CARB" or "the Board") proposed amendments to the Low Carbon Fuel Standard ("LCFS"), released on August 12, 2024 (the "15-Day Changes").

CTV believes that the proposed modifications to LCFS credit generation for hydrogen projects is inconsistent with the requirements of California's Administrative Procedure Act ("APA") as well as CARB's December 2022 Scoping Plan (the "2022 Scoping Plan"). CARB must not finalize the 15-Day Changes or CARB risks suppressing California's nascent low-carbon hydrogen industry in a manner that will inevitably increase the risk of stranding existing assets and projects.

098.1

Restricting LCFS credits to non-fossil hydrogen after 2031:

- Does not align with CARB's 2022 Scoping Plan;
- Inhibits economic incentives that will constrict supply and the California hydrogen sector;
- Ignores the State's technology-neutral approach to carbon reduction; and
- Sends a message to investors that California's regulatory agencies may arbitrarily change rules that negatively impact the investment landscape without notice laid out by the state's own legislation.

Please see the attached letter for details.

Attachment	www.arb.ca.gov/lists/com-attach/7427-lcfs2024-BWZSIFIIUV1WPFc0.pdf
Original File Name	CTV LCFS for Gas+CCS in Hydrogen Production - 15-Day Comment Letter 08272024.pdf
Date and Time Comment Was Submitted	2024-08-27 13:28:44

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

August 27, 2024

Submitted electronically via ww2.arb.ca.gov

Chair Liane M. Randolph and
Members of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Comments on the August 12, 2024 CARB Low Carbon Fuel Standard 15-Day Changes

Dear Chair Randolph and Members of the Board:

Carbon TerraVault Holdings, LLC (“CTV”) appreciates the opportunity to comment on the California Air Resources Board’s (“CARB” or “the Board”) proposed amendments to the Low Carbon Fuel Standard (“LCFS”), released on August 12, 2024 (the “15-Day Changes”).¹ CTV believes that the proposed modifications to LCFS credit generation for hydrogen projects is inconsistent with the requirements of California’s Administrative Procedure Act (“APA”) as well as CARB’s December 2022 Scoping Plan (the “2022 Scoping Plan”). CARB must not finalize the 15-Day Changes or CARB risks suppressing California’s nascent low-carbon hydrogen industry in a manner that will inevitably increase the risk of stranding existing assets and projects.

098.1 cont Restricting LCFS credits to non-fossil hydrogen after 2031:

- Does not align with CARB’s 2022 Scoping Plan;
- Inhibits economic incentives that will constrict supply and the California hydrogen sector;
- Ignores the State’s technology-neutral approach to carbon reduction; and
- Sends a message to investors that California’s regulatory agencies may arbitrarily change rules that negatively impact the investment landscape without notice laid out by the state’s own legislation.

Consistent with the 2022 Scoping Plan, California energy companies have planned for low carbon intensity (“CI”) hydrogen projects that mitigate carbon emissions by employing carbon capture and storage (“CCS”),² with the understanding that these projects would receive LCFS credits. The 2022 Scoping Plan calls for a broad approach to defining low-CI hydrogen projects to support a projected massive increase in demand for hydrogen in the future. Developing a pipeline of low-CI hydrogen projects with CCS is essential to meet state climate targets, which compels CARB to provide long-term incentives in support of this emerging industry. The 15-Day Changes, as proposed, would eliminate these financial incentives by 2031, materially jeopardizing the long-

¹ California Air Resources Board, Proposed 15-Day Changes, <https://ww2.arb.ca.gov/rulemaking/2024/lcfs2024>.

² E.g., [Elk Hills Hydrogen Project Press Release](#), California Resources Corporation (July 31, 2023).

term business justification for these projects and undercutting California's chance to be a leader in low-CI hydrogen production.

Moreover, finalizing such disruptive changes sends the wrong signal to investors with respect to support for low-CI hydrogen projects. The 15-Day Changes represent an unexpected and surprising proposal, exactly the kind that sends shocks through the investment and lending communities and ultimately risk provoking a sweeping retreat from investment in *any* type of low-carbon fuels because of fears of arbitrary and last-minute regulatory changes. CARB must abandon the 15-Day Changes and refocus its efforts on sending clear regulatory support for all types of low-CI hydrogen projects.

About Carbon TerraVault Holdings, LLC

Carbon TerraVault Holdings, LLC ("CTV"), a subsidiary of California Resources Corporation ("CRC"), provides services that include the capture, transport and storage of carbon dioxide for its customers. CTV is engaged in a series of CCS projects that inject CO₂ captured from industrial sources into depleted underground reservoirs and permanently store CO₂ deep underground. For more information about CTV, please visit www.carbonterravault.com.

About Carbon TerraVault Joint Venture

Carbon TerraVault Joint Venture ("CTV JV") is a carbon management partnership focused on carbon capture and sequestration development, and was formed between Carbon TerraVault, a subsidiary of CRC, and Brookfield Renewable. The CTV JV develops both infrastructure and storage assets required for CCS development in California. CRC owns 51% of the CTV JV with Brookfield Renewable owning the remaining 49% interest.

CTV JV is involved in several new clean energy initiatives. These include the Grannus Ammonia and Hydrogen Project, which expects to sequester 370,000 metric tons ("MT") of CO₂ annually and produce clean ammonia and hydrogen in Northern California. The project aims to be California's first clean ammonia and hydrogen facility producing an expected 150,000 MT per annum of clean ammonia and an expected 10,000 MT per annum of clean hydrogen. The Lone Cypress Hydrogen Project, in collaboration with Lone Cypress Energy Services, expects to sequester 205,000 MT of CO₂ per year from a new hydrogen plant and the production of an expected 65 tons per day of hydrogen.^{3,4} Lastly, the Yosemite Hydrogen Facility, in partnership with Yosemite Clean Energy, expects to sequester 40,000 MT of CO₂ per year from a new hydrogen plant expected to produce 24 tons per day of hydrogen, with plans for two additional facilities. These projects contribute to our sustainability goals to reduce carbon emissions and promote clean energy.

³ Lone Cypress CDMA Press Release, California Resources Corporation (Dec. 7, 2022).

⁴ CTV expects that the Lone Cypress Hydrogen Project will utilize a blended feedstock consisting of natural gas and RNG, subject to the availability of RNG.

Recommendations

As a California-based company committed to the energy transition, CTV supports CARB's overall goal of achieving carbon neutrality by 2045 and reducing greenhouse gas ("GHG") emissions by 2045 to a level that is 85% below 1990 levels. In its Statement of Reasons for the December 2023 proposed LCFS amendments, CARB stated that "[m]eeting this goal will require the deployment of greenhouse gas emission reduction strategies *at an unprecedented scale and pace*."⁵ However, we are concerned that many aspects of the 15-Day Changes unnecessarily restrict or prohibit established and proven strategies for reducing GHG emissions in connection with the production of low-CI hydrogen from generating LCFS credits. In particular, the 15-Day Changes as written would exclude low-CI hydrogen production using fossil gas with CCS from generating LCFS credits after 2030. By removing LCFS credit generation eligibility for hydrogen produced using fossil gas as a feedstock, the proposed amendments only support incentives for hydrogen produced using (1) electricity generated from renewable power sources and (2) renewable natural gas ("RNG") as a feedstock. Neither source can practically meet CARB's projected demand for low-carbon hydrogen production likely inhibiting the foundation of a meaningful low-carbon hydrogen industry in California. This proposal is inconsistent with the California APA and the CARB 2022 Scoping Plan and will ultimately frustrate the deployment of low carbon hydrogen projects in California.

As discussed in greater length below, the California APA compels that the 15-Day Changes actually be subject to a 45-day comment period. In any case, we respectfully request that prior to finalization of the 15-Day Changes, CARB must:

- **Reject the proposed Subsection 95482(h)**, which removes LCFS credit generation eligibility for hydrogen produced using fossil gas as a feedstock, effective January 1, 2031;
 - In the alternative, CARB should revise Subsection 95482(h) to (1) expressly allow for LCFS generation at hydrogen projects using fossil gas feedstocks *when paired with CCS*, and (2) permit existing LCFS credit generating facilities (*i.e.*, those generating credits before January 1, 2031) to be exempt.

These requests largely stem from regulatory inconsistencies and counterproductive consequences associated with the 15-Day Changes, including (1) potential deficiencies under California's APA, (2) misplaced assumptions regarding other feedstocks for hydrogen plants, (3) conflicts between the 15-Day Changes and CARB's 2022 Scoping Plan, (4) negative impacts to California's climate goals, and 5) harmful financial effects, including the risk of stranding assets.

California Resource Corporation's Concerns with the August 2024 15-Day Changes

1. CARB's 15-Day Changes Do Not Comply with California Administrative Law

The California APA requires that any substantial modification to a proposed rule must be available for public comment for a minimum of 45 days, unless the modification is "sufficiently

⁵ 2024 LCFS Amendments Staff Report: Initial Statement of Reasons at 4 (Dec. 2023) [hereinafter "Initial Statement of Reasons"] (emphasis added).

related” to the original proposal.⁶ Only if a modification is “sufficiently related” to the original proposed rule, such that a reasonable member of the directly affected public could have determined from the notice that these changes to the regulation could have resulted, can a California agency make the modification available for a 15-day public comment period.⁷ The 45-day public comment period—one of only a few ways the public can help shape rulemaking—is integral to allow the public sufficient time to consider and analyze new rules that could have drastic impacts on their business operations and efficiently convey this information to the agency.

The proposed addition of Subsection 95482(h) in CARB’s August 12, 2024 15-Day Changes to the proposed December 2023 LCFS amendments is not sufficiently related to those earlier proposed amendments and, as such, is deficient under the California APA. The inquiry into whether a modification is sufficiently related focuses on whether the change concerns “the same subject or issue” as the original proposed rule and whether the original proposed rule provided any “specific indication” of the changes that may be made.⁸ Here, commentors had no indication that CARB would propose to remove hydrogen produced using fossil gas from credit generation eligibility under the LCFS. This *drastic* change to Section 95482, completely removing an entire category of fuels from eligibility, is not sufficiently related to the previous proposal, which only proposed minor changes related to fossil jet fuel and biomass-based diesel fuel credits. The public could not have had any indication that a modification to hydrogen generation credits was under consideration, and thus, commentors are “hampered in effectively opposing those changes.”⁹ To rectify this APA deficiency, we ask CARB to set aside these 15-Day Changes or reissue the proposed changes under a 45-day public comment period.

2. Other Hydrogen Feedstocks Are Insufficient to Meet Projected Fuel Demands

The LCFS program can play a critical support role in the development of California’s low-carbon hydrogen economy. For example, strong market signals from the LCFS have supported increased production and use of biodiesel and other low carbon fuels.¹⁰ Even regarding CCS, a recent May 2022 study from the Stanford Center for Carbon Storage found that “LCFS is the single largest financial incentive for eligible CCS projects in California.”¹¹ But rather than send strong market signals or incentives in support of California’s growing low-carbon hydrogen industry, the 15-Day Changes send the opposite signal, likely harming both the low carbon hydrogen and CCS industries. By picking winners and losers at such an early stage in the energy transition, CARB is abandoning the technology-neutral approach outlined in its own 2022 Scoping Plan where it stated

⁶ Ca. Gov. Code § 11346.8(c).

⁷ 1 Cal. Admin. Code § 42.

⁸ *Wendz v. Ca. Dep’t of Edu.*, 311 Cal. Rptr. 3d 213, 246 (Cal. App. 1 Dist. 2023) (quoting *Small Refiner Lead Phase-Down Task Force v. United States E.P.A.*, 705 F.2d 506, 548 (D.D.C. 1983)). In *Wendz*, a case not dissimilar to the rulemaking proceeding at issue here, the California Court of Appeal found that a proposed Superintendent of Public Instruction rule that placed a cap on the number of members on a Regional Migrant Parent Advisory Council, which was later modified to prohibit alternate members, was not sufficiently related because the public did not have adequate notice that the agency might prohibit the use of alternate members. In that case, the Court of Appeal found this portion of the rule invalid because a 45-day notice was required for the modified proposal. *Id.* at 247.

⁹ *Id.* at 246.

¹⁰ CARB 2022 Scoping Plan at 191.

¹¹ SCCS Study at 32.

that “[t]he challenge before us requires us to keep all tools on the table.”¹² We believe that CARB should adopt this latter approach and reverse the restrictive course proposed in the 15-Day Changes. In particular, as part of this reversal, CARB needs to revise its proposal so that low-CI hydrogen projects—regardless of feedstock or technology—are eligible to receive LCFS credit generating opportunities.

The 15-Day Changes ignore the technical realities associated with the time to scale the deployment of hydrogen solely produced from RNG, renewable electricity, and other non-fossil sources. In this interim period, low-CI hydrogen produced with fossil gas and CCS is the only proven and scalable technology capable of meeting the demands of California’s expanding low-carbon economy.¹³ CARB itself acknowledged in its 2022 Scoping Plan, that “[t]here is a high degree of uncertainty around the availability of solar to support both electrification of existing sectors and the production of hydrogen through electrolysis.”¹⁴ More recently, California’s long reliance and proven history with fossil-based hydrogen production is referenced in the ARCHES White Paper which states that “California is home to the second-largest hydrogen economy in the United States, a predominately fossil-based system which has been in place for more than 60 years.”¹⁵ The fastest way to decarbonize existing hydrogen production in California is to incentivize the installation of CCS at these facilities by allowing hydrogen production using fossil gas with CCS to generate LCFS credits. Providing this support avoids the risk of stranding the assets that have made California a leader in the hydrogen industry for the past 60 years by creating a bridge to low-CI hydrogen production. However, the 15-Day Changes would have the opposite effect, undercutting support for the best pathway to rapid reductions in carbon intensity of California’s existing hydrogen industry.

The proposed amendment assumes that renewable electricity would be dedicated to hydrogen production versus used for other grid demands. This unnecessary competition over developing renewable electricity supplies can be avoided by revising the LCFS amendments to incentivize low-CI hydrogen with CCS as an alternate strategy while these other hydrogen generation technologies develop.

At least one unintended consequence of CARB’s proposal is that it could further delay decarbonizing the grid. Increased demand that will correspond with the electrification of the transportation sector and population growth will require maintaining adequate reliable baseload power generation such as natural gas-fired power plants even with the addition of new renewable generation capacity. These existing natural gas plants could be retrofitted to co-fire hydrogen, and incentivizing the production of low-CI hydrogen produced with fossil gas and CCS represents

¹² CARB 2022 Scoping Plan at 11.

¹³ Bracci, J., et al., *Fueling the California Mobility Market with Hydrogen from Natural Gas plus Carbon Capture and Storage*, Stanford Natural Gas Initiative and Stanford Center for Carbon Storage, May 2022, at 41 (“near-term techno-economic models still point to SMR-CCS being the cheaper hydrogen generation pathway to kickstart a clean hydrogen economy in California”) [hereinafter “SCCS Study”].

¹⁴ California Air Resources Board, 2022 Scoping Plan for Achieving Carbon Neutrality, at 88 (Dec. 2022) [hereinafter “CARB 2022 Scoping Plan”].

¹⁵ White Paper Overview, Alliance for Renewable Clean Hydrogen Energy Systems, at 6 (2024).

would provide additional support for the overall decarbonization of the state's electric grid in an orderly and least-disruptive manner.

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Moreover, CARB may be overestimating the availability of RNG for use in hydrogen production within California. Separate from the 15-Day Changes related to hydrogen, the previously proposed December 2023 LCFS amendments would also effectively end LCFS crediting for RNG projects after 2040. Given that the RNG pathway is widely used to support the development of RNG projects across the country, this change will remove the primary financial incentive for new RNG projects in California and for producers to send RNG to California. This is because LCFS credits are critical to making RNG projects competitive with fossil gas given the comparatively low value of environmental credits available under the federal Renewable Fuel Standard ("RFS") and other state low-carbon fuel programs. Removing RNG crediting from LCFS may also result in producers sending RNG to Oregon and Washington to capture more value under those state low-carbon fuel programs. On August 13, 2024, the American Biogas Council confirmed these concerns in its press release regarding these proposed 15-Day Changes, stating that the amendments "may deter the [biogas] industry from bringing new supplies to the [LCFS] program later in the decade."¹⁶ Such an immediate reaction by the main RNG trade group should come as a warning to CARB of the long-term impacts of these proposed changes.

Demand for RNG outside of California is only expected to grow over the next several years, with New Mexico recently enacting a low-carbon fuel standard¹⁷ and the U.S. Environmental Protection Agency's expected eventual finalization of rules allowing RNG used in electricity generation to generate credits under the RFS. This will inevitably increase demand for RNG for non-hydrogen uses outside of California and could accordingly result in RNG supply shortfalls within the state. CARB's assumption that sufficient RNG may be available as a feedstock for low-CI hydrogen production does not appear to consider this factor.

Electricity demand is expected to grow substantially in California over the coming decades – driven by the anticipated demands of electrifying the transportation and industrial sectors and supercharged by increased demand from data centers. This massive surge in electricity demand would have to be met, at least in part, by natural gas power plants ostensibly supplied with RNG. In the meantime, the amendments introduced by the 15-Day Changes would mean power generators and hydrogen producers compete for these limited RNG supplies when there are other proven methods available to deliver low-CI hydrogen. This overall approach, however, would result in compound inefficiencies from the energy losses associated with this two-step process: (1) producing hydrogen via RNG and (2) burning the hydrogen in power plants.¹⁸ A more efficient approach would entail sending RNG directly to power plants to produce electricity, while leaving hydrogen production open to multiple technologies such as low-CI fossil gas paired with CCS.

¹⁶ American Biogas Council, *Statement on Proposed Changes to California's Low Carbon Fuel Standard* (Aug. 13, 2024).

¹⁷ New Mexico House Bill 41, Clean Transportation Fuel Standards (Mar. 5, 2024).

¹⁸ See Krieger, Elena, et al., *Green Hydrogen Proposals Across California*, PSE Healthy Energy, at 93 (May 21, 2024).

3. CARB's 15-Day Changes are Inconsistent with the 2022 Scoping Plan

Assembly Bill (“AB”) 32 requires CARB to develop a Scoping Plan which lays out California’s strategy for meeting the state’s climate goals and update the Scoping Plan every five years.¹⁹ The 2022 Scoping Plan provides a detailed pathway to achieve targets for carbon neutrality and reduce anthropogenic GHG emissions by 85% below 1990 levels no later than 2045.

Hydrogen production plays a critical role in meeting these goals per the 2022 Scoping Plan. In order to achieve these ambitious climate targets, the 2022 Scoping Plan recognized that **1,700 times** the current hydrogen supply will be required by 2045.²⁰ AB 32 requires that any CARB scoping plan embrace “technologically feasible and cost-effective reductions in GHG emissions.”²¹ Production of hydrogen using fossil gas with CCS is feasible, cost-effective, delivers verifiable GHG emission reductions and displaces traditional more carbon intensive uses of fossil gas, when properly incentivized. The 2022 Scoping Plan follows the statutory directive because it does not call to exclude hydrogen produced using fossil gas with CCS from the LCFS, but the December 2023 LCFS amendments and the recent August 2024 15-Day Changes do not.

The massive scaling of low carbon hydrogen projects necessary to meet the goals of the 2022 Scoping Plan requires an “all of the above” approach to low-carbon hydrogen production. The most efficient and logical way to do that is to ensure that sufficient supportive financial incentives are in place. LCFS credits represent a potentially critical financial incentive for low or zero carbon hydrogen projects. In light of the 1,700-fold expansion in the state’s hydrogen supply called for by the 2022 Scoping Plan, CTV believes that CARB must be encouraging *all forms* of low-carbon hydrogen production as called for by the 2022 Scoping Plan. Any other approach would be arbitrary and capricious.

As highlighted above, the 2022 Scoping Plan calls for a flexible approach to supporting the development of low-carbon hydrogen.²² Specifically, the Plan makes the following key references to hydrogen and CCS:

“For the purposes of this Scoping Plan, ‘renewable hydrogen’ and ‘green hydrogen’ are interchangeable and are not limited to only electrolytic hydrogen produced from renewables.” (page 26)

* * * *

“CCS can support hydrogen production until such time as there is sufficient renewable power for electrolysis and an abundant water source.” (page 86)

* * * *

“If steam methane reformation is paired with CCS, the hydrogen produced could potentially be low carbon.” (page 88)

¹⁹ Cal. Code Regs. Title 17, § 38561.(a)-(h) (2023).

²⁰ CARB 2022 Scoping Plan at 8.

²¹ AB 32 § 38561.(a) “[CARB] shall prepare and approve a scoping plan, as that term is understood by the state board, for achieving the **maximum technologically feasible and cost-effective reductions** in greenhouse gas emissions (emphasis added).”

²² CARB 2022 Scoping Plan at 6.

These references were included in the final adopted version of the 2022 Scoping Plan despite multiple commenters calling on CARB to explicitly exclude CCS from its definition of hydrogen production eligible to generate LCFS credits. Adhering to the 2022 Scoping Plan requirements outlined in AB 32, CARB refused to take such a narrow approach and built flexibility into the final 2022 Scoping Plan. The August 2024 15-Day Changes, with the newly proposed Subsection 95482(h), inexplicably and radically depart from CARB's prior actions and as called for by the 2022 Scoping Plan. This change in the Board's direction seems arbitrary and capricious in light of the rulemaking record.

This abrupt change in CARB's stance towards low-CI hydrogen with CCS is further evidenced when compared to the Board's responses to public comments on the draft 2022 Scoping Plan. When a public commenter called for CARB to only support electrolytic hydrogen generation via renewable electricity, the Board responded by stating that:

[t]he 2022 Scoping Plan does not prescribe the energy source to produce hydrogen, and therefore, steam methane reformation paired with CCS could be considered in the near term to ensure a rapid transition to hydrogen and increase hydrogen availability until such time as electrolysis with renewables and biomass-based hydrogen can meet the ongoing need.²³

CARB further acknowledged that because "the build-out [of renewable power generation] takes time and is additive to the growth in demand associated with electrification across the economy, the state needs to keep options open for other methods to produce zero carbon hydrogen at the scale needed to meet the projected demand."²⁴ The 15-Day Changes, however, without explanation or support, seemingly ignore CARB's prior express statements supporting broad approaches to identifying low-carbon methods of hydrogen production that will meet state climate goals and should therefore be incentivized. The 15-Day Changes directly conflict with the 2022 Scoping Plan and all other prior signals of regulatory intent from CARB without more than a cursory explanation.

It is unrealistic to expect hydrogen produced from renewable energy will scale sufficiently by the end of the decade to develop the market size California seeks. Developers seek to maximize their investment, thus build financial models based on the ability to operate an electrolyzer as much as possible. As such, electrolyzers that use renewable energy to produce hydrogen need to be paired with energy storage capabilities to ensure maximum use of the equipment. Goldman Sachs, an investment bank that has conducted extensive market research in the hydrogen sector, notes that power prices need to be below US\$30/MWh to compete with hydrogen produced from natural gas combined with carbon capture and storage²⁵ (see chart below labeled "Exhibit 74": the bank refers to this production method as "blue" hydrogen). Current PG&E industrial consumer retail prices in Q1 2024 were ~US\$200/MWh. Lazard, an investment bank with extensive industry research, notes in June 2024 research (see chart below²⁶) that to ensure firm reliability when

²³ CARB 2022 Scoping Plan Response to Comments, Appendix B at 57.

²⁴ *Id.*

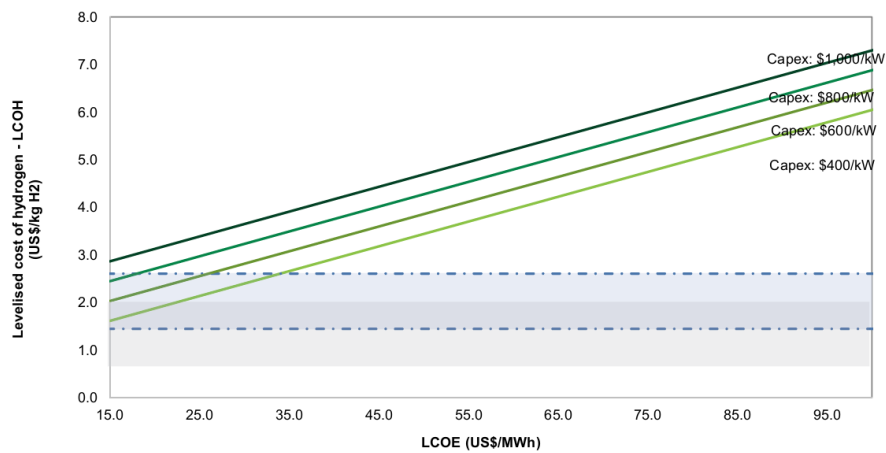
²⁵ Goldman Sachs. "The Clean Hydrogen Revolution," February 2022.

²⁶ Lazard. "Levelized Cost of Electricity," June 2024.

renewables are intermittent, the levelized cost of wind and solar in the California Independent System Operator (CAISO) region is between US\$123-177/MWh.

These price signals do not incentivize developers to build renewable generation, required storage and hydrogen electrolyzer equipment – and it is unlikely that these pricing dynamics will change sufficiently by 2031.

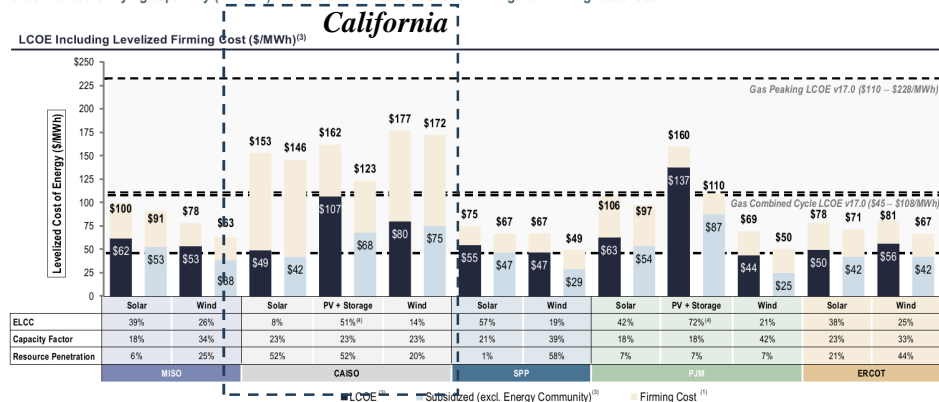
Exhibit 74: Overall, we estimate that for an electrolyzer of an efficiency of 64% and operating for 5,000 full load hours, an LCOE that is lower than c.US\$30/MWh is required to be at cost parity with 'blue' hydrogen, and lower than c.US\$20/MWh to be at cost parity with 'grey' hydrogen
Levelized cost of green, blue and grey hydrogen under different electrolyzer capex assumptions



Source: Goldman Sachs Global Investment Research

Levelized Cost of Energy Comparison—Cost of Firming Intermittency

The incremental cost to firm⁽¹⁾ intermittent resources varies regionally—as such is defined by the relevant reliability organizations using the current effective load carrying capability ("ELCC")⁽²⁾ values and the current cost of adding new firming resources



Source: Lazard and Robert Berger estimates and publicly available information.
Note: Total LCOE, including firming cost, does not represent the cost of building a 24/7 firm resource on a single project site, but, instead, the LCOE of a renewable resource and the additional costs required to achieve the resource adequacy requirement in the relevant reliability region based on the net cost of new entry ("Net CONE"). ISO ELCC data as of April 2024.
(1) Firming costs reflect the additional capacity needed to supplement the net capacity of the renewable resource (nameplate capacity "1" – ELCC) and the Net CONE of a new firm resource (capital and operating costs, less expected market revenues). Net CONE is assessed and published by grid operators for each regional market. Grid operators use a natural gas peaker as the assumed new resource in MISO (\$8.22/MWh-mc), SPP (\$8.56/kWh-mc) and PJM (\$10.20/MWh-mc). In CAISO, the assumed new resource is a 4-hour lithium-ion battery storage system (\$16.50/MWh-mc). For the PV + Storage cases in CAISO and PJM, assumed storage configuration is 50% of PV MW and 4-hour duration.
(2) ELCC is an indicator of the incremental reliability contribution of a given resource to the electricity grid based on its contribution to meeting peak electricity demand. For example, a 1 MW wind resource with a 15% ELCC provides 0.15 MW of capacity contribution and would need to be supplemented by 0.85 MW of additional firm capacity in order to represent the addition of 1 MW of firm system capacity.
(3) Reflects the average of the high and low of Lazard's LCOE v17.0 for each technology using the regional capacity factor, as indicated, to demonstrate the regional differences in project costs.
(4) For PV + Storage cases, the effective ELCC value is represented. CAISO and PJM assess ELCC values separately for the PV and storage components of a system. Storage ELCC value is provided only for the capacity that can be charged directly by the accompanying resource up to the energy required for a 4-hour discharge during peak load. Any capacity available in excess of the 4-hour maximum discharge is attributed to the system at the solar PPA. PJM ELCC values are also provided for the 10% and 15% firming levels.

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4. CARB's 15-Day Changes Negatively Impact California's Climate Goals

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The California Climate Crisis Act (AB 1279) sets an ambitious goal, requiring the state to achieve net zero GHG emissions as soon as possible, but no later than 2045, and thereafter achieve and maintain net negative GHG emissions. CCS is critical to this endeavor; it is, importantly, a *viable* option to reduce emissions from sectors that are key contributors to California's total emissions.²⁷ It is also a "critical enabler" of various carbon dioxide removal pathways and a "strong complement" to other decarbonization strategies.²⁸ In California specifically, CCS has the potential to play "a key role" in the removal of unabated carbon emissions, with potential geologic sequestration capacity in the state estimated to be between 35 to 425 gigatons of CO₂e in saline aquifers and five gigatons of CO₂e in the largest oil and gas basins.²⁹ This could provide storage capacity for up to 1,000 years.³⁰

CARB itself has acknowledged the essential role that CCS must play in achieving California's ambitious climate goals. In fact, CARB has stated that "there is no path to carbon neutrality without carbon removal and sequestration," as indicated not just by the 2022 Scoping Plan Update but also by the IPCC's Climate Change 2022: Mitigation of Climate Change report.³¹ The 2022 Scoping Plan is the main regulatory document governing how CARB will approach progress toward, and the meeting of, the state's ambitious climate aims. Integral to such progress is the development of, and support of, CCS projects—without this tool, carbon neutrality will remain an illusory hope. CARB's LCFS 15-Day Changes, then, are entirely inconsistent with the state's 2022 Scoping Plan, completely disregarding prior acknowledgement of the absolute necessity of CCS, because of how they would disincentivize a proven method of low-carbon hydrogen production by prohibiting LCFS credits for hydrogen produced with fossil gas and CCS after 2030. CARB must return to embracing CCS as an integral part of its strategy to achieve the state's targets.

CCS represents a both foundational building block for meeting California's climate goals and as a bridge to support low-carbon hydrogen production until sufficient renewable power generation capacity exists to allow for large-scale hydrogen production using only renewable electricity. Even if, as CARB has recognized, the transportation sector is headed toward electrification, hydrogen produced with fossil gas and CCS will be a key component in any strategy to decarbonize hard-to-abate industries, such as heavy manufacturing (*e.g.*, steel and cement).³² Restricting economic support in the transportation sector will likely limit the ability for hydrogen producers to develop projects that will supply these other industries – and thus inhibit market development broadly. This role serves as a necessary bridge to 100% renewable-derived hydrogen, but it will be thwarted without the right long-term support under the LCFS.

²⁷ See Energy Future Initiatives, Standard Precourt Institute for Energy & Stanford Earth, *An Action Plan for Carbon Capture and Storage in California: Opportunities, Challenges, and Solutions*, at S-1 (Oct. 2020) [hereinafter "Action Plan"].

²⁸ *Id.* at S-2.

²⁹ See California Air Resources Board, *Achieving Carbon Neutrality in California*, at 65 (Oct. 2020).

³⁰ See Action Plan at S-6.

³¹ California Air Resources Board, *Carbon Sequestration: Carbon Capture, Removal, Utilization, and Storage - About Webpage* (last visited May 5, 2024), <http://tinyurl.com/r46r5ucf>.

³² See CARB 2022 Scoping Plan, Table 2-1, at 72-79.

5. CARB's 15-Day Changes Stymie Investor and Developer Confidence

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For California to be a leader in the low-CI hydrogen industry and, moreover, to meet state climate targets, CARB must use the LCFS to incentivize low-carbon hydrogen production using all known proven methods, including hydrogen produced from fossil gas and CCS. LCFS credits are critical here.³³ To mitigate against the expenses of production, low-carbon hydrogen developers have come to rely on stacking multiple incentives, particularly following the passing of the Inflation Reduction Act in August 2022.³⁴ For CCS projects, the stacking of incentives relies not only on tax credits but also the LCFS credit.³⁵ Long-term support for these incentivizes is essential. However, by adopting the restrictive approach proposed in the 15-Day Changes, California-based CCS projects face undue capital and economic uncertainty, stymying development and, ultimately, the achievement of state decarbonization targets. Moreover, this unnecessary barrier to market and develop CCS projects will likely result in stranded assets, the very idea of which CARB has strongly rejected in the 2022 Scoping Plan³⁶ and acknowledged it must avoid in its Statement of Reasons provided with other recent LCFS amendments.³⁷ Finalizing the 15-Day Changes is inconsistent with and arbitrarily departs from CARB's prior expressly stated broad views on supporting hydrogen produced using CCS.

³³ See *supra* n.19 and n.20.

³⁴ See Hedreen, Siri, *Stacked Tax Credits Make Green Hydrogen Economic for First Time in US*, S&P Global Market Intelligence Webpage (last visited May 5, 2024), <http://tinyurl.com/ycxf5se3>.

³⁵ See Littlefield, Anna, et al., *Decarbonization of Ethanol: Pathways to Monetization Series Part One: Stacking 45Q with Voluntary Carbon Markets*, Colorado School of Mines: Payne Institute for Public Policy (Dec. 2023); see also SCCS Study at 2 (“These [federal] tax credits, combined with Low Carbon Fuel Standard incentives, offer a strong—and urgent—business case for commercial scale blue hydrogen projects in California.”); SCCS Study at 42 (“Existing federal and state policies—the 45Q and LCFS—are key in making blue hydrogen more cost-competitive[.]”).

³⁶ *Id.* at 9 “We must avoid making choices that will lead to stranded assets and incorporate new technologies that emerge over time.”

³⁷ With respect to RNG, CARB acknowledges that, for the fuel to transition to more sectors in the long term, “the existing market signals will need to transition accordingly to avoid stranded assets and the closure of methane capture projects.” Initial Statement of Reasons at 30 (Dec. 2023). The same idea is applicable to CCS projects if projects are forced to cease mid-development due to the lack of financial incentives, support and access to capital.

Conclusion

As more fully explained above, CARB must revisit various provisions of its proposed 15-Day Changes to the LCFS regulations that exclude projects producing hydrogen from fossil gas and CCS from LCFS credit generation after 2030. Revisions to the 15-Day Changes are necessary to ensure consistency with the 2022 Scoping Plan and, importantly, to recognize the importance of low-CI hydrogen in meeting the state's ambitious climate goals. To that end, we respectfully ask CARB to reconsider the inclusion of the proposed Subsection 95482(h) in light of the concerns detailed above. Failure to do so would not meet CARB's obligations under the California APA.

CTV appreciates the opportunity to comment on the August 12, 2024 LCFS 15-Day Changes. We thank CARB for its consideration and look forward to continued dialogue and public workshops on this matter.

Respectfully submitted,

A handwritten signature in black ink that reads "Chris Gould". The script is fluid and cursive, with the first letters of "Chris" and "Gould" being capitalized and prominent.

Chris Gould
Managing Director

Comment Log Display

Here is the comment you selected to display.

Comment 99 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Yuliya
Last Name	Shmidt
Email Address	yuliya.shmidt@bart.gov
Affiliation	BART
Subject	BART's comments on fixed guideway crediting
Comment	<div>BART supports the removal of the pre-2011/post-2010 delineation for Fixed Guideway System crediting thus recognizing that electric rail - no matter when it was constructed - significantly reduces Vehicle Miles Traveled (VMT) and emissions. BART also supports the efforts to strengthen the price of credits. The LCFS program provides a rare opportunity for public transit to be supported by polluting companies instead of California taxpayers.</div>

Attachment	www.arb.ca.gov/lists/com-attach/7428-lcfs2024-UDJWMQd0VXJRCAhr.docx
Original File Name	BART comments on LCFS amendments August 2024 final.docx
Date and Time Comment Was Submitted	2024-08-27 13:40:07

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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2024

August 27, 2024

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GENERAL MANAGER

Chair Liane Randolph and Members of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: August 12th Amendments to the LCFS Program

DIRECTORS

Debora Allen
1ST DISTRICT

Mark Foley
2ND DISTRICT

Rebecca Saltzman
3RD DISTRICT

Robert Raburn, Ph.D.
4TH DISTRICT

Melissa Hernandez
5TH DISTRICT

Elizabeth Ames
6TH DISTRICT

Lateefah Simon
7TH DISTRICT

Janice Li
8TH DISTRICT

Bevan Dufty
9TH DISTRICT

Dear Chair Randolph and Members of the Board,

099.1

The San Francisco Bay Area Rapid Transit District (BART) appreciates the opportunity to comment on the proposed amendments to the Low Carbon Fuel Standard (LCFS) program published on August 12, 2024. BART applauds CARB staff's proposal to remove the pre-2011/post-2010 delineation for Fixed Guideway System crediting thus recognizing that electric rail – no matter when it was constructed – significantly reduces Vehicle Miles Traveled (VMT) and emissions. BART also supports the amendments that will strengthen the price of LCFS credits because BART relies on revenues from the sales of those credits to help fund its system.

BART owns and operates an electrified fixed-guideway transit system, along with electric vehicle charging at its parking facilities. We have participated in the LCFS as an opt-in entity since 2016. The LCFS program is a powerful tool to meet the state's climate goals by incentivizing use of fuels with lower carbon intensity and switching to modes of travel such as public transit. The LCFS is one of California's best instruments to get passengers out of cars and reduce VMT.

Almost 160,000 passengers ride BART each weekday and over 75,000 daily on weekends. We operate in five counties -- San Francisco, San Mateo, Alameda, Contra Costa, and Santa Clara -- with 131 miles of track and 50 stations. The vast majority of BART trains are electric, with 100% of its electricity supplied by zero-carbon resources including solar, wind, and hydroelectric generators. Every weekday of 2023, BART prevented 47,117 car trips and reduced California greenhouse gas (GHG) emissions by 608,036 lbs. CO₂e.

099.1 cont

We strongly support the staff's proposal to provide equal treatment to all fixed guideway systems for the purposes of LCFS crediting. Transit systems all over the state are facing severe fiscal issues and the additional LCFS credits are vital to help rail agencies continue to provide service with diminished local funding sources. Given the very small percentage of total LCFS credits that fixed guideways generate, this change will have no discernible impact on credit prices while significantly helping with BART's current fiscal difficulties.

BART also supports the proposed amendments that will strengthen the price of LCFS credits such as increasing the stringency of the program and capping certain kinds of biomass. The recent steep decline in credit prices has noticeably impacted BART's budget, which is still hundreds of millions of dollars in deficit. Transit systems around the

country have not recovered from the COVID passenger decline, with the Bay Area being most impacted. BART is coping with severe fiscal issues facing a substantial budget shortage beginning in fiscal year 2027.

Public transit is essential to California's achievement of its climate goals. BART applauds CARB staff's proposals that will support transit across the state including the equal treatment for all fixed guideway systems and the amendments that will strengthen the price of LCFS credits.

Sincerely,

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Manager of Energy
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(510) 287-4835



Alexandria Moffat
Clean Transportation Director

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August 27, 2024

Clerk's Office
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Submitted electronically at: <https://ww2.arb.ca.gov/lispub/comm/bclist.php>

Re: Proposed Amendments to the Low Carbon Fuel Standard Regulation

Dear Chair Randolph and Honorable Board Members:

SDG&E appreciates this opportunity to comment on the Low Carbon Fuel Standard ("LCFS") regulation and provide feedback for CARB Board member consideration. SDG&E supports many provisions in the 15-Day Changes¹ including, as discussed in comments filed through the California Electric Transportation Coalition in February 2024 on the 45-day amendments. However, SDG&E continues to have significant concerns and recommends changes to the 15-Day Changes to provide clarity and address serious operational challenges.² These modifications are discussed below and reflected in the Appendix. Specifically:

- 100.1 • **Electric Distribution Utility ("EDU") Definition:** The current EDU definition in Section 95481 is drastically outdated, relying on 2017 electric sales, and should be modified to 1) rely on 2022 annual electric sales and, 2) accordingly, recalibrate EDU sizing.
- 100.2 • **Pre-Approved Holdback Project List:** Bifurcating equity and other project types in Section 95483(c)(1)(A)(5) unnecessarily complicates rather than streamlines the list of pre-approved projects. The two lists should be consolidated, with a 75% equity requirement.
- 100.3 • **Base Credits to Original Equipment Manufacturers ("OEMs"):** CARB must resolve ambiguity regarding the potential carveout in Section 95483(c)(1) for OEMs by:
 - Ensuring that any reallocation of base credits will protect EDU holdback funding
 - Establish guardrails around the Executive Officer's discretion via a one-time option by March 15, 2025, and Board oversight.
- 100.4 • **Administrative Cost Caps:** CARB should maintain the cap for both the holdback projects and the statewide rebate program at 10%, as this is currently accepted by both CARB and the CPUC. There is no data to support lowering the cap to 7%.

¹ See "15-Day Changes," posted August 12, 2024, at: <https://ww2.arb.ca.gov/rulemaking/2024/lcfs2024>.

² SDG&E has also signed onto comments on the 15-Day Changes filed separately and concurrently with the California Electric Transportation Coalition; the Joint California Utilities; and Southern California Gas Company.

1) Definition of Electric Distribution Utilities in Section 95481 *Definitions and Acronyms* Must Be Updated to Reflect the Most Current Electric Sales

Currently, SDG&E overpays into the statewide Clean Fuel Reward (“CFR”) program relative to the base credits it receives. SDG&E requests that CARB revise the definition of Electric Distribution Utility (“EDU”) in Section 95481 “Definitions and Acronyms” to rely on 2022 electric sales, rather than 2017 data. This change ensures that SDG&E is defined as medium investor-owned utility (“IOU”) and have a comparable contribution to the statewide program as similarly sized utilities. In the Initial Statement of Reasons released December 19, 2023,³ CARB staff states, “San Diego Gas & Electric is re-defined to have a comparable contribution to the statewide program to similarly sized public utilities.” However, this change was not in the proposed regulation. CalETC identified this discrepancy in 45-day comments submitted on February 20, 2024. The 15-Day Changes still fails to update the EDU definition.

Under the regulation, “The EDU or its designee is the credit generator for base credits for the portion of residential EV charging assigned to that EDU by the Executive Officer.”⁴ Each EDU’s assignment of base credits is calculated according to Section 95486.1(c)(1), which results in SDG&E receiving a similar portion of base credits as the Los Angeles Department of Water and Power (“LADWP”) – a medium publicly owned utility (POU). However, under the current regulation and as written in the 15-Day Changes, SDG&E is defined as a large IOU and contributes 67% of LCFS credit proceeds to the Clean Fuel Reward program. Therefore, while SDG&E receives equivalent base credits as a medium POU, SDG&E remits the same proportion of revenues to the statewide program as a large IOU.

Since base credits are directly attributable to EV charging, the EDU definition is aligned with electric sales. As in the current regulation, the 15-Day Changes defines a large IOU or POU as having annual load served as equal to or more than 10,000 Gigawatt-hours (“GWh”) in 2017, while a medium IOU or POU has 700 to 10,000 GWh. However, this data is outdated and should be updated to reflect the most currently available data to show “the estimated electricity use in kWh of non-metered residential plug-in electric vehicles assigned to an EDU for the reporting period.”⁵ The annual sales reflected for 2022 in the California Energy Commission’s 2023 Integrated Energy Policy Report (“IEPR”) Planning Forecast highlight the discrepancy:

EDU	2022 Electric Sales	Definition under LCFS
PG&E	88,602 GWh	Large IOU
SCE	97,680 GWh	Large IOU
SDG&E	17,867 GWh	Large IOU
LADWP	21,842 GWh	Medium POU
SMUD	10,662 GWh	Medium POU

³ See Appendix E: Purpose and Rationale of Proposed Amendments for the Low Carbon Fuel Standard Requirements (“ISOR”), at p. 15. Available at:

https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/lcfs_appe.pdf.

⁴ Section 95483(c)(1)(A)

⁵ Section 95486.1(c)(1)(A)

Therefore, SDG&E urges CARB to update the thresholds for electric sales to align with the most recently available historical data (2022) published by the CEC. SDG&E proposes changes to the 15-Day Changes in the Appendix.

100.2 cont

2) The Two Holdback Project Lists in Section 95483(c)(1)(A)(5) *Restrictions on Use of Holdback Credits Should Be Consolidated into a Single List*

The current regulation⁶ identifies a single list of projects that the EDUs may fund through holdback credit proceeds, with targets for equity. The ISOR indicates staff's intent to enhance the list of pre-approved projects to include the priorities set from the Scoping Plan as well as community input.⁷ While SDG&E agrees that the list in pre-approved equity projects is enhanced, the 15-Day Changes introduces a second non-equity list categorized as "Other Holdback Projects" as Section 95483(c)(1)(A)(5)(b).

SDG&E recommends that the two lists be consolidated into one and that project spending be considered towards the EDUs' equity allocation compliance requirements if it benefits the communities and individuals defined in the equity holdback section. To ensure that the utilities are only deploying projects that CARB supports for equity communities and individuals, SDG&E recommends that the single project list must be used for equity projects and may be used for non-equity projects in addition to other non-equity projects that further transportation electrification in California as defined by 95491(e)(5). This approach is more straightforward, minimizes opportunity for conflicting interpretations, and provides certainty on expectations around CARB's priorities while still allowing flexibility for utilities to propose non-equity programs that are best suited to their specific service areas and customers.

SDG&E proposes revisions to the 15-Day Changes in the Appendix to reflect these comments.

100.3

3) *Ambiguity Regarding the OEM Carveout in Section 95483(c)(1) Residential EV Charging Must be Resolved*

The 15-Day Changes introduces an optional carveout of residential base credits for Original Equipment Manufacturers ("OEMs"). Specifically, "The Executive Officer may direct up to 45% of base credits to eligible OEMs, if the share of new zero emission vehicle sales for model year 2024 zero emission vehicles certified under California Code of Regulations, title 13, section 1962.2 is less than 30 percent."⁸ If the Executive Officer directs base credits to eligible OEMs, the 15-Day Changes stipulates that the requirements of section 95483(c)(1)(A)2 – *i.e.*, for opt-in EDUs to contribute a minimum percent of base credits for residential EV charging (or net base credit proceeds) toward a Clean Fuel Reward program – no longer apply. There are several challenges that must be resolved to avoid negative consequences.

⁶ Section 95483(c)(1)(A)(6)(a)

⁷ ISOR, at pp. 14-15.

⁸ 15-Day Changes, at Section 95483(c)(1)(B)

a) **Any base credits allocated to OEMs come from the EDU minimum percent CFR contribution and preserve EDU holdback allocation**

SDG&E believes that CARB's intent is that any base credits that would be allocated to OEMs would essentially take from the minimum percent of base credits for residential EV charging (or net base credit proceeds) that would have otherwise been remitted to the statewide program. However, the plain language of the 15-Day Changes stipulates otherwise. Specifically, "If the Executive Officer assigns a portion of base credits to OEMs pursuant to section 95483(c)(1)(B), **the EDUs are assigned the remaining base credits**" (emphasis added).⁹ This wording indicates that the Executive Officer would assign 45% of the entire pool of base credits to OEMs and then divide the remaining 55% among the EDUs.

Further, the 15-Day Changes provides that, "If the Executive Officer directs base credits to eligible OEMs, the requirements of section 95483(c)(1)(A)2. do not apply."¹⁰ Simply put the requirements for the EDU contributions to the CFR do not apply. However, this section contains the requirements for EDU contribution to the statewide program:

EDU Category	% Contribution
Large Investor-owned Utilities	50%
Large Publicly-owned and Medium Investor-owned Utilities	25%
Medium Publicly-owned Utilities	10%
Small Publicly-owned Utilities and Small Investor-owned Utilities	0%

While these requirements would cease to apply as currently written in the 15-Day Changes, they provide a level of clear proportionality that is absent from the OEM carveout.

This scenario could significantly decrease the allocation of base credits for EDUs that currently remit less than 45% of their credit proceeds to the statewide program. For example, small POUs and small IOUs currently have 0% contribution to the statewide program and, therefore, holdback 100% of LCFS revenues; the 15-Day Changes suggests that their allocation of base credits could be reduced. This is a critical nuance in language that can significantly reduce EDU holdback funding rather than simply redirect CFR funding. If the intent is to allocate CFR funding to the OEMs, SDG&E recommends stating that clearly in the language so that no EDUs are adversely impacted by the OEM carveout.

Therefore, CARB should (1) establish in the regulation that individual and aggregate utility holdback credits will not be reduced as a result of this directive, and (2) clarify in the regulation

⁹ 15-Day Changes, at Section 95483(c)(1)(A)

¹⁰ 15-Day Changes, at section 95483(c)(1)(B).

that in redirecting credits to the OEMs, the Executive Officer would allocate only that portion of the credits dedicated for CFR according to the table in section 95483(c)(1)(A)(2), but not to exceed 45% of the total base credits. SDG&E proposes such clarifications in Appendix A.

b) The Executive Officer should have deadlines for initiating the allocation of base credits to OEMs

As written, the 15-Day Changes enables the Executive Officer to direct base credits to OEMs at any time. Should the final order allow the Executive Officer the discretion to allocate base credits to OEMs, SDG&E recommends that the regulation stipulate a deadline to allow certainty and cost-effectiveness for the statewide rebate program. Otherwise, the EDUs risk developing, funding, and administering a program only to have it lost funding upon the Executive Officer's decision to redirect base credits to OEMs. This concern is especially acute considering the shift in the statewide program's complete focus from light-duty to medium- and heavy-duty EVs. SDG&E recommends that the 15-Day Changes be revised to allow the Executive Officer to issue a one-time decision no later than the March 15, 2025. See the Appendix for proposed changes.

100.4 cont

4) The Current 10% Cap on Administrative Costs Should be Preserved in Section 95483(c)(1)(A) Base Credits to EDUs

The 15-Day Changes maintains a reduced cap of 5% on administrative costs to support the Clean Fuel Reward program¹¹ and 7% for holdback credit projects.¹² SDG&E recommends that the 15-Day Changes preserve the cap on administrative costs for both the holdback projects and rebate program at 10%, as this is currently accepted by both CARB and the CPUC.

Based on how utilities currently track and report program administrative costs, the reduction of allowable administrative costs for utility holdback programs from 10% to 7% in the proposed amendments will make it extremely difficult, if not impossible, to administer these programs. Smaller utilities may only be able to implement a portfolio of small programs that will never benefit from the economies of scale that larger programs achieve. Meanwhile, CPUC shift in policy away from utility-specific ratepayer-funded programs, with a sunset of December 31, 2026, for these programs, places the larger IOUs in a similar predicament. While there is an option in the Regulation that allows the utilities to exceed the administrative cost caps with advanced approval from the Executive Officer, this is likely to create administrative challenges for CARB and utility staff if each utility must make a request each year that they expect to exceed the proposed 7% cap.


SDG&E recommends that, for medium and large EDUs, the cap on equity holdback administrative costs should revert to 10% as allowed in the current regulation. Please see the Appendix for all proposed revisions.

¹¹ 15-Day Changes, at Section 95483(c)(1)(A)(4)

¹² 15-Day Changes, at Section 95483(c)(1)(A)(5)(c)

SDG&E appreciates the opportunity to provide comments on this important 15-Day Changes. If you have any questions, please do not hesitate to contact me at any time.

Sincerely,

A handwritten signature in black ink, reading "Alex Moffat". The signature is written in a cursive, flowing style.

Alexandria Moffat
Clean Transportation Director

Appendix

Proposed Revisions

Proposed text deletions are in bold and strikethrough (~~**abcd**~~)

Proposed text additions are in bold and underlined (**abcd**)

Appendix A Proposed Revisions

SDG&E proposes the following modifications to the 15-Day Changes (additions in underline and deletions in ~~strikeout~~ format; numeration follows that of the 15-Day Changes):

100.1 cont

Section 95481. Definitions and Acronyms.

“Electrical Distribution Utility” means an entity that owns or operates an electrical distribution system, including:

1. a public utility as defined in the Public Utilities Code section 216 (referred to as an Investor-Owned Utility, or IOU); or
 - A. “Large Investor-owned Utility” means an IOU with annual load served equal to or more than ~~10,000~~25,000 Gigawatt-hours (GWh) in ~~2017~~2022;
 - B. “Medium Investor-owned Utility” means an IOU with annual load served of less than ~~10,000~~25,000 GWh and equal to or more than ~~700~~15,000 GWh in ~~2017~~2022;
 - C. “Small Investor-owned Utility” means an IOU with annual load served equal to or less than ~~700~~15,000 GWh in ~~2017~~2022.
2. a local publicly-owned electric utility (POU) as defined in Public Utilities Code section 224.3;
 - A. “Large Publicly-owned Utility” means a California POU with annual load served equal to or more than ~~10,000~~15,000 Gigawatt-hours (GWh) in ~~2017~~2022;
 - B. “Medium Publicly-owned Utility” means a California POU with annual load served of less than ~~10,000~~15,000 GWh and equal to or more than ~~700~~5,000 GWh in ~~2017~~2022;
 - C. “Small Publicly-owned Utility” means a California POU with annual load served of less than ~~700~~5,000 GWh in ~~2017~~2022. or (C) an Electrical Cooperative (COOP) as defined in Public Utilities Code section 2776

100.2 cont

Section 95483(c)(1)(A)(5). Restrictions on Use of Holdback Credits.

5. *Restrictions on Use of Holdback Credits.* Documentation of adherence to the following restrictions must be included in the annual report submitted pursuant to section 95491(e)(5)(A).
 - a. *Holdback Credit **Equity** Projects.* At least 75 percent of holdback credit proceeds must be used to support transportation electrification for the primary benefit of or primarily serving disadvantaged communities and/or low-income communities and/or rural areas or low-income individuals eligible under California Alternative Rates for Energy (CARE) or Family Electric Rate Assistance Program (FERA) or the definition of low-income in Health and Safety code section 50093 or the definition of low-income established by a POU’s governing body or a community in which at least 75 percent of public school students in the project area are eligible to receive free or reduced-price meals under the National School Lunch Program, or a community located on lands belonging to a state or federally recognized California Indian tribe. These projects may include:

- i. Electrification of drayage trucks as well as other medium-, heavy-duty, or off-road vehicles including school and transit buses.
 - ii. Investment in public EV charging infrastructure and EV charging infrastructure in multi-family residences.
 - iii. Investment in electric mobility solutions, such as EV sharing and ride hailing programs.
 - iv. Additional rebates and incentives for low-income individuals beyond existing local, federal and State rebates and incentives for: purchasing or leasing new or previously owned EVs; installing EV charging infrastructure in residences; and offsetting costs for residential or nonresidential EV charging.
 - v. Promoting use and additional incentives for use of public transit and other clean mobility solutions, via charging equipment or infrastructure for the following categories:
 - I. EV sharing and ride hailing programs,
 - II. Electrification of public transit and school buses, including battery swap programs, and
 - III. Use or ownership of neighborhood electric vehicles, eBikes, eScooters, eMotorcycles, and other micromobility solutions.
 - vi. Re-skilling and workforce development for transportation electrification and electric vehicle infrastructure applications, developed in coordination with the California Workforce Development Board or local workforce development agencies.
 - vii. Investments in grid-side distribution infrastructure necessary for ~~medium- and heavy-duty~~ EV charging.
 - viii. Transportation electrification projects that are identified in, or consistent with, a Community Emission Reduction Plan created in response to AB 617.
 - ix. Alternatively, EDUs, in coordination with local environmental justice advocates, local community-based organizations, and local municipalities, may develop and implement other projects that promote transportation electrification in disadvantaged and/or low-income communities and/or rural areas or for low-income individuals. These alternative projects are subject to approval by the Executive Officer. Applications submitted to the Executive Officer must include, and will be evaluated for approval based on, a complete description of the project, demonstration that the project promotes transportation electrification in disadvantaged and/or low-income communities and/or rural areas or provides increased access to electric transportation for low-income individuals, and evidence that the project was developed in coordination with local environmental justice advocates, local community-based organizations, and local municipalities.
- ~~b. Other Holdback Projects. Holdback projects that are not specified in subsection 95483(c)(1)(A)65.a. must follow the requirements specified in 95491(e)(5). Below are examples of pre-approved uses for these other holdback credit proceeds:~~**
- ~~i. Investments in grid-side distribution infrastructure necessary for EV charging.~~
 - ~~ii.~~ **x. Support for vehicle-grid integration with projects such as:**

I. Encouraging the optimization of EV charging through education in the following areas: peak demand, rate pricing, grid emergencies, potential power shutoffs, infrastructure deferral, renewable integration, and/or other signals and grid needs to provide grid and customer benefits.

II. Providing program incentives to encourage driver participation in monitored/managed charging, demand response, or vehicle-to-load / vehicle-to-grid applications.

III. Supporting the deployment and installation of bidirectional charging equipment.

IV. Other innovative approaches to promoting and managing EV charging and discharging that provides benefits to customers and the grid.

iii.xi. Hardware and software that decrease the cost of or avoid updates to infrastructure, including load management software or outlet splitting.

100.4 cont c. *Administrative Costs of Holdback Credit Equity Projects.* With the exception of EDUs with annual sales of less than 2000 GWh, a Administrative costs to support the ~~development~~ and implementation of holdback credit equity projects must not exceed ~~7~~10 percent of total spending on holdback credit equity projects annually unless the EDU contracts with a community-based organization, and the exceedance is approved in advance by the Executive Officer. The request for administrative cost exceedance for a calendar year must be submitted by September 30 of the prior year. The request must include, and will be evaluated for approval based on, a complete description of the equity projects planned by the EDU, an estimate of total administrative costs relative to total spending on the projects, and evidence that the community-based organization is a non-profit organization focused on serving disadvantaged and/or low-income groups. Within 30 days of receiving a request for higher administrative costs, the Executive Officer will inform the EDU of its decision in writing. If the request is

100.3 cont

Section 95483(c)(1). Residential EV Charging.

A. *Base Credits to EDUs.* The EDU or its designee is the credit generator for base credits for the portion of residential EV charging assigned to that EDU by the Executive Officer, except for any portion of base credits that the Executive Officer assigns to OEMs pursuant to section 95483(c)(1)(B). ~~If the Executive Officer assigns a portion of base credits to OEMs pursuant to section 95483(c)(1)(B), the EDUs are assigned the remaining base credits.~~ The EDU may authorize a third party to sell the EDU's credits. The EDU or its designee must meet the requirements set forth in paragraphs 1. through 5. below, and 95491(e)(5).

B. *Base Credits to OEMs.* No later than March 15, 2025, The Executive Officer may reallocate some or all of the EDUs' credits that would have otherwise been allocated to the Clean Fuel Rewards contributions, not to exceed direct up to 45% of base credits, to eligible OEMs, if the share of new zero emission vehicle sales for model year 2024 zero emission vehicles

certified under California Code of Regulations, title 13, section 1962.2 is less than 30 percent. If the Executive Officer directs base credits to eligible OEMs, the following provisions apply:

- i. Each EDU's base credits shall be reduced by no more than the percent contribution for the applicable EDU category as specified in section 95483 (c)(1)(A)2.
- ii. ~~¶~~ The requirements of section 95483(c)(1)(A)2 do not shall no longer apply.
- iii. No further contributions to the Clean Fuel Reward program shall be made, and the administrator of the Clean Fuel Reward program shall implement the windup procedures set forth in the statewide program Governance Agreement.
- iv. The OEM is the credit generator for base credits for the portion of residential EV charging assigned to that OEM by the Executive Officer pursuant to 95486.1(c)(1)(A).
- v. The OEM must meet the requirements set forth in paragraphs 1. through 3. below, and 95491(e)(5).

C. **OEM Eligibility.** The OEM must identify itself to the Executive Officer as eligible to generate base credits. The Executive Officer may revoke the eligibility of an OEM to generate base credits if it fails to sell base credits and spend the proceeds within three years of base credit issuance. An OEM must submit any request to change base credit generation eligibility status for base credit generation by the end of the first month of the prior quarter.

D. **Reporting Requirements.** The Executive Officer shall review the implementation of any OEM program and present a report to the Board annually, beginning January 1, 2027, with recommendations for continuing or decreasing allocations to the OEMs. Documentation of adherence to the following restrictions must be included in the annual report submitted pursuant to section 95491(e)(5)(A).

COMMENTS OF STEVE BERRY & TIM SEARCHINGER
REGARDING RENEWAL OF LOW CARBON FUEL STANDARD
(August 27, 2024)

Steven Berry, David Swenson Professor of Economics, Yale University
(steven.berry@yale.edu)

Timothy D. Searchinger, Senior Research Scholar, Princeton University
(tsearchi@princeton.edu)

We are an economist at Yale University and an environmental scientist at Princeton University and have written papers analyzing the emissions from biofuel use as well as economic land use models. Our shortform CV's are attached. Berry previously served as a consultant for CARB on economic issues related to the analysis of indirect land use change from biofuels. We offer the following comments.

101.1

There are compelling reasons to believe that biofuels are contributing significantly to global agricultural land expansion and associated greenhouse gas emissions. There is now a sound satellite study of cropland expansion, which finds that annual crops are expanding at a record rate of roughly 25 million acres per year (Potapov et al. 2021). FAO data would indicate expansion of an additional 2.5 million acres per year of perennial crops. This is net expansion, which is caused by growing global demand for agricultural products, including for biofuels.

According to the same study, global expansion is roughly double, but the roughly 20 million hectares of expansion of arable cropland is offset by roughly 10 million hectares of abandonment. Yet, even with this abandonment, the gross expansion causes additional carbon losses both because it is occurring heavily in carbon-rich lands and because the carbon losses are relatively immediate compared to the carbon gains from regrowing native vegetation. These shifts reflect the fact that agriculture is not only expanding on a net basis but also to some extent shifting, particularly into the tropics, in response to changing economics. These shifts reflect, in part, an outsourcing of agricultural production by countries in the global north, and are indicative of how demand in the global north, including for biofuels, helps to drive expansion and carbon losses in the Global South. (Pendrill et al. 2019) (T. Searchinger et al. 2022).

Oilseeds, which occupy roughly one quarter of global cropland, are major drivers of this expansion including soybeans and oil palm (Weisse and Goldman 2021). Since 2005, when global policy began to drive large increases in biofuels, biodiesel has contributed more than 40% of the increase in global demand for vegetable oil. As discussed in the attached paper regarding the GTAP model, there is strong econometric evidence that prices of vegetable oils and the major grains move in parallel in different parts of the world. This is no surprise. Any simple observation of a chart on global vegetable oil prices for different

101.1 cont vegetable oils in different parts of the world shows that their prices move closely in parallel. Global commodity traders ensure this parallel movement as they are engaged in global arbitrage. This means that vegetable oils have high substitutability at the margin. It means that increased demand for vegetable oil anywhere in the world and for any vegetable oil will tend to cause the same price response and therefore lead to similar expansion of vegetable oils. Not surprisingly, cropland will expand most where it is most economical to do so, namely in the Tropics and Neo-tropics. And vegetable oil expansion in the Global North will contribute to this cropland expansion further to replace displaced crops.

We therefore support proposed changes to the Low Carbon Fuel Standard that would impose caps on biodiesel production from virgin vegetable oil. As the above discussion indicates, this cap should be extended to all vegetable oils, including corn oil and sunflower oil, as increases in demand for any vegetable oil will cause comparable increases in demand for vegetable oil in general and will therefore elicit very similar market and land responses. There is no reason to exempt corn or sunflower oil from the cap.

101.2 More generally, in this rulemaking CARB should commit to an immediate and expeditious reevaluation of the way it estimates the climate costs of using land for biofuels.. When lifecycle analyses such as those used by CARB ignore the emissions of burning biofuels, they are implicitly offsetting these emissions by the carbon removed from the atmosphere by plant growth. This is the climate benefit. But it takes land to grow these plants, and not using this land for other purposes has a climate cost. The evaluation of biofuels is largely based on the valuation of this cost of dedicating the productive capacity of land to biofuel production. Today, indirect land use change estimated by a version of the GTAP is the only way CARB assigns a climate cost to the use of land. There are several reasons this needs prompt evaluation.

First, GTAP lacks an empirical basis, and builds in structural biases that guarantee low ILUC estimates. Many of its predictions are also contradicted by substantial bodies of empirical evidence. In summary:

- GTAP does not work with physical acres but only land revenues, which leads the model to create or destroy large quantities of land. Its economic components estimate a large ILUC, but modelers artificially readjust this estimate by a “hand of God” to conserve land area, which leads to the small ILUC. This kind of readjustment is inherently invalid. If the economic components of the model are correct, then the readjusted results are incorrect. If the economic estimates are physically impossible, then the model is invalid.
- Several invalid model features make it extremely difficult for the model to convert forests. “Unmanaged” forests do not exist in the model although they are the major concern with cropland expansion. The authors also chose a forest

area elasticity many times higher than the underlying study they cite, which causes forests to strongly resist conversion or immediately reappear elsewhere if converted in one location.

- Although the model has thousands of economic parameters, only a handful are based on any cited reference, none instrumented, and are then incorrectly applied to other products and in other regions. In addition, *every* elasticity is altered, often greatly, by a formula based on its share of a category of expenditure. That contradicts any underlying estimates, which are not based on expenditure shares. It also leads to bizarre results. For example, biofuels for fuel somehow lead to price decreases for electricity, which somehow lead to *less* electricity consumption.
- Without empirical basis, the model is programmed to prevent international land use change, which is where agricultural expansion occurs. It does so by using arbitrary assumptions to constrain trade in agricultural products. The resulting predictions are provably wrong because this leads the model to predict large price differences for crops in different parts of the world, which do not occur in reality. Because global prices of grains and vegetable oils are highly linked, changes in demand will have global effects leading to heavy cropland expansion in the Tropics, where it is cheapest.

Because CARB's emissions estimates are dependent on GTAP, it lacks an empirical basis for encouraging their use. Faced with this evidence, an argument can be made that CARB should immediately stop incentives for at a minimum crop-based biofuels. At a minimum, CARB should undertake a quick review.

101.3

Second, as also discussed in the attached paper, the ILUC estimates generated by GTAP are only around 10% of the average carbon losses from vegetation and soils that have occurred to generate the cropland used to produce the quantity of corn used in corn ethanol or the quantities of vegetable oil used in any form of biodiesel or renewable diesel. (Timothy D. Searchinger et al. 2018). (These calculations adjust generously for by-products and co-products.) In other words, if the additional corn or vegetable oil used for biofuels is replaced on the average type of land used to generate these products globally and at the average global yields, the land use emissions will be roughly ten times the ILUC estimates used by CARB. If the ILUC emissions are even around 20% of this average, the emissions reductions estimated by CARB will disappear. In the absence of compelling economic evidence that the sources of supply will be overwhelmingly lower than the global average land use source to the present date, these biofuels cannot credibly be viewed to lower emissions.

Third, even if the GTAP model were correct, the resulting policy is morally indefensible. As revealed even in the publication by the GTAP authors (Hertel et al. 2010), but also shown separately in (T.D. Searchinger et al. 2015), the ILUC number for ethanol is much lower because GTAP estimates much of the food diverted to biofuels is not replaced due to higher crop prices. As shown in the latter paper, the literal physical source of the emissions reduction is people and livestock around the world eat less carbon and therefore emit less carbon dioxide in their respiration. Global food prices primarily affect consumption by the global poor. California's implicit policy, by using GTAP, is therefore to obtain greenhouse gas reductions by increasing global food prices so that the global poor consumed less. This is an indefensible position.

Finally, the use of economic models to estimate ILUC does not actually estimate the true climate costs of devoting land to biofuels. In effect, the ILUC estimate seeks to ask what are the climate effects if California enacts expensive policies to make greater use of land for biofuels but there are no policies in the world to use land to achieve climate benefits in any other way. The true costs reflect the lost opportunity to use land in other ways to benefit the climate. These are the opportunity costs, and in economic terms, opportunity costs are costs, and that principle applies equally to climate effects as money or use of any other asset.

Land is an extremely valuable asset, with fixed global quantity, for the climate. The world needs both more food and more carbon storage. The proper measure in evaluating the costs of diverting land from food production is the quantity of carbon that could reasonably be saved by continuing that food production. And even if that food production were treated as surplus, the appropriate measure would be the quantity of carbon that could be removed from the atmosphere by reforesting "surplus" cropland. As discussed in the GTAP paper and in (T. D. Searchinger, Beringer, and Strong 2017), these alternative uses of land are vastly more valuable than using land for biofuels, even cellulosic biofuels. The best uses of U.S. corn land for climate purposes are to produce corn, but even if they were established in forest, they would reduce carbon for decades far more than biofuels. And the world faces challenges even of siting solar power. On three quarters of the world's land, solar power will generate more than 100 times the useable energy, and when used to transport cars in electric engines, will generate more than 300 times the motion. On low productivity land, the ratio extends into the thousands. Overall, the world has no substitute for the use of well-watered land for food, forests and other carbon-rich native habitats. But the world has far more efficient alternatives for the generation of energy.

The academic literature has been moving broadly to recognize that the climate uses of land must be evaluated using some form of opportunity cost (see list in Appendix A). CARB should do so as well. And once it does so, it will conclude that the dedication of the productive capacity of land to produce biofuels is a poor use of land and has adverse effects on the climate.

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Evaluating the Economic Basis for GTAP and Its Use for Modeling Biofuel Land Use

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Increased biofuel use requires crops, producing crops requires cropland, and producing cropland causes losses of carbon from vegetation and soils. In a typical lifecycle context for products other than biofuels, carbon accounting attributes to each product the emissions from each input, including some of the emissions of fixed inputs to each output if they are significant. For example, some of the emissions of producing a car factory are assigned to each car. Following this straightforward approach, some of the carbon emissions of producing cropland should be assigned to each gallon of biofuel. This standard lifecycle approach makes the emissions from biofuels high because, as discussed below, the average emissions to generate a hectare of cropland greatly exceed the reduced emissions from gasoline or diesel that result from 30 years of biofuel production on that hectare.

In determining the emissions from the use of cropland for biofuels, however, governments have sometimes relied instead on complex, global economic models to estimate how much carbon will be lost from land conversion that occurs to replace crops diverted from food to biofuels, known as indirect land use change, or “ILUC”. These models can claim fewer emissions than the past average carbon losses for a crop for a variety of reasons: claims that some or much food is not replaced, claims that higher food prices lead farmers to produce more food on the same land, or for some reason, claims that the land converted to generate each additional ton of crop loses less carbon than the global average. In general, these models claim to show how biofuel demand will reallocate land in each part of the world through not just global but national or regional market pricing mechanisms, sometimes claiming to factor in interactions with the entire global economy.

GTAP is one model used to estimate ILUC, with one version used by the California Air Resources Board (CARB) and changed versions used as inputs to the GREET model at the U.S. Department of Energy. In both versions, estimated ILUC carbon losses from a gallon of corn ethanol and soybean biodiesel are extremely low, meaning there is little carbon cost for

¹ The research on which this report continues. Comments welcome to steven.berry@yale.edu and some further improvements are likely. Berry: Yale University Department of Economics and Tobin Center. Searchinger: Princeton University and Tobin Center. Yang: Yale University and Tobin Center. We thank Thomas Hertel, Farzad Taheripour, Marinos Tsigas, Xin Zhao, and Alla Golub for their helpful responses to inquiries. The results and opinions here are solely the responsibility of the authors.

diverting even vast areas of prime farmland to biofuel production. To serve this function, the GTAP model must be scientifically credible. This report evaluates GTAP's economics. It finds that GTAP lacks a credible economic foundation. GTAP is particularly unable to credibly evaluate land use changes.

- Of thousands of economic parameters, only a small number claim to have any direct, empirical basis. Of these, few of the cited empirical studies make any use of credible techniques for distinguishing correlation from causation and, most fundamentally, supply from demand. Regardless, these parameters are all or nearly all misapplied to data, regions, and functional forms that differ fundamentally from the original empirical results and therefore lose any statistical validity. GTAP is doing the equivalent of using parameters estimated of how the effectiveness of a drug varies by weight to estimate how its effectiveness varies by height. In effect, these parameters are claimed to predict changes in supply and demand that they do not.
- GTAP's basic economic structure is particularly unsuited to the analysis of land use change because its economic components do not reallocate land among different uses, such as pasture or forest to cropland, but instead destroy or create large quantities of physical land. These physically impossible changes in land area are then arbitrarily adjusted back to respect the actual finite quantity of land. Such "hand of God" adjustments are inherently invalid. In GTAP, these adjustments also radically reduce the ILUC results and even shrink the share of land use change from GTAP's version of forests.
- We also find that the purely assumed functional form of the GTAP model, to which parameters are misapplied, inherently leads to limited conversion of forests and low ILUC. As one example, the functional form leads GTAP to select incorrect parameters from the one underlying study that GTAP uses to estimate the "elasticity" of conversion of cropland to forest and forest to cropland. This deliberately overestimated elasticity has the effect of overestimating the economic resistance of forests to conversion by cropland, leading to limited conversion of forests. Related features also cause forests to instantly reappear in new areas. In some cases, the structural form leads to bizarre results.
- The model's structural form also cannot allow conversion of unmanaged land, which is much of the world's carbon-rich land. It also contains no notion of a standing forest that can exist for multiple reasons – there is only land that exists to produce wood. These assumptions not only force the model to ignore a major direct source of potential land use change, unmanaged land, but work backward to limit the model's loss of managed forests and even of grasslands.

- GTAP uses an outdated trade model that is designed to capture patterns of trade in manufactured goods. Applying this model to agricultural products artificially limits the predicted effects of US policy on world land use.
- We also review how additional, empirically unsupported decisions added to the model since the first version used for CARB have further reduced the estimated ILUC. As an example, the model makes a pure assumption, without any supporting economic analysis, that most new cropping area will be supplied not by expansion of cropland but by cropping existing cropland more frequently. This assumption also contradicts actual experience in the U.S.

Benchmarking ILUC

Global cropland for annual crops is expanding at an increasing rate: according to a recent, high-quality satellite-based study, annual cropland is increasing at a net rate of 10 million hectares per year (and a gross rate of roughly twice that) (Potapov et al. 2021), roughly equal to the annual harvested cropland area of Iowa. Although data limitations impede analysis of net changes in pasture area, satellites show that expansion of pasture is an even larger direct source of deforestation than cropland (Weisse and Goldman 2021).

To determine a useful benchmark for ILUC, we can ask on average how much carbon has been lost from vegetation and soils to produce the crops that go into one gallon (or one megajoule) of each biofuel. Following both national and California policy, we can then amortize, i.e., divide, this carbon loss over 30 years of biofuel production. This calculation generates an ILUC if the crop, such as corn diverted to biofuels, is replaced by the same quantity of corn on new cropland with the average global yield and with the average carbon losses that have occurred from previous cropland expansion for corn. This is the same approach taken generally for all inputs in lifecycle analyses, including for other inputs used for corn.

As shown in Table 1 (and estimated in Searchinger et al. 2018), this theoretical ILUC is 200 gCO₂/MJ for corn ethanol and 330 gCO₂/MJ of biodiesel. That number, which excludes the production emissions from use of fertilizer and fossil fuels, is roughly 3-4.5 times the direct fossil fuel savings from the use of the biofuel. By this benchmark, the GTAP ILUC estimate used by CARB is only around 10% of these average emissions in generating cropland to produce corn and soybeans. That estimated ILUC is also only around 25% of the carbon that could be sequestered by allowing U.S. corn land to grow forest (assuming carbon sequestration at 3tC/ha/year). (See Table 1). The GTAP versions incorporated into the GREET model are even lower. Implicitly, they are claiming that all the cropland in Iowa can be diverted to biofuel production -- or to any other use -- with almost no effect on global land use elsewhere and almost no resulting climate consequences.

The GTAP estimates are also far below estimates of some other recent economic model estimates. In (Lark et al. 2022), the authors found that ILUC emissions in the U.S. alone were 39

grams CO₂/MJ without counting international ILUC emissions. These high domestic emissions alone are particularly significant because international responses are likely to be higher. In Merfort et al. (2023), the authors estimated an ILUC of 92 grams CO₂/MJ for ethanol from high-yielding energy crops.

Table 1: Comparison of GTAP ILUC Estimates with Biophysical Carbon Costs

	Average global carbon loss to produce crop	Land use cost of not reforesting land at 3tC/hectare at U.S. yields	GTAP California ILUC estimate	GTAP-BIO ILUC estimate used by GREET	Exhaust pipe emissions from gasoline or diesel
Grams CO ₂ /mega joule					74
Corn ethanol	200	83	22	7.8 – 14.3	
Soybean biodiesel	330	179	27	9.1-12.1	

Biofuel figures are "land use cost" figures measured by the different methods excluding production emissions and excluding the portion of land attributable to co-products. Sources: Column 1 (Searchinger et al. 2018), column 2, author's calculations, column 3, CARB emissions estimates, column 4, GTAP results incorporated into GREET model outputs.

There are sound reasons to believe economic responses will not cause ILUC to be substantially less than those associated with the average loss of carbon in the past to create the requisite quantity of cropland. Rigorous econometric studies have shown that shocks to agricultural supply translate into similar price changes for crops around the world (Roberts and Schlenker 2013). This relationship means that increases in demand for biofuels in one region will cause similar price increases in different parts of the world and thereby stimulate cropland expansion wherever it is cheapest to do so. Although robust econometric studies are limited, where they are available, they have found that cropland expansion is highly sensitive to crop prices in carbon-rich parts of the world, such as Brazil in general and the Amazon in particular, particularly over a few years (Souza-Rodrigues 2019) (Sant'Anna 2024). These same rigorous studies have found that increased crop yields in response to higher prices play a much smaller role in replacing crops than agricultural expansion. Overall, these econometrically rigorous studies support the conclusion that cropland expansion in the parts of the world where cropland is expanding is the dominant way the market replaces crops diverted to biofuels.

The global, land use models that project substantially lower ILUC emissions than the benchmark do so for one or a combination of three reasons, all of which particularly contribute to GTAP's low ILUC estimates.

- First, a model may estimate that much of the food diverted to biofuels is not replaced because higher food prices depress consumption. New cropland is not therefore needed to replace much of the food. In the original GTAP estimates of ILUC from corn ethanol for CARB, roughly half of the food calories are not replaced. (Hertel et al. 2010)(T.D. Searchinger et al. 2015).

- Second, a model may claim that higher prices induce farmers to increase output per acre on existing agricultural land: This can occur by increasing crop yields, by intensifying pasture, or by increasing double-cropping or other forms of “cropping intensity. These effects also play a major role in GTAP (Malins, Plevin, and Edwards 2020) (Hertel et al. 2010) (Searchinger et al. 2015). In recent modeling, for example, the model predicts that 80% or more of additional cropping area in most regions is supplied not by new cropland but by growing crops on existing cropland more frequently (Malins, Plevin, and Edwards 2020).
- Third, the model may claim that converting land for new cropland releases little carbon. In recent GTAP runs for corn ethanol, 89% of the new cropland comes from grassland, with only 11% from forests (Table 1) (Taheripour, Zhao, and Tyner 2017) (Table 1). As discussed in Malins et al. (2020), some new versions of GTAP used for GREET also claim that converting much of this pasture to cropland gains soil carbon.

These functions may interact. In GTAP, for reasons discussed below, farmers directly convert overwhelmingly grassland rather than forest. In turn, livestock producers do not then significantly convert forests to replace grazing land either because GTAP projects reduced meat consumption or high livestock intensification.

The ILUC calculation depends in essence on the ratio of the three different responses to increased prices: agricultural land expansion, intensification, and food demand reductions. This means that all three responses must be soundly estimated to produce a scientifically useful ILUC estimate and errors in estimating any of these responses even in a single region could generate substantially flawed results.

Specific recent GTAP modifications that lead to a low ILUC

GTAP was originally used by the California Air Resources Board to establish an ILUC in 2010 but has undergone subsequent revisions. This section discusses specific parameter decisions made regarding GTAP, critiqued in Malins, Plevin, and Edwards (2020), and to which some GTAP modelers responded in Taheripour, Mueller, and Kwon (2021). These decisions by themselves will generate extremely low ILUC estimates in three ways:

- by increasing the “intensification” effect of cropland, so new cropland is not needed to replace crops;
- by increasing the intensification effect on pasture, so if pasture is converted to cropland, conversion of forest to pasture is not needed to replace the meat or milk;
- through adjustments to ensure that even more cropland expansion comes out of grassland not forest, plus assumptions that estimate conversion of much grassland

to cropland causes little loss of carbon. Both changes reduce the carbon losses from expanding cropland.

Although the major contribution of this paper is to focus on the underlying model, we discuss first the issues raised by these recent changes because of their ability to greatly lower ILUC and because they help illustrate how a model can generate low ILUC estimates. We agree with the critiques in Malins et al., and we add some relevant additional observations.

1. Double cropping or other increases in cropping intensity

A major feature introduced into the model is an elasticity that ensures that at least 80% of the increase in cropping area in most regions, including the U.S., results not from expansion into native lands but from cropping the same cropland more frequently (Malins, Plevin, and Edwards 2020). Such a change is modeled as an increase in “cropping intensity.” This can occur, for example, by increasing the acres that produce two crops in a year, known as “double cropping.” Because doing so reduces the need for new cropland; an 80% increase in cropping intensity reduces ILUC by 80% (relative to the estimate without this effect).

As discussed in Malins et al., the GTAP authors have neither conducted nor cited any economic analysis that estimates that increased demand causes increases in double cropping or otherwise increases cropping intensity. What the authors appear to have done is simply adopt elasticities tailored by region, which they feel match recent cropland trends in these regions. Even if there were a trend toward increased cropping intensity, that does not mean that increased demand for crops drives this trend, let alone by how much if it contributes at all.

One way to highlight the flaw in this analysis is to compare the author’s claim that 80% of U.S. cropping will be provided by increases in cropping intensity with the contrary evidence of what has happened. Although there appeared to be a small increase in double-cropping in the U.S. in the first years of the renewable fuel standard mandate, there has since been a significant decline. Double cropping over the last five years was roughly 40% lower than between 2007-2011 and among the lowest levels ever recorded in USDA data. For overall cropping intensity, which also factors in how often land is left fallow or crops fail, there has been no discernible U.S. trend for decades. (USDA data available at <https://www.ers.usda.gov/data-products/major-land-uses/major-land-uses/#Cropland>). (For the remainder of the world, poor data makes it impossible to determine even what the true trends really are.²) If nothing else, this data calls the authors’ assumptions into question.

But this change also helps illustrate the improper economic data-analysis methods that are frequently used in designing the GTAP model. The “method” here is to treat short-run observed changes in double-cropping as reflecting a large, long-run causal effect of crop prices

² As Malins et al. correctly observe, the data from the FAO that estimates a country’s area of cropland and that estimates its area harvested come from different sources using different methods. The limitations in our understanding of cropping intensity are discussed in Searchinger et al. (2019), which provides examples of how FAO statistics can conflict with results from satellite studies.

on double-cropping. Having now seen the recent data on double cropping, if they followed their own method, the GTAP modelers would presumably adjust and remove this double cropping effect for the U.S. But of course, the original decision was not based on any serious attempt to distinguish causal relationships in the data. In fact, none of this data tells us about the real effect of prices on double cropping in either direction. We discuss these issues more broadly below.

More broadly, these kinds of ad hoc adjustments turn modeling into mathematical forms of storytelling. But any number of stories could be told from the same snippets of information. For double-cropping, alternative potential stories include that the original increase in double cropping was driven by non-price factors. Alternatively, increases in cropping intensity could be explained as a short-term response to increased demand before cropland area expanded to meet demand at a lower cost. The large number of potential and contradictory story lines are why economics requires rigorous methods to tease out the effects of changes in demand or supply.

2. Demand-induced yield gains of cropland and pasture

The GTAP modelers have similarly incorporated a substantial price-induced yield effect. This was originally based on a claimed set of U.S. papers for corn and then applied to every crop and to every country in the world. The lead author here reviewed these papers for the California Air Resources Board and determined that the papers relied upon actually as a whole found no yield intensification effect after the 1960's (Berry 2011). In fact, as discussed in Malins et al., corn yields in the U.S. follow an intensely linear trend independent of price. Furthermore, applying this intensification effect to other crops and to other regions lacks any foundation at all as the physical and economic factors that determine the ratio between land expansion and intensification will vary greatly by country.

In revisions to the model, as discussed in Malins et al., a large intensification effect has also been applied to pasture. As a result, when cropland expands into pasture, little pasture expands into forest to replace the meat or milk. As quoted in Malins et al. (2020), the GTAP authors conceded that this estimate does “not have an empirical basis.”

We add that this is a particularly significant, pure assumption. Expansion of pasture into forest is the main direct source of global deforestation (Weisse and Goldman 2021). Although lacking economic rigor, several papers have found statistical associations in Brazil between conversion of pasture to cropland and knock-on expansion of pasture into forest (Lapola et al. 2013)(Lapola et al. 2010) (Arima et al. 2011). A rigorous, econometric study has shown that increases in beef prices have a strong effect on deforestation in the Brazilian Amazon (Araujo, Costa, and Sant' Anna 2020), which implies a significant knock-on effect if pasture is converted to cropland elsewhere. Other unjustified model features, discussed below, lead GTAP to project that cropland will mainly expand into pasture. By assuming little need to replace the pasture, this pure assumption therefore has the effect of additionally assuming away much ILUC.

3. Cropland pasture

The introduction of a category of land called cropland pasture was one of the model features that leads the model to project even more conversion of pasture rather than forest. Cropland pasture is land that is occasionally cropped but is used for pasture, and it became the dominant GTAP-projected source of new cropland in both the U.S. and Brazil. This was not based on any kind of economic analysis but on an observation that as U.S. biofuel production rose, USDA was reporting a continuing decline in a land use category called cropland pasture. The primary effect of this change, given the GTAP structure, is to make it even more likely that cropland will expand into pasture rather than forest. (GTAP assumes that cropland will more likely switch from one cropland use to another than expand into new non-crop uses.) As Malins et al. observe, the GTAP-GREET versions of the model then further assume that this conversion increases soil carbon, contrary to virtually all other estimates of the effect of pasture conversion. This carbon assumption means that the cropland pasture assumption, as well as other elements of the model that lead cropland to expand into pasture rather than forest, cause even larger reductions in ILUC.

As discussed in both Malins et al. (2020) and Lark et al. (2022), this trend in cropland pasture is as likely based on definition changes and measurement inconsistencies as real changes, as USDA has cautioned. Malins et al. also observe that the GTAP authors employed no economic estimates to differentiate any changes in cropland pasture due to biofuels from trend line changes. And they observe that there is no international category of cropland pasture.³ We agree with these critiques and add two observations.

First, the GTAP authors claim that the FAO category of “temporary pastures and meadows” is the global equivalent of cropland pasture, so they can apply it in Brazil (Taheripour, Mueller, and Kwon 2021). Even if this were true, in Brazil this category of land use has had a steady increase, not decrease, during the rise of biofuels, increasing in area by 20% from the average of 2003-05 average to the of 2019-2021. As in the case of double cropping, this is an example of how pure “story telling” goes awry, and why economic methods are needed instead to determine the effect of demand on land use changes.

³ In Taheripour, Mueller, and Kwon (2021), the GTAP authors claim that the decline in cropland pasture was based on USDA data and large enough to accommodate increased land for biofuels even assuming losses to alternative uses. But this claim does not address the critiques. The GTAP authors did not perform an economic analysis to determine if increased demand leads to a decrease in cropland pastures. Moreover, if the data on cropland pasture is fundamentally flawed, it could not be used for economic analysis. There might be some trend in behavior, but not knowing the true quantity of cropland pasture, it would not be possible even to try to determine its causal factors. As stated in Lark et al. 2022: “[T]he source of cropland-pasture data in the United States is the 5-year interval Census of Agriculture, where the category is a subjectively interpreted aggregate variable that has undergone significant definition changes (Bigelow and Borchers (2017)) and measurement inconsistencies (USDA 2019; 2002) across time, further rendering it inappropriate for LUC assessment.”

Second, the claim that converting cropland pasture to cropland increases soil carbon is not merely empirically unsupported but flawed conceptually because it is based on a failure to distinguish fluctuations in price from a structural shift in demand. This claim assumes that cropland pasture is marginal cropland that rotates in and out of cropping, which depresses its carbon stock relative to land used consistently as pasture (Taheripour, Mueller, and Kwon 2021). However, due to fluctuations in price, there will always be “frictional” cropland, i.e., land that is cropped in some years and not others. Even at a higher level of demand for crops due to the growth of ethanol, there will continue to be fluctuations in prices, so there will continue to be land cropped only in some years. There could be other structural economic changes that alter cropland pasture area, but there is no conceptual reason to believe, let alone econometrically established evidence, that the quantity of frictional cropland will decrease due to the rise of biofuels or other increases in demand.

GTAP’S Economic Foundation

This section goes beyond the specific, recent modeling choices discussed in *Malins et al.* to evaluate the GTAP model more generally. This part first explores the parameters and economic structure of the model. It finds that these lack an economic foundation. We then focus on the specific modeling of land use. We find that ILUC is reduced both by pure assumptions that dictate the structure of the model and particularly its land use components.

In both parts of this discussion, we show some results from running the 2010 version of GTAP-Bio. This is the only reasonably well-documented version of GTAP-Bio, and it is the version applied, with some adjustments, to generate the ILUC estimates for crop-based biofuels originally incorporated into regulations by CARB. Among our findings, we find that the basic structure of the model, by itself, can lead to odd and hard-to-explain results. One such flaw is that the economic equations in GTAP lead the model to destroy or create large quantities of land, which the model handles via a bolted-on adjustment factor that brings total land area back to its original level. In doing so, the model greatly reduces ILUC and the role played by deforestation.

This “hand of God” nonprice adjustment also contradicts the core rationale for using GTAP to study ILUC. The GTAP community often argues that some global equilibrium price model is necessary to evaluate ILUC. Both the climate benefits and costs of biofuels, including ILUC, are indeed driven entirely by the mechanisms of price changes. But GTAP’s behavioral responses to price changes do not allocate actual, physical land. The resulting ad hoc nonprice adjustments contradict the entire rationale for using GTAP in the first place. Whatever its other qualities, GTAP is therefore particularly inappropriate for estimating land effects.

1. Basic Structure of Model

At its essence, GTAP is a model for estimating shifts in supply and demand. For demand, it estimates how much changes in price for one good, whether corn, electricity, or various services, cause shifts in its consumption. (In economics, this is known as an “own-price” effect, often expressed as an “own-price elasticity.”) GTAP also estimates how this change affects the consumption of other goods. For example, if the price of corn increases, and its consumption for food and feed declines, GTAP estimates what (and to what degree) other crops or foods replace those losses. (These are known as “cross-price” effects, often expressed as a “cross-price elasticity.”) Price changes can affect consumption and production in a multitude of ways. For example, if corn prices increase, not only may livestock producers shift to other feeds, but the price of livestock products will increase, causing food consumers to shift to other foods and potentially to reduce their consumption of food overall, buying more of other goods. GTAP purports to predict all these effects.

The same adjustments occur on the supply side as producers of goods shift from one input to another. For example, if the demand for one form of energy increases, producers may not only shift to another form of energy but also reduce their energy consumption overall and shift a little to alternative inputs. GTAP purports to measure both the decline in consumption of each input whose prices increase and the shift to other inputs. GTAP purports to project these shifts, which are the core of the model, in a highly disaggregated ways: by country or groups of countries, by multiple agroecological zones (AEZs) within countries, and by product.

To do this, GTAP creates a hierarchical “tree” structure of layers, or “nests” of equations. Lower level nests result in aggregate products that are inputs to higher level nests. For example, a lower nest has the cropland used for different crop types, which compete with each other for use of cropland. The aggregate of these different uses of cropland generate a total cropland area, which is included in a higher level nest. At this higher level, cropland overall competes for the uses of total land with other uses of land, particularly grassland used for livestock and wood-producing land (GTAP’s proxy for forests). Throughout the model, GTAP modelers group goods and inputs based on an intuition of which are likely to compete more directly with each other.

Within each nest, responses to price changes are based on two factors. First, there is a “substitution parameter”, a single number, which is supposed to determine in general how likely it is that the quantity of goods produced, or the inputs used increase or decrease as a result of changes in price. We call this the “nest parameter.”⁴ However, this parameter by itself does not determine the sensitivity of change, i.e., the elasticity of supply or demand. Instead, as discussed more below, this elasticity depends both on that parameter and on a product’s share

⁴ In the literature, in ways that vary across the components of the model, this parameter might be called the “CES substitution parameter” or the “CET transformation parameter” or the “elasticity” parameter. The terms CES and CET refer to the restrictive functional forms of the model. The CES is somewhat modified in the consumer demand portions of the model, adding some additional flexibility, especially with respect to income.

of the total revenue of all products, or all inputs, within that nest.⁵ For example, the elasticity of cropland area within each agroecological zone, i.e., the extent to which the area of cropland varies with a 1% change in price, depends on both the nest parameter and on the share of total rent cropland provides of all land uses in that agroecological zone. The revenue shares and the nest parameters are the only factors determining the substitution among products in the nest when the price of one product changes.

As a result, all supply and demand elasticities are determined by a single nest parameter for all products within a nest, and by the share of revenue or cost of each product within that nest.⁶ This formula is chosen for its computational tractability not for its empirical reality. (As discussed below, it contradicts the limited economic analyses cited by the modelers to justify their choice of nest parameters.) This choice is understandable as a research strategy, but it does not produce a model that can be treated seriously as a policy tool.

2. Absence of economically estimated parameters

The first problem is that even if the overall formula were empirically grounded, its legitimacy still depends on thousands of necessary nest parameters. GTAP only even claims to base a handful of these parameters directly on *any* empirical economic analysis.

For the parameters that are claimed to have an empirical basis, none appear to be derived using modern econometrics. There is a very large literature on how to properly estimate demand and supply elasticities, including cross-price effects. It is the strong consensus of the economics profession that such estimates require changes in demand conditions (“instruments”) to estimate supply, and vice-versa. For a famous application to biofuels, see Roberts and Schlenker (2013). For the consensus around this broad idea, see papers ranging from Wright (1928) to Berry and Haile (2021). To our knowledge, none of the thousands of parameters in GTAP is based on a high-quality application of consensus econometrics.

For others, although some reference may be made for an elasticity parameter, this parameter is nearly always based on analysis of a particular product in a particular location. GTAP’s general approach is to apply the same parameters to quite different products or inputs and in multiple or all regions. In some cases, whole categories of parameters are set by pure assumption to a fixed fraction (such as one-half) of some other set of parameters.⁷

⁵ As discussed more in Appendix B and disregarding a potential expansion of all products within a nest, the precise formula is the nest parameter multiplied by 1 minus the revenue share. For example, if the nest parameter is .2 and the cropland has 60% of the total revenue, then the elasticity will be $.2 * (1-.6) = .08$. This means that a 100% increase in price will cause an 8% change in cropland area.

⁶ A parameter on an upper-level nest will then determine the percentage changes in the upper-level nests. Cost/expenditure/revenue shares play a similar role at the upper levels, interacting with the nest parameter to produce a set of computationally convenient results. At the upper level, the relevant price is a price index for the composite commodity.

⁷As examples, the elasticity of substitution in value-added-energy sub-production for many goods is the same for every region. The elasticity of substitution between domestic and imported goods is the same for firms and households, although it is not clear why demand and supply parameters should be equal. The relationship

The land use nest parameters illustrate these problems. To estimate the elasticity of cropland area, and therefore of cropland expansion, the GTAP authors originally relied on a single study, which we call *Lubowski*,⁸ focused exclusively on changes in the United States. The use of the *Lubowski* results is a “best case” for GTAP, because this is a respectable, although still imperfect, empirical study. This solely US-focused study generated highly different estimates for different land use transitions in different locations. GTAP boiled down these different elasticities to a single nest parameter for all transitions in all locations and applied this parameter to each type of land transition, in each agroecological zone, and in each of multiple countries or regions (Taheripour, Mueller, and Kwon 2021) (Hertel et al. 2010).

In reality, the relationship between cropland expansion and price will depend on widely different physical conditions in different locations, such as soil qualities, rainfall and slope, as well as economic factors such transportation costs, energy costs, property rights, and differential access to capital. *Lubowski* modeled detailed *plot-level* transitions, factoring in such variables as soil quality and prior land use. Not surprisingly, *Lubowski* found wide differences in the elasticities that should apply to different plots of land (as well as different elasticities for different types of shift in land uses as discussed below).

The land use nest parameter chosen by GTAP was intended to be an average of these different elasticities in the U.S. Given both the vast physical differences around the world, and the different economics of different land uses in different parts of the world, it would be an extraordinary coincidence if this U.S.-derived parameter could be validly applied to multiple regions and multiple countries.

This is not a correct way to do global analysis. It is economically consistent to use globally estimated parameters from global datasets to predict global responses. The biofuel analyses of Roberts and Schlenker (2013) illustrate how this can be done. GTAP-Bio 2010 instead uses local estimates from one country to distill a single parameter that is then applied to many different agroecological zones in many different regions where the parameter interacts with land use data from that zone and region. Doing so is virtually guaranteed to create invalid results as well as a spurious implication of specificity and precision where none is warranted.

Interestingly, the principal GTAP modelers decided in 2013 that applying the *Lubowski* parameter to the whole world was not justified, and they purported to “tune” this elasticity parameter to different regions. But they did not provide any economic analysis for any other

between sources of inputs and the domestic/imported allocation follows the so-called “rule of two.” For example, the so-called Armington CES for regional allocation of imports of gasoline is 4.2 and the domestic/imported allocation is one half of that. The CES elasticity of import demand for oil across sources is 10.4, and the CES elasticity between domestic and imported goods is one half of that, and so forth.

⁸ Versions of roughly the same empirical study design were published in several versions with different policy applications including (Lubowski 2002), (Lubowski, Plantinga, and Stavins 2006) (Lubowski, Plantinga, and Stavins 2008).

country or region. Instead, they appeared to still use the U.S. parameter as a kind of global, middle benchmark, although it was not. Then, after surveying regions with more or less cropland expansion, the authors subjectively raised or lowered their nest parameter from this benchmark in different regions. They did so without the use of any standard econometric method, most particularly without any attempt to determine if observed land transitions are caused by price changes as opposed to changes in any other determinants of demand and supply. The lack of economic basis is so extreme that the modelers informally chose price elasticity parameters without making use of any systematic data on prices.

Among the resulting alterations, it appears that the GTAP modelers lowered the cropland expansion parameter and therefore elasticity in the U.S. to 10% of the value ascribed to *Lubowski*. Although this U.S.-derived parameter remains the *only* land use change parameter for which the GTAP authors claim to have *any* econometric support, they picked a new U.S. value that contradicted that basis.

Model parameters matter. The lack of empirical support for GTAP is therefore disqualifying all on its own.

In a recent commentary, some GTAP authors claimed that without econometrically derived parameters, it is appropriate to “use a calibration/tuning process to proxy the missing parameters” (Taheripour, Mueller, and Kwon 2021). If there is strong econometric support for a model and its key parameters, it might be appropriate to use a sensitivity analysis to test an unknown parameter. But this model lacks virtually any parameters that are derived from appropriate econometric method applied to appropriate data variation. In this case, appropriate data would include variation in prices, quantities, and in demand side factors that shift demand curves, tracing out land supply. Moreover, the authors are not even using any combination of statistics and data to even roughly “fit” a price-quantity relationship— itself an inappropriate technique. As in the case of double cropping, they appear to be picking parameters to fit a narrative.

3. The role of revenue shares, which leads to misapplication of these parameters, and contradiction with their underlying economic analyses

Even if some or all the parameters used in the model had some empirical basis, GTAP changes their meaning by misusing them to project wildly different relationships. That is because, as discussed, all the demand and supply elasticities in GTAP, which govern the supply and demand changes, are determined also by the share of costs or revenues each product or input has within each “nest.” This feature was presumably selected because this cost share data is relatively easily available, which may be fine for a research project, but not in a serious policy realm. Its use to determine elasticities, which has large consequences, both lacks an empirical basis and contradicts the limited economics cited by the modelers.

A cake recipe can help illustrate both how a revenue share formula works and why it cannot in general be used to replace empirical estimates of how demand or supply for specific

products or inputs varies with price. Baking a cake may require flour, milk, butter, eggs, granulated sugar, powdered sugar, chocolate or vanilla, salt, sprinkles, and baking powder. Increased use of some of these ingredients may be able to partially compensate if others increase in price, but that will depend not only on the price of each but on the physical role each plays. For example, a baker might be reasonably willing to substitute powdered sugar for granulated sugar. But given the special need for baking powder, it is unlikely that increasing its cost would cause bakers to use less per cake baked. That is particularly true given the modest contribution to the total costs of a cake of a tablespoon or two of baking powder. With a high enough price increase, it is conceivable that a baker might substitute more egg white to generate the rising effect, but other ingredients probably cannot be substituted at all.

As this example illustrates, demand and supply responses in general depend on a variety of functional attributes and consumer preferences that are specific to those products, inputs, and various alternatives. Consumers will more readily substitute green beans for broccoli than lard. Producers will more readily substitute internet-based news for a newspaper than a massage, although all may be characterized as services. In none of these examples is the overall share of the cost necessarily a single factor let alone a determinative factor in determining these substitutions.

However, under the basic structure of the GTAP model, if the ingredients for a cake are put into the same nest, and the price of baking powder rises, the percentage share of each other cake ingredient will determine what is substituted. As a result, if the price of baking powder rises, GTAP would predict that consumption of baking powder will decline and will be replaced by at least some of *all* the other ingredients. Moreover, the ratios of quantities of the other ingredients replacing baking powder will be based solely on their cost shares. As a result, milk, butter, and chocolate would likely be the largest replacements, in proportion to their cost shares, even though their functional roles are distinct.⁹

Cakes are not specifically in GTAP, but this revenue-share (or cost-share) function is key to determining the elasticity of demand or supply for all products and all inputs. For example, if demand for cropland and therefore its price increases, the quantity of cropland expansion will depend on a nest parameter, but also on its revenue share. And in general, the level and type of substitute inputs (the diversion ratios) will depend exclusively on their relative revenue shares.

Appendix C uses the energy sector to illustrate how this structure leads to non-credible, results. For example, as modeled, the ethanol mandate leads to a large price increase for gasoline, producing a decline in the aggregate consumption of gasoline and ethanol. It also causes substantial declines in household electricity use, and consumption of natural gas, coal and oil for uses other than for transportation. The bizarre feature is that consumption of these other energy sources declines even though their prices decline, which should lead to their increased consumption. As explained in the Appendix, these results, which contradict economic

⁹ The formal way to discuss these “patterns of substitution” is as a “diversion ratio,” as in the land “diverted” from alternative uses to corn land when the return to corn land increases. See Conlon and Mortimer (2021). In the CES/CET functions of GTAP, within-nest diversion ratios do not depend at all on any parameter, but only on revenue/expenditure shares.

sense and do not seem to have actually occurred, are driven by the structural form of the model, i.e., in the expenditure share assumption together with the multi-level tree structure of the nests.

This theory that revenue or expenditure shares determine elasticities also *contradicts* the few economic analyses cited to generate parameter inputs and results in invalid use of their parameters. Again, GTAP claims that the elasticities governing shifts between cropland, pasture and forest – the prices at which land shifts from one use to another --- are based on each land use’s share of the total revenue of all land uses within each agroecological zone. To provide parameters for these shifts, the authors rely exclusively on *Lubowski*. However, that study found that elasticities vary with soil and prior land use, not with AEZ level revenue shares.

An analogy helps to explain the nature of the error. Consider a careful, data-based study of a health treatment that finds success varies with weight. The results might imply that the treatment should only be applied to higher weight people. Now consider a new researcher who has constructed a model that, without evidence, varies treatment success with height. This researcher could (but should not) fit an average treatment effect to people of all heights that matches the average effect found for people of all weights. This researcher could then say, “my model uses the results of the earlier treatment/weight study,” but that would be misleading. The interactions with height were purely invented. This new model could not validly be used to advise people to obtain treatment based on their heights.

As described more precisely in Appendix B, the GTAP modelers have engaged in this kind of statistically invalid effort to convert elasticities found using one kind of relationship to project changes based on entirely different relationships, i.e., changes based on revenue share. This is true for shifts among land but also true for all, or nearly all, other statistical relationships in the model.

How the Model Structure and Assumptions Lead to Physical Impossible Economic Projections and Low ILUC Estimates

This section focuses specifically on the effects of this model structure and choice of parameters on the land functions in GTAP. This function plays a key role in determining how much cropland expands and whether that expansion occurs into pasture or forest.

1. GTAP economic functions commonly destroy or create land, and GTAP then uses an artificial constraint to adjust land area in ways that greatly reduce ILUC and further lower conversion of forests.

Because land area is fixed, a land use model needs to be able to determine if cropland expands and how much of this land area comes from each alternative land use, such as pasture and forest. GTAP, however, does not actually base its economic function for allocating land on physical land areas and as a result it can (and will) create or destroy land.

The reason is that the competition between different land uses, such as cropland, grasslands, and managed forest, is represented by their share of their combined revenue within an agroecological zone. When there is a shock to the system, such as more demand for cropland for biofuels, roughly speaking, not the physical areas but the revenue from changes in pasture and managed forest need to match the revenue increase from cropland. Because each acre has a different rent, the physical areas do not match. Depending on the different price changes and other characteristics in different agroecological zones, the model “creates” physical land or “destroys” it. As shown in Appendix A, this features results in vast discrepancies. The changes in total land area are several times larger than the projected changes in cropland area.

One fundamental problem with GTAP is therefore that a viable economic model of land use change cannot create or destroy total land. This is not an insignificant technical discrepancy. The economic theory of the model is that substitutions depend on revenue shares. If the resulting model claims that land is created or destroyed, the economics are incorrect.

The second problem is how the remainder of the model responds to these economic claims. To deal with this problem of fictionally created or destroyed land, GTAP modelers have added a pure adjustment factor, which reduces or increases the area of pasture and forest automatically to match the real physical area. Such an arbitrary adjustment does not make the model economically valid. If a model claims that individual incomes increase in total vastly more than the total national income increases, it is not a sign of a valid model that the model then imposes an adjustment to reduce individual incomes proportionately to match the national income.

In addition, the adjustment factor applied by GTAP generates results that are inconsistent with its economics and result in less forest conversion and a lower ILUC. In Appendix A, we show the results before and after final adjustment of the GTAP model for the U.S. using the 2010 model version of GTAP-Bio for corn ethanol:

- As shown in Table A3, the economic projections in the model in the U.S. are for a total of 7,952 million tons of CO₂ emissions from land use change, but these shrink to 536 million tons with the adjustment (7% of the “economically” estimated ILUC).
- While the economic portion of the model projects that 54% of the non-cropland converted to cropland comes from forest, Table A2 shows this share shrinks to 34% after the adjustment. In other words, the adjustment does not just reduce total ILUC area, but it also sharply reduces the relative contribution of forests to supplying new cropland.
- In several agroecological zones, including AEZ7, which has the largest U.S. quantity of cropland expansion, the model shifts the forestry results and transforms a large decline in forestry area into an increase.

To summarize, the structure of the economics of the model produces physically impossible results. Even if the economics were reliable, the imposed adjustment factor generates an inconsistent result and lower ILUC.

2. GTAP cannot allow conversion of unmanaged land, and thereby forces intensification and demand reduction versus agricultural land expansion.

Previous commentary on GTAP has noted that it cannot model and does not allow conversion of unmanaged land. Unmanaged land can be a large part of a country's agricultural region, and its conversion is a major focus of global agricultural land expansion. Making unmanaged available for conversion would roughly double the potential area of forest that could be converted in GTAP (Plevin et al. 2022). It is difficult to imagine how a model that does not allow conversion of unmanaged land can be used to calculate ILUC. Not surprisingly, using a different model, modelers have found that incorporating unmanaged land leads to a substantially larger ILUC (Plevin et al. 2022).

The significance of this gap in GTAP will even more depress ILUC because the lack of unmanaged land also leads to more limited conversion of grassland and managed forest. In effect, grasslands and managed forest exist in GTAP only to supply livestock or wood products. Yet under GTAP, if increased crop prices were to encourage cropland conversion of these lands, livestock products and wood products cannot be alternatively supplied by expansion into unmanaged land. If cropland begins to expand into grassland, the only options are: (a) for livestock production to be intensified to replace the meat produced; (b) for meat consumption to decline, or (c) for pasture to replace "wood-producing land" not unmanaged land. In turn, for wood-producing lands, the only options are (a) intensification, which the model does not count as causing emissions, (b) a decline in wood consumption, or (c) for wood-producing lands to replace pasture elsewhere. Of these six options, five cannot cause ILUC emissions and one actually reduces ILUC emissions.

In effect, because the model does not allow people to bring more land into human use, the model will structurally favor cropland responses that do not cause ILUC. Then, because of the inability of wood production or livestock production to expand into more unmanaged land, the model will project increases in the profitability of grassland and managed forest. These price increases will further push back against cropland expansion according to essentially the same formula that causes cropland to expand. None of this is based on economic analysis but flows from the unwarranted assumption that only land with a rent can be converted and that its conversion depends on its revenue share.

In short, the model structure both makes it impossible for cropland to expand into unmanaged land, which is much of the concern with land use change, and artificially reduces the conversion of grassland and managed forest.

3. The revenue share formula requires parameter choices that reduce conversion of forest and conflict with the sole economic source of this parameter.

The *Lubowski* study, which is the sole, claimed economic basis for land conversion elasticities in GTAP, not surprisingly found that increases in cropland profitability had a far larger effect on conversion of noncropland than increases in the profitability of forest had on conversion of cropland to forest. In fact, the study found that even a doubling of the profitability of forest caused only “extremely small” changes in forest area (Lubowski 2002). (This can be seen visibly in Appendix B.) The reason is intuitive. Wood production and therefore forest “rents” are much lower than cropland rents (Lubowski 2002), so it takes much larger increases in the profitability of forestry to displace cropland than the price increases required of cropland to replace forest. As a result, any viable model, and specifically any model based on the results of *Lubowski*, should have lower elasticities for changes in managed forest area to changes in the profitability of forest than the elasticities the model has for changes in cropland area in response to changes in the profitability of cropland.

But GTAP requires that the same nest parameter that is used to estimate how much cropland expands into other lands with a change in price of cropland also controls how much other land expands into cropland with a change in the price of other land. To provide this single parameter, the GTAP authors chose a parameter that averages the elasticities of the different land uses. (Appendix B provides a more specific description.) As a result, GTAP deliberately chose a parameter that simultaneously understates the elasticity of conversion of cropland and overstates the conversion of cropland to forestry multifold. This means that relative to the findings of *Lubowski*, cropland will not expand as much in GTAP. It also means that GTAP will overestimate the rebound effect that curtails cropland expansion by overestimating the effect rising wood prices have on resisting cropland expansion.

In short, the functional form causes GTAP to fundamentally misuse the results in *Lubowski* leading to far less forest conversion than the *Lubowski* results imply and thereby to a misleadingly low ILUC.

4. Additional, incorrect assumptions about managed forests work together with the revenue-share structure to cause forests to instantly reappear elsewhere and to reduce net forest conversion.

Both the inability to convert unmanaged land to other uses, including wood production, and the misuse of *Lubowski*'s parameters lead to a strong need to preserve the existing area of managed forest to maintain wood production. Adding to this effect is the assumption that wood production lost due to conversion of managed forests cannot be replaced just by cheaply harvesting more wood from existing managed forests, resulting in additional carbon losses. In the real world, managed forests are growing, in significant part due to higher carbon dioxide fertilization and other aspects of climate change itself (Harris et al. 2021) (Pan et al. 2011) (Ruehr et al. 2023). Forests have abundant more wood that can be harvested, which means

that they can supply more wood – with a carbon cost not counted in GTAP – to replace any wood supplies lost by conversion of some managed forests to cropland.

These limitations of the GTAP structure work together not only to resist forest conversion but also to a “rebound” of agricultural land to forests. In other words, if some forests are converted to agriculture in one agroecological zone, new managed forests can reappear at the expense of agricultural land in another US zone. This is not based on any actual economic estimates – and is contradicted by the estimates in the *Lubowski* analysis that even a doubling of the profitability of forest has “extremely small” effects on forest area (Lubowski 2002).

5. How inappropriate modeling of international trade limits GTAP’s projection of U.S. biofuel consumption on world land use.

In Appendix D, we discuss the GTAP trade model. This model is based on a late 1960s idea that trade patterns in manufactured goods can best be explained by a “home bias” for domestic products. GTAP applies such a model to world agricultural trade. As explained in this Appendix, this structure goes against a large, high-quality, empirical literature that there is a well-integrated world market for homogeneous agriculture products, without home bias, limited only by transportation costs. An implication of this literature is that cross-country price differences for core agricultural commodities are severely limited by cross-country arbitrage, constrained only by (relatively low) transportation costs. GTAP does not impose this arbitrage constraint, instead allowing the modeled “home bias” to limit trade.

The empirically contradicted GTAP trade model forces much of the adjustment to U.S. biofuel policy to remain in the US. The model can predict very large changes in U.S. crop prices that are not matched by changes in other countries. This then forces much of the equilibrium adjustment onto predicted U.S. consumption and U.S. livestock intensification. A realistic model of world trade could easily predict that much more of the adjustment would take place outside of the US, particularly along active forest/crop boundaries, as in the well-measured empirical papers cited in the introduction.

Summary

In summary, we find that GTAP lacks an economic basis, is peculiarly unsuited to estimate changes in land use, and systematically and without economic foundation leads to low ILUC estimates:

- Of thousands of parameters, only a few are claimed to have any credible economic foundation for the products and locations to which they are applied. Even these parameters that are referenced by the model are misapplied. Most importantly, they are claimed to project economic changes based on revenue or cost shares,

which has large consequences, even though the original empirical studies made no such projections.

- The structure causes the model not to allocate land but to create or destroy large quantities of land relative to changes in cropland, which makes it not credible for analyzing land use change. A subsequent “hand-of-God” readjustment is required to conserve physical land area. This adjustment both greatly reduces ILUC estimates and reduces the role of deforestation – and therefore its high emissions – in contributing to additional cropland.
- The structure of the model, including its unsupported use of revenue and cost-shares, leads to low ILUC.
 - The structure prevents GTAP from allowing conversion of unmanaged land, which includes roughly half of all forests and is a major focus of global land use change. The inability to convert unmanaged land in turn leads the model to project increased profitability of managed forest and pasture, which limits their conversion to cropland.
 - The structure requires GTAP to select a single parameter for each nest, which resulted in a parameter that understates the expansion of cropland in response to price increases and vastly overstates the role that increased profitability of forestry has in resisting conversion to cropland or pasture.
 - The structure does not model standing forests and so requires an assumption that all “forestry land” is currently fully engaged in the production of wood. If forestry land is converted to cropland in one zone, this creates pressure to create forestry land in other zones to meet the continuing demand for wood. In the model, these new “forests” do not even need to grow and mature; rather they instantly appear.
- The trade model, borrowed from non-agricultural markets and without econometric support, underestimates the role that trade in agricultural goods leads to similar changes in crop prices across countries and thereby leads to large underestimates of the global land use change from U.S. changes in biofuels.
- More recent changes to the model, also without economic support, further lower ILUC in a variety of ways. One assumes, in contradiction to experience in the U.S., that most of the new cropping area is supplied by increases in double cropping or other cropping intensity. Another assumes a large, unjustified response of pasture-intensification to grassland conversion, which greatly reduces the need for pasture to expand into forest to maintain meat and milk production if other pasture is converted to cropland. A third change greatly reduces the carbon losses associated with conversion of pasture.

Many of these unjustified effects work together to generate an extremely low ILUC. Several effects cause the economic component of the model to select conversion of grassland rather than forest. The ad hoc adjustment at the end then further reduces the role of forest conversion relative to grassland. The pasture intensification function avoids the pressure to clear forest to replace pasture converted to cropland. After these factors combine to limit forest conversion, the claim that much of the grassland conversion to cropland increases soil carbon makes the remaining conversions carbon “cheap.”

In Taheripour et. al. (2021), the GTAP modelers do not claim to have significant econometric support for the model but contend, in effect, that it is appropriate to assume a model structure and most of the parameters and then adjust it to data. That is incorrect. Across the sciences, particularly those that cannot use direct experiments, there has been widespread attention to statistical abuses. Economics went through a credibility revolution in which even otherwise valid regressions were shown to be improper because they did not use “instruments” to separate correlations from causal effects (Angrist and Pischke 2010). But the calibration exercise the GTAP modelers are employing – many that involve ad hoc adjustments to parameters -- are not even making statistical errors because they are not using statistics to try to explain the effects of changed prices. They are at best assuming some stories to explain what is happening in the world and then altering parameters to fit their assumed stories. This effort is illegitimate: it is always possible to use different stories to explain the data, with different implications for the role of biofuels or any other source of increased demand.

Economics requires more. As shown, GTAP is generating results that project the lost carbon from land to generate additional crops for biofuels is only a very small fraction of the average carbon lost to produce these crops in the past. Only with these large reductions in ILUC can a model even project greenhouse gas reductions from these biofuels relative to using fossil shows. By contrast, as shown in Table 1, using this average carbon loss would indicate that crop-based biofuels do not come close to reducing greenhouse gas emissions from transportation over 30 years. This average from experience should not be disregarded absent sound economic evidence to the contrary.

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Appendix A: GTAP-Bio's Projections of Changed U.S. Land Use and ILUC Projections with and Without Adjustments

This appendix shows results from the GTAP-Bio 2010 ethanol expansion policy experiment. The columns are U.S. agroecological zones (AEZs). The columns labeled "With Adjustment ..." are the reported land use changes. These are given in percentage terms in Table A1 and in physical terms in Table A2. The U.S. does not have the full set of AEZs, so while GTAP produces "percentage changes" for zones that do not exist in the U.S., they correspond to no physical change in land. The three columns labeled "economic predictions" are the values net of the ad-hoc adjustment. These are not equilibrium outcomes as defined in the model, but they are the "economic output" of the model, to which the adjustment is applied. In Table A1, we see that forestry and livestock land are arbitrarily reduced by the same number of percentage points. The cells in red represent cells where the adjustment causes projections of forest area decline by the economic model to turn into forest area increases after the adjustment. The table further shows how the model does not allow changes in unmanaged land.

Table A1.

Non-Market Ad-hoc Adjustment vs Economic Predictions in the GTAP-BIO Model (in % Change)

	With Adjustment in the Model				Economic Predictions				% Adjustment (Differences)			
	Forestry	Livestock	Crops	Unmngland	Forestry	Livestock	Crops	Unmngland	Forestry	Livestock	Crops	Unmngland
AEZ1	-0.50	-1.13	1.66	0.00	-2.37	-2.99	1.09	0.00	1.86	1.85	0.57	0.00
AEZ2	-0.50	-1.13	1.66	0.00	-2.37	-2.99	1.09	0.00	1.86	1.85	0.57	0.00
AEZ3	-0.50	-1.13	1.66	0.00	-2.37	-2.99	1.09	0.00	1.86	1.85	0.57	0.00
AEZ4	-0.50	-1.13	1.66	0.00	-2.37	-2.99	1.09	0.00	1.86	1.85	0.57	0.00
AEZ5	-0.50	-1.13	1.66	0.00	-2.37	-2.99	1.09	0.00	1.86	1.85	0.57	0.00
AEZ6	-0.50	-1.13	1.66	0.00	-2.37	-2.99	1.09	0.00	1.86	1.85	0.57	0.00
AEZ7	0.34	-0.30	1.15	0.00	-2.39	-3.00	1.38	0.00	2.72	2.70	-0.23	0.00
AEZ8	0.16	-0.48	0.56	0.00	-3.23	-3.84	0.53	0.00	3.38	3.36	0.03	0.00
AEZ9	-0.05	-0.69	0.30	0.00	-4.51	-5.12	0.23	0.00	4.46	4.43	0.07	0.00
AEZ10	-0.41	-1.04	0.86	0.00	-5.01	-5.61	0.67	0.00	4.60	4.57	0.18	0.00
AEZ11	-0.39	-1.02	0.85	0.00	-4.35	-4.95	0.75	0.00	3.96	3.93	0.10	0.00
AEZ12	-0.25	-0.88	1.34	0.00	-1.93	-2.55	1.46	0.00	1.69	1.68	-0.12	0.00
AEZ13	0.15	-0.49	0.75	0.00	-1.19	-1.82	0.98	0.00	1.34	1.33	-0.23	0.00
AEZ14	0.01	-0.62	1.86	0.00	-1.34	-1.96	2.15	0.00	1.35	1.34	-0.29	0.00
AEZ15	0.00	-0.63	2.60	0.00	-1.34	-1.97	1.70	0.00	1.34	1.33	0.90	0.00
AEZ16	-0.00	-0.64	2.74	0.00	-0.10	-0.73	3.20	0.00	0.10	0.10	-0.46	0.00
AEZ17	-0.50	-1.13	1.66	0.00	-2.37	-2.99	1.09	0.00	1.86	1.85	0.57	0.00
AEZ18	-0.50	-1.13	1.66	0.00	-2.37	-2.99	1.09	0.00	1.86	1.85	0.57	0.00

Note: The values in the table are presented in percentage terms.

Table A3 (on the next page) applies the GTAP land use changes in CO₂ emissions to the physical land changes in Table A2. These changes are dramatic. The "hand of God" adjustment turns large CO₂ emissions from forestry land destruction into small positive or negative changes in CO₂. For U.S. ILUC, the arbitrary adjustment factor has large effects on the predicted results.

Table A2

Non-Market Ad-hoc Adjustment vs Economic Predictions in the GTAP-BIO Model (Level Changes from Baseline)

	With Adjustment in the Model				Economic Predictions				Adjustment in Levels			
	Forestry	Livestock	Crops	Ummngland	Forestry	Livestock	Crops	Ummngland	Forestry	Livestock	Crops	Ummngland
AEZ1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AEZ2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AEZ3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AEZ4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AEZ5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AEZ6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AEZ7	0.03	-0.43	0.41	0.00	-0.19	-4.33	0.49	0.00	0.21	3.90	-0.08	0.00
AEZ8	0.02	-0.18	0.15	0.00	-0.49	-1.42	0.15	0.00	0.52	1.24	0.01	0.00
AEZ9	0.00	-0.04	0.04	0.00	-0.44	-0.28	0.03	0.00	0.43	0.24	0.01	0.00
AEZ10	-0.26	-0.17	0.43	0.00	-3.14	-0.94	0.34	0.00	2.89	0.76	0.09	0.00
AEZ11	-0.20	-0.12	0.32	0.00	-2.25	-0.58	0.28	0.00	2.05	0.46	0.04	0.00
AEZ12	-0.16	-0.06	0.22	0.00	-1.23	-0.18	0.24	0.00	1.07	0.12	-0.02	0.00
AEZ13	0.02	-0.04	0.01	0.00	-0.19	-0.14	0.02	0.00	0.21	0.10	0.00	0.00
AEZ14	0.01	-0.01	0.01	0.00	-0.75	-0.04	0.01	0.00	0.76	0.03	0.00	0.00
AEZ15	0.00	0.00	0.00	0.00	-0.68	0.00	0.00	0.00	0.68	0.00	0.00	0.00
AEZ16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AEZ17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AEZ18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	-0.54	-1.05	1.59	0.00	-9.35	-7.91	1.55	0.00	8.81	6.85	0.04	0.00

Note: The values in the table are presented in million hectares.

Table A3

Non-Market Ad-hoc Adjustment vs Economic Predictions in the GTAP-BIO Model (in CO2 Emissions)

	With Adjustment in the Model				Economic Predictions				Adjustment in Levels			
	Forestry	Livestock	Crops	Ummngland	Forestry	Livestock	Crops	Ummngland	Forestry	Livestock	Crops	Ummngland
AEZ1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AEZ2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AEZ3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AEZ4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AEZ5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AEZ6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AEZ7	-5.74	45.96	-7.33	0.00	141.61	459.07	-8.78	0.00	-147.35	-413.10	1.45	0.00
AEZ8	-5.22	18.79	-2.76	0.00	375.99	150.35	-2.62	0.00	-381.21	-131.57	-0.14	0.00
AEZ9	3.77	3.99	-0.77	0.00	331.58	29.77	-0.59	0.00	-327.81	-25.78	-0.18	0.00
AEZ10	194.05	18.38	-7.72	0.00	2386.75	99.31	-6.08	0.00	-2192.71	-80.92	-1.64	0.00
AEZ11	154.42	12.68	-5.81	0.00	1708.66	61.31	-5.13	0.00	-1554.24	-48.63	-0.68	0.00
AEZ12	118.33	6.57	-3.92	0.00	931.92	19.10	-4.28	0.00	-813.59	-12.53	0.36	0.00
AEZ13	-4.96	3.89	-0.25	0.00	141.43	14.45	-0.33	0.00	-146.40	-10.56	0.08	0.00
AEZ14	-1.54	1.39	-0.11	0.00	571.93	4.39	-0.13	0.00	-573.47	-3.00	0.02	0.00
AEZ15	-0.06	0.09	-0.01	0.00	514.30	0.29	-0.01	0.00	-514.36	-0.20	0.00	0.00
AEZ16	0.02	0.00	0.00	0.00	3.61	0.00	0.00	0.00	-3.58	0.00	0.00	0.00
AEZ17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AEZ18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	453.07	111.74	-28.68	0.00	7107.79	838.04	-27.94	0.00	-6654.72	-726.29	-0.74	0.00

Note: The values in the table are presented in million Mg CO2 Emissions.

Appendix B: How GTAP Transforms *Lubowski* Land Use Transformation Elasticities to GTAP Parameters and the Resulting Inconsistencies

The ways in which GTAP uses the estimated elasticities from Lubowski (2002) can be seen in graphs taken from the GTAP working paper (Ahmed, Hertel, and Lubowski 2009), which are reproduced below. Lubowski (2002) used a functional form that estimated different elasticities over different years, in other words, it estimated that land use conversions would occur more over time. The GTAP authors decided to use the estimated elasticity after 5 years. As can be seen in what the Ahmed paper labeled Figure 2, the percentage change in the area of forest in response to changes in forestry's own profitability is extremely small. By contrast, the response of cropland area to a percentage change in the price of cropland is many times larger. In other words, for the same percentage change in their own profitability, cropland should expand by a much larger percentage than forestry.

Figure 3 shows how GTAP translated this "own price" elasticity into the very different transformation elasticities used in GTAP, which we have called "nest parameters," and which the GTAP authors call CET values. These "nest parameters" contribute to but are not themselves elasticities in GTAP. Those elasticities depend both on the nest parameter and on the share of revenue each land use type has in each agroecological zone in each country or group of countries. The formula for the ultimate elasticity is this nest parameter multiplied by one minus the revenue share of that land use. For example, if the nest parameter is 0.2 and cropland in an AEZ has 60% of the revenue, the elasticity would be $0.2 * (1 - .6)$, which equals 0.08. Running GTAP for the U.S., the authors determined the average nest parameters values (CET values), for each of the three different land uses (cropland, pasture/range and managed forest). These are the CET values that result in the relevant elasticity predicted by *Lubowski* for that land use. Figure 3 shows that the matched nest parameters are very different for the different land uses, with particularly large differences between managed forestry and pasture or cropland. The authors chose a roughly average parameter of the three different land use types at the period of 5 years, or 0.2. They did so because the GTAP function requires that the same parameter be used for all items, such as all land uses, in the same nest.

As discussed in text, this approach has two fundamental flaws that both ensure the predictions of GTAP will not actually match those implied by *Lubowski* (2002), the claimed source, and that they will result in far less conversion of forest. One flaw is simply that the resulting CET value will result in wildly different elasticities for different land uses and in different agroecological zones and countries based on their different revenue shares. Yet *Lubowski* (2002) did not find that elasticities vary by revenue share. The GTAP function is therefore not just inconsistent but contradicts the findings in *Lubowski* even as it purports to base the model on *Lubowski*.

The second flaw is that this approach greatly overestimates the elasticity of managed forest, which leads to a strong underestimate of conversion of forest and underestimate of cropland conversion. The reason an excessive forestry elasticity also reduces cropland expansion is that the model predicts increases in the price of managed forest due to some loss

of forest area, and then, as forestry prices increases, this excessive elasticity will cause the model to over-resist net conversion of forest to cropland. As discussed in text, this excessive own price forest elasticity, which is far beyond the elasticity found in *Lubowski*, will also cause forests to expand in other agroecological zones at the expense of cropland.

Figure B1 – Figures taken from Ahmed et al. (2008) showing how GTAP derived its transformation parameters from Lubowski (2002)

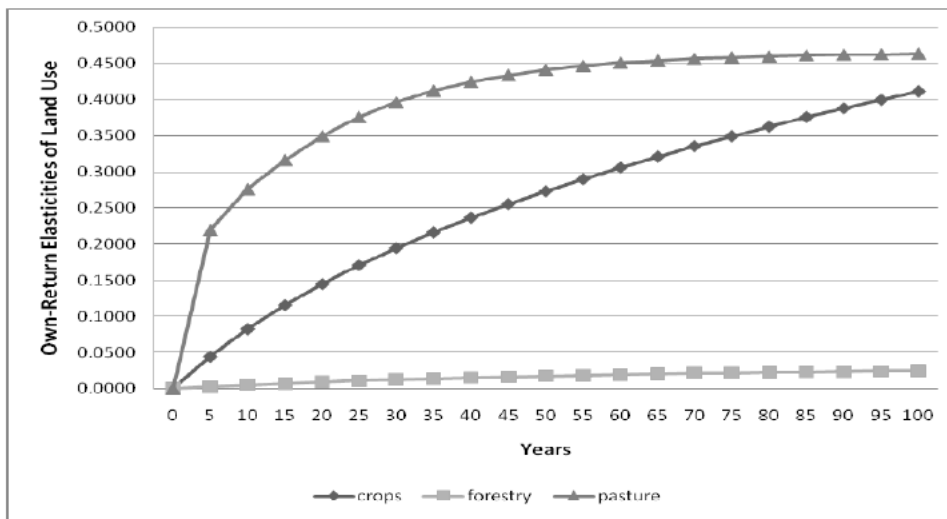


Figure 2: Own-Return Elasticities of Land Use at t for Use i

Source: Authors' Simulations

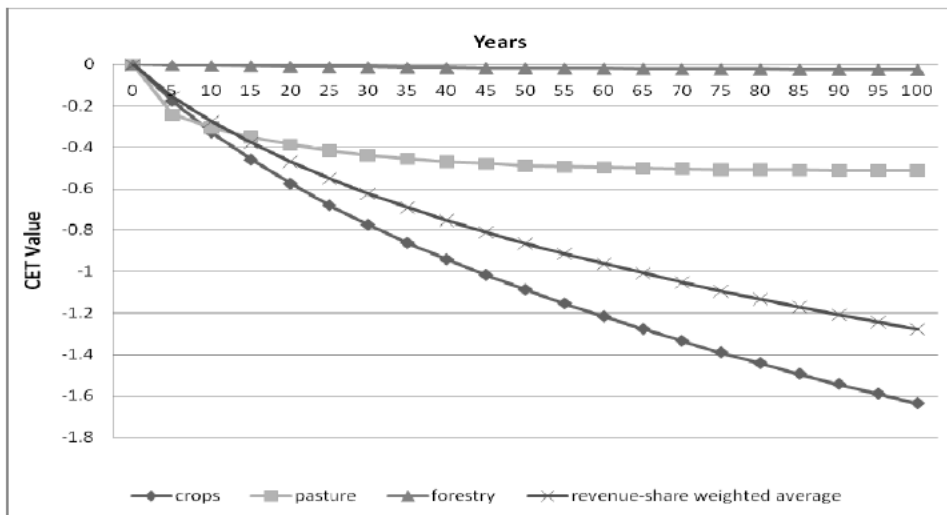


Figure 3: CET Calibration Estimates by Land Use at time t , for $t=5$ to $t=100$

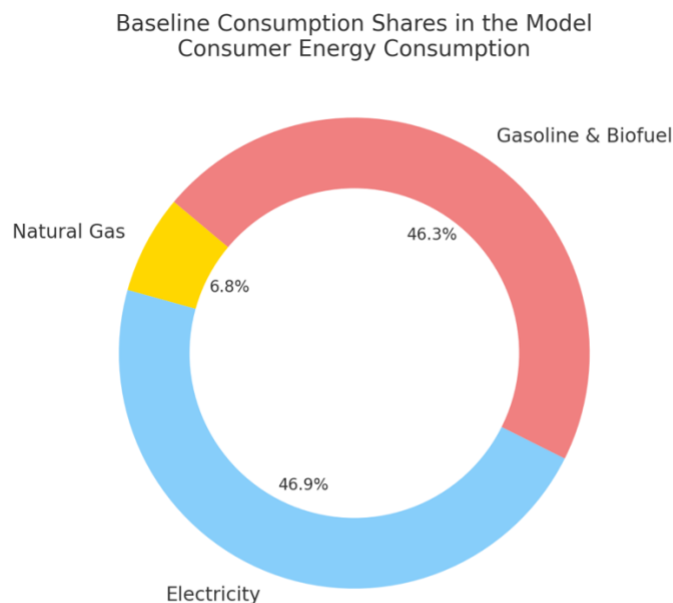
Source: Authors' Simulations

Appendix C: Example and Discussion: Household Energy Consumption and the Counterintuitive Effects of the GTAP Model Structure

Examining projected changes in household energy consumption due to ethanol serves as a pedagogical exercise to understand the structure of GTAP, and illustrates how GTAP can generate counterintuitive results that likely bear little resemblance to reality. The result is most counterintuitive because the model projects household electricity consumption to fall, even as it projects declining electricity prices that should cause its consumption to increase. The reason lies in the choice of nesting structure for household energy and its interaction with the expenditure-share formula, which are hard for policy makers to understand.

The following figure displays the GTAP-Bio (2010) data on baseline household energy expenditure shares in the base year of the model.¹⁰ “Gasoline and Biofuel” is an aggregate created by a lower-level nest from a combination of gasoline and biofuels. As noted, quantities and types of energy substituted are determined by these expenditure shares and do not even depend on the nest parameter. This result means that the structure of the model will automatically create a large substitution effect if a policy changes the consumption of the gasoline-biofuel bundle.

Figure C1.

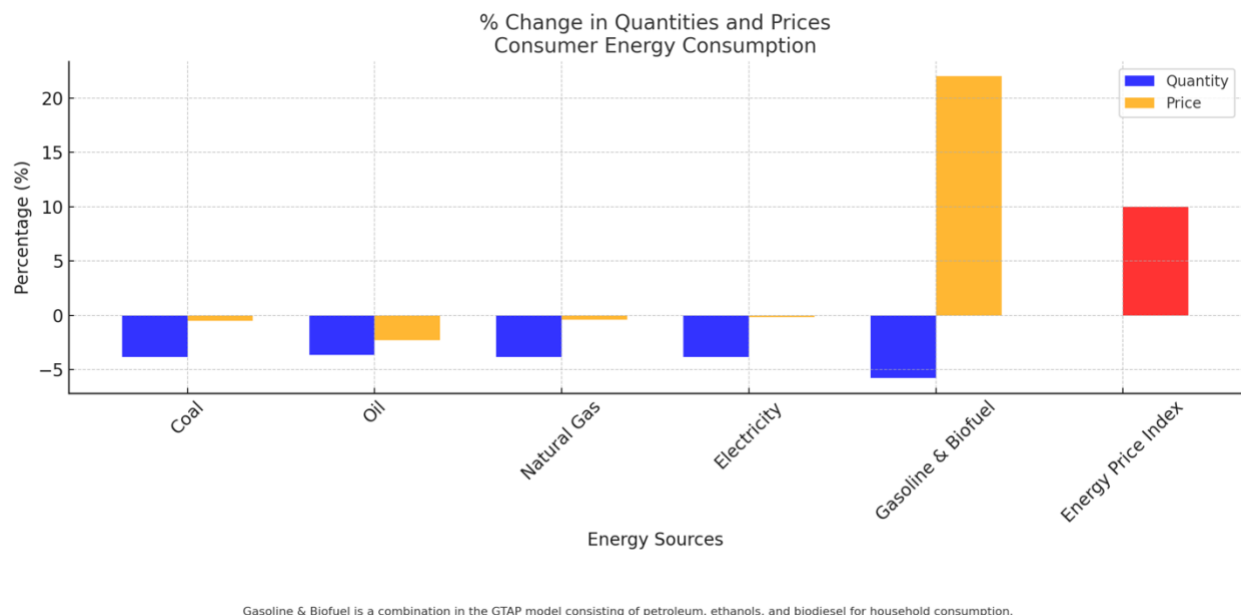


1. Gasoline & Biofuel is a combination in the GTAP model consisting of petroleum, ethanol, and biodiesel for household consumption.
2. The combination of coal and oil consumption take only less than 0.1% in the baseline data thus omitted here.

¹⁰ We frequently rely on the 2010 version of GTAP-Bio because it is by far the best documented version of the model. We have verified that most key features remain in place in a later CARB version of the model, although some components of the overall model are further elaborated by CARB.

The result of the GTAP ethanol policy simulation exercise is shown in the following figure. (It reveals market prices before taxes.)

Figure C3.



We see that the price of the gasoline-biofuel bundle is predicted to increase by over 20%. This causes the use of the combination of gasoline and biofuel to drop by more than 5%. Surprisingly, though, the consumption of household electricity and natural gas falls by more than half as much in percentage terms. One can see in the graph that these startling effects are not caused by a rising price for non-gasoline energy; in fact, they decline. We know of no attempt in the GTAP modeling community to validate their predictions that ethanol policy will cause the consumption of natural gas, fuel oil and electricity to decline without any price increase in these energy sources to motivate a decline.

It turns out that these odd results are caused by a combination of (1) the simplified way that GTAP models ethanol policy and (2) the use of a particular price index to model overall household energy consumption. The second effect, the use of special nest price indices, has important effects throughout the GTAP model.

On the first point, the modelers assume a target level of corn ethanol use (a more than 750% increase over pre-policy levels) and assume that this will be achieved via a consumption subsidy to corn ethanol. In the model, the subsidy is paid for via a tax on gasoline.¹¹ This is contrary to reality, but the modelers can only do simple policy exercises. They require that

¹¹ The choice of how to simplify a policy (and other exogenous factors) inside of GTAP is called the “closure” of the model. Discussion of model predictions are rarely related back to the decisions made about the closure, even though the choice of the closure can have large effects on policy outcomes.

government policy is budget-balanced, so the subsidy has to be offset by some tax. In the GTAP computation, the required taxes and subsidies are very large.

This artificial policy then interacts with the very structure of the model to create the odd (and very likely incorrect) results. In GTAP, a higher-level nest determines consumer expenditure on the dollar-valued “household energy bundle.” The consumption of this bundle is driven by a single price index. The percentage change in this price index is calculated as a weighted average of the percentage price changes across all the products in the nest. The weights are the fixed base-year expenditure shares displayed in the prior chart.

Since gasoline is a large part of the energy bundle, the predicted increased price of gasoline drives up this price index, as shown in the red bar of the last chart. Figure C3 shows see that the overall “price of energy” is now 10% higher. In the GTAP structure, this price increase causes a decrease in the fictional “energy composite,” which drives down the consumption of all energy. That sounds reasonable overall, but the strange result occurs because the GTAP structure simply distributes this declining energy consumption across all the energy products, even those with declining prices. It thereby causes consumption of these alternative energy products to decline even as decreases in their prices should motivate consumers to increase their consumption.

Appendix D. The GTAP Trade Model

As noted elsewhere in our report, there is strong empirical evidence of a moving cropland frontier in some places in the world. Given world trade in agricultural products, this means that diverting corn production to ethanol in the US will likely result in land use changes along these more active non-US land use frontiers. The GTAP model was originally built as a trade model, and it contains a complex model of these effects.

Over decades, the GTAP -BIO approach to trade has been rendered obsolete in the academic literature. New trade models (e.g. Eaton and Kortum (2002) and Adao, Costinot and Donaldson (2017)) are explicitly motivated by a desire to avoid the problems of models with thousands of poorly justified parameters. These new trade models feature product differentiation, imperfect competition and, above all, a key role for the effects of distance and market size (the empirically impressive “gravity” model of trade). This is very different from GTAP.

GTAP has parameters that reflect a strong “home bias” in consumption. This reflects, for example, the traditional tendency of French consumers to buy French cars while German consumers buy German, but not French, cars. The home bias effect is motivated by trade in manufactured goods and certain kinds of services. However, there is an important literature that rejects the idea of a large home bias for agricultural products. Shipping distance may still have a strong effect on fresh goods (although these are often shipped very long distances) but likely has much lower effects for non-branded bulk products like grain or food oil. It is difficult to believe that many consumers care intensely about the country-of-origin of the grain or food oil in processed foods.

In contrast to GTAP, Roberts and Schlenker (2013), published in the prestigious American Economic Review with 581 citations, uses rigorous econometric tests to show that Brazilian crop price responses to U.S. corn yield shocks are statistically indistinguishable from U.S. responses to U.S. shocks. This indicates a high degree of world market integration, consistent with the existence of large international companies who are in the business of agricultural commodity arbitrage. This empirical finding conflicts with the GTAP “home bias” assumption that restricts trade in agricultural commodities. Roberts and Schlenker also cite Fackler and Tastan (2008), who develop statistical procedures to test for market integration. They consider the market for soybeans, which they say is well-understood to be integrated. Their statistical tests confirm that “the United States/Brazil/Rotterdam markets appear to be fully integrated” in soybeans.

Berquist et al (2022) argues persuasively that credible policy analysis in agricultural policy cannot rely on GTAP style models (which are a subset of the more general traditional “CGE models”.) That paper criticizes GTAP-style models that “largely abstract from modeling the granular economic geography of farm production, consumption and trade costs” that are key to policy analysis. The paper properly distinguishes trade in homogenous goods like commodity crops from trade in manufacturing goods, for which variations in products like the

cars of Renault versus Volkswagen, create loyalties that slow shifts in trade. The paper showed how trade is still influenced by transportation costs that vary with distance, but once cross-location price differences are enough to overcome the transportation cost, new and expanded trade links can be created very quickly.

In (Villoria and Hertel 2011), the authors conceptually defend the GTAP trade model through analysis claiming that data does not prove an integrated world model of prices. Their analysis, which conflicts with papers cited above, is not convincing:

- It does not use any kind of exogenous shock ("instrument") to test market integration. The paper therefore of necessity confuses different supply and demand effects and cannot produce credible empirical results (Angrist and Pischke 2010); (Berry and Haile 2021), (Pearl 2009). By contrast, Roberts and Schlenker (2013) do make use of such shocks, which makes their results showing close price integration far more credible.
- The paper does not reference any modern trade literature.
- Although the paper rejects a theory of one global price, that does not justify use of the GTAP model, which just imposes a restriction for unknown reasons on the degree of shift in trade in response to prices. The alternative to account for differential prices is to factor the effect on prices of real, measured, transportation costs, which is an approach consistent with modern trade theory. The two approaches reach different results. A transportation cost model, with otherwise homogeneous goods such as soybeans, would impose maximum price differences between two points (with the difference being the transport cost). GTAP does not impose these maximum differences, which can result in unrealistic trade barriers because it can allow US prices to rise tremendously more than European or Brazilian prices.

Overall, there is a lack of evidence to support the GTAP approach to agricultural trade and a large well-cited literature that advocates very different approaches. These are important for ILUC. By artificially restraining trade effects in agriculture, GTAP is artificially restricting the effects of biofuel policy to the U.S. Because the crop/forest frontier is more settled in the U.S. than elsewhere, and because quickly expanding trade links are plausible, this trade feature will underestimate the world-wide land use changes.

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Nathan Miller, Steven Berry, Fiona Scott Morton, Jonathan Baker, Timothy Bresnahan, Martin Gaynor, Richard Gilbert, George Hay, Ginger Jin, Bruce Kobayashi, Francine Lafontaine, James Levinsohn, Leslie Marx, John Mayo, Aviv Nevo, Ariel Pakes, Nancy Rose, Daniel Rubinfeld, Steven Salop, Marius Schwartz, Katja Seim, Carl Shapiro, Howard Shelanski, David Sibley, and Andrew Sweeting (2022), “On the Misuse of Regressions of Price on the HHI in Merger Review,” *Journal of Antitrust Enforcement*, 10(2), 248—259.

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Steven Berry (2011), “A Proposal for Future SBE/NSF Funded Research: Refocusing Microeconomic Policy Research,” in *Ten years and beyond: economists answer NSF’s call for long-term research agendas*, C. L. Schultze and D. H. Newlon, eds., AEA Committee on Government Relations and the NSF Directorate for the Social, Behavioral and Economic Sciences (electronic copy on ssrn.com).

Steven Berry, Geoffrey Hewings and Charles Leven (2000) “Adequacy of Research on the Upper Mississippi-Illinois River Navigation,” Northeast-Midwest Institute.

Currently Inactive Papers

Steven Berry and Philip Haile (2009) “Identification of a Heterogeneous Generalized Regression Model with Group Effects,” Cowles Foundation Discussion Paper 1732,

Steven Berry and Ariel Pakes (2001), “Estimation from the First Order Conditions for Dynamic Controls.”

Grants, Positions, Special Lectures and Honors

IIOC (International Industrial Organization Conference) 2024 Plenary, “30 Years Since BLP,” together with Chris Conlon

Asia-Pacific Industrial Organization Society Keynote 2021, “Foundations of Demand Estimation in IO.”

Clarivate Citation Laureate 2020, together with James Levinsohn and Ariel Pakes, “for their BLP random coefficients logit model for demand estimation.”

Frisch Medal Committee 2020-2022; Chair for the 2020 award.

Elected to the *Econometric Society North American Regional Standing Committee*, 2020-2023, and also to the *Econometric Society Council*, 2021-2024.

Search Committee for Econometrica Co-editor, 2020

Inaugural Faculty Director of the Tobin Center for Economic Policy at Yale, 2018–

2018 *Merton J. Peck Prize* for excellence in undergraduate teaching in the Department of Economics.

Founding Fellow (2018) of the International Association of Applied Econometrics.

2017 *Distinguished Fellow* of the Industrial Organization Society

Lex Hixon '63 Prize for Teaching Excellence in the Social Sciences, Yale College, 2015

Inaugural *David Swensen Professor of Economics*, Yale Economics Department, 2014-present

Fellow of the American Academy of Arts and Sciences, Elected 2014

Chair, Yale Economics Department, January 2013-June 2013

Latin American Meetings (LACEA/LAMES) Plenary Lecture, Santiago Chile, 2011

Director of the Yale FAS Division of Social Sciences, July 2010–January 2013

Search Committee for Econometrica Editor, 2009

University of Pennsylvania Economics Department External Review Committee, 2009

The Fifth Toulouse Lectures in Economics: “Empirical Models of Product Differentiation”, November 2007, Toulouse, France

IIOC (International Industrial Organization Conference) 2007 Keynote Speaker “Empirical Models of Product Differentiation ”

Co-Editor, Econometrica July 2006-June 2009

2005 World Congress of the Econometric Society: Invited Symposia on Empirical Modeling of Imperfect Competition, “Empirical Models of Oligopoly Entry,” (joint with Elie Tamer), London

Search Committee for Econometrica Editor 2006

Frisch Medal Committee 2006

Chair, Yale Economics Department July 2004-June 2006

NSF Economics Panel Member, 2002-2004

EARIE (European Association for Research in Industrial Economics), 2002 Conference: Invited Plenary Speaker, Madrid, Spain

Fellow of the Econometric Society, elected 1999

James Burrows Moffatt Professor of Economics, 1999-2014

NSF Grant SBR-9617887 for the project “Estimating Models with Product Differentiation and Endogenous Product Characteristics” awarded for 1997-2001

Best Advisor Award (co-recipient), 1997, Yale Graduate Economics Club

Frisch Medal of the Econometric Society, 1996 (awarded every two years by the Econometric Society for the best applied article, empirical or theoretical, published in the journal *Econometrica* over the past five years) for the article “Estimation of a Model of Entry in the Airline Industry ”

Alfred P. Sloan Foundation, Research Fellow, 1993-1995

EPA Grant R 819878-01-0 (joint with Ariel Pakes and Samuel Kortum) for research on the effect of environmental policy on the automobile industry, 1992-1994

NSF Grant SES-9122672 (with James Levinsohn and Ariel Pakes) for research on the automobile industry, 1992-1994

Olin Fellowship at the National Bureau of Economic Research, 1991-1992

May 15, 2024



August 27, 2024

Chair Liane Randolph and Board Members
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: 15-day notice for comment on additional Low Carbon Fuel Standard proposed amendments announced on August 12, 2024

Dear Chair Randolph and CARB Board Members:

On behalf of the members of the American Coalition for Ethanol (ACE), I am writing in response to additional amendments proposed on August 12 by the California Air Resources Board (CARB) on the Low Carbon Fuel Standard (LCFS).

Crop-Based/Biomass Sustainability Criteria

102.1

The subject of sustainability criteria for crop-based biofuels is complex and consequential. ACE members do not believe CARB's broad yet cursory proposal, nor the brief discussion of this topic during the April 10 workshop or additional regulatory red tape proposed in the 15-day comment package of amendments, warrant implementation of such criteria within the context of the overall LCFS.

Rushing to implement such criteria could backfire. As we noted in our February 20 comment letter, the broad proposal to require pathway holders to track crop-based feedstocks to their point of origin and obtain independent third-party certification will discourage participation in the LCFS and hinder the goals of the program.

In general terms, we could support CARB's goal to ensure biomass and crop-based feedstocks used to produce low carbon fuels are not grown on land converted from forests, native grasslands or wetlands after 2008. However, the rushed approach CARB is taking without adequately defining or being transparent about what constitutes "sustainability" beyond the above-stated goal leaves us with more questions and concerns than answers. While CARB seemingly is attempting to dull the biting nature of this proposal by "phasing-in" the documentation and verification of certain feedstock supply chain data, the overall proposal still lacks adequate explanation and transparency about the underlying need or goal for sustainability criteria.

Instead, we recommend initiating a thoughtful stakeholder engagement process so all parties can better understand what CARB wants to accomplish through sustainability criteria. We believe this process can help surface the fact there are multiple existing protocols which can be relied upon to satisfy any real or perceived concerns related to ensuring the LCFS is not causing land use change (LUC) to forests, wetlands and native prairies.

102.2

One such protocol is the "R&D Greenhouse Gases, Regulated Emissions, and Energy Use in Technologies (GREET) 2023 Rev1 Technical Report" on indirect effects of biofuels completed by the U.S. Department of Energy to help establish the 40B GREET model for the 40B sustainable aviation fuel (SAF) tax credit. The Department of Energy engaged Purdue University to generate results on induced land use changes (ILUC), crop production, livestock production and rice production with its



GTAP-BIO model, and ICF to develop emission profiles of crop production, livestock production and rice paddy fields.¹

Argonne modified R&D GREET 2023 to create an updated version, R&D GREET 2023 Rev1, that addresses the lifecycle GHG emissions associated with seven SAF pathways for 40B use. The technical report includes updates to ensure the indirect effects of four SAF pathways using dedicated feedstocks (corn, soybean, canola and sugarcane) are covered. It can help inform questions CARB may have relative to indirect effects, including ILUC, from crop-based biofuels.

Second, the U.S. Department of Agriculture (USDA) has an existing and robust apparatus which, since 1985, has been enforcing certain requirements ensuring farmers meet conservation requirements on croplands in order to be eligible for federal farm programs administered by USDA's Farm Service Agency (FSA), Risk Management Agency (RMA) and Natural Resource Conservation Service (NRCS). Known as "conservation compliance," Congress charged USDA with this responsibility to ensure federal farm programs did not entice farmers to grow crops on highly erodible lands or convert wetlands for agricultural production.

Farmers who fail to abide by these rules are ineligible for federal farm programs including FSA loans and disaster assistance payments, NRCS and FSA conservation benefits, and federal crop insurance support.

USDA has 40 years of experience enforcing these provisions. Under federal regulation, farmers and affiliated persons must affirmatively attest (form AD-1026) that they will not plant or produce an agricultural commodity on highly erodible land without following an NRCS approved conservation plan or system, plant or produce an agricultural commodity on a converted wetland, or convert a wetland which makes the production of an agricultural commodity possible. Additionally, activities that may affect compliance such as removing fence rows, combining fields or conducting drainage activities must be pre-approved by USDA to ensure compliance.

USDA's FSA and NRCS are tasked with ensuring eligibility. Leveraging nearly 10,000 staff in state and county offices, NRCS is responsible for making the technical determinations of compliance at the farm level, and FSA's staff of nearly 7,000 state and county offices use this information to make program eligibility determinations for the covered programs. Farmers understand and accept this system. There is no need to re-invent the wheel. Instead, CARB should leverage USDA's existing enforcement infrastructure to verify desired sustainability criteria.

Speaking of federal fuel programs, third, as you know, the U.S. Environmental Protection Agency (EPA) is charged with enforcement of land use and total cropland acres relative to implementation of the Renewable Fuel Standard (RFS). This is yet another safeguard in place to prevent expansion of cropland for biofuel use.

102.3

Finally, ACE has previously written about a project we are engaged on with USDA's Regional Conservation Partnership Program (RCPP) to unlock corn ethanol access to LCFS markets and new tax

¹ <https://greet.anl.gov/files/greet-2023rev1-summary> April 2024. Development of R&D GREET 2023 Rev1 to Estimate Greenhouse Gas Emissions of Sustainable Aviation Fuels for 40B Provision of the Inflation Reduction Act. Michael Wang, Hao Cai, Uisung Lee, Saurajyoti Kar, Tom Sykora, and Xinyu Liu, Systems Assessment Center, Energy Systems and Infrastructure Analysis Division, Argonne National Laboratory



incentives based on the adoption of climate-smart agricultural (CSA) practices which reduce GHG emissions.

Specifically, in late 2021, NRCS provided ACE with \$7.5 million in RCPP funds to work with a member ethanol company (Dakota Ethanol, LLC) and farmers in the counties surrounding the facility to: (1) incentivize farmer adoption of CSA practices at scale, (2) partner with leading land-grant university scientists and Sandia National Laboratory to collect data to measure, verify and model resulting soil health and GHG benefits, and (3) use this data to help participating farmers access clean fuel markets and take advantage of other opportunities to monetize CSA practices.²

Since the launch of this South Dakota-based RCPP, ACE and our partners have successfully executed contracts with farmers in the seven counties surrounding Dakota Ethanol, LLC to adopt CSA practices on nearly 20,000 acres of cropland. Currently our technical team, led by South Dakota State University, is conducting ongoing verification of practices and we are making reimbursement payments to participating farmers. Soon our technical team will begin collecting soil samples and other relevant data to pressure test the agro-ecosystem models.

Based on this progress, earlier this year, NRCS invested an additional \$25 million for a larger 10-state RCPP led by ACE.³ The USDA funding will help hundreds of farmers adopt reduced and no-tillage, nutrient management and cover crops on nearly 100,000 acres across 167 counties surrounding 13 ethanol facilities partnering with ACE to implement the project in Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, Nebraska, Ohio, South Dakota and Wisconsin. The sites were strategically chosen to provide our project's scientific team with statistically significant data regarding the GHG effect of conservation practices in different soil types and climates.

ACE and our partners will accomplish three important objectives with this funding support from USDA. First, we will incentivize farmers in 10 states to adopt conservation practices. Three-fourths of the funding will go toward farmer adoption of practices. Second, our team of soil scientists and agronomists will monitor, measure and verify how the conservation practices adopted by the farmers reduce GHG emissions from corn production. The data they collect will be shared with the U.S. Department of Energy who will use it to pressure test existing models such as the GREET model to address real and perceived 'information gaps' which currently prevent farmers and ethanol producers from adequately monetizing climate-smart ag practices. Third, our ultimate objective is to empower ethanol producers and farmers with modeling and calculator tools to earn higher tax credits and premium prices in clean or low carbon fuel markets based on climate-smart ag practices. Our partners, including 13 ethanol companies and team of technical experts, are currently making plans to ensure farmers in the 167 counties are aware of their eligibility and we hope to execute contracts for initial conservation practices following the 2024 fall harvest.

While we may share CARB's goal for better understanding the GHG impacts farming practices have on crop-based biofuels, we disagree feedstocks such as corn must be tracked to their point of origin.

² <https://ethanol.org/ace-news/usda-announces-investment-in-effort-to-utilize-climate-smart-practices-to-secure-market-access-to-clean-fuel-markets-for-farmers-and-ethanol-producers>

³ <https://ethanol.org/ace-news/ace-announces-project-to-unlock-ethanols-access-to-new-markets-and-tax-credits>



Rather, GREET and other models CARB and other regulators use today to penalize corn ethanol for LUC and farm-level practices can be improved and modified to assign carbon credits based on climate-smart agriculture practices. Specifically, GREET currently estimates nitrous oxide emissions from fertilizer use, contains a module for estimating LUC penalties through the Carbon Calculator for Land Use Change from Biofuels (CCLUB), and features a relatively new Feedstock-Carbon Intensity Calculator (FD-CIC) module estimating soil carbon emissions and sequestration credits for practices such as conservation tillage and cover crops on corn production.

102.5

Capping Credits for Soy and Canola-based Biomass-based Diesel

CARB's August 12 surprise proposal to cap credits for biomass-based diesel produced from soy and canola oil to just 20% of a company's annual LCFS obligation also lacks transparency and rationale. It would appear this proposal does not apply to distillers corn oil (DCO) or used cooking oil (UCO) but once again, CARB needs to provide more information about the purpose and scientific need for such a radical proposal.

Agriculture and crop-based biofuels are poised to play an even more meaningful role in helping CARB achieve the more ambitious carbon intensity reduction targets set forth in your overall package of amendments, but proposals to limit or cap the volume of carbon credits which can be derived from crop-based biofuels would make it appear CARB is altogether abandoning the "performance-based" nature of the LCFS and simply picking winners and losers.

E15

102.6

While it is outside the scope of the proposed amendments to the LCFS, we were encouraged by discussion during the April 10 workshop about how E15 could help reduce retail pump prices. This is true. E15 typically costs 5 to 25 cents per gallon less than E10 and 40 cents to \$1.00 less than non-ethanol gasolines. E15 also has a higher octane rating, so allowing the sale of this fuel would give consumers the option to buy a higher quality product for less money. Moreover, 95% of all U.S. vehicles are approved to use E15 and nearly 3,400 retail sites offer E15 across 30 states.

We implore CARB to finally approve the use of E15 in California, noting that the Center for Environmental Research and Technology at the University of California Riverside found that replacing E10 with E15 in California will significantly improve air quality.⁴

Thank you for your time and consideration of these comments.

Sincerely,

A handwritten signature in black ink, appearing to read "B. Jennings", is written in a cursive style.

Brian Jennings, CEO
American Coalition for Ethanol

⁴ <https://ww2arb.ca.gov/resources/documents/comparison-exhaust-emissions-between-e10-carfg-and-splash-blended-e15>



August 27, 2024

Honorable Chair Liane Randolph and Honorable Board Members California Air Resources Board
1001 I Street
P.O. Box 2815
Sacramento, CA 95812

Re: Proposed 15-day Change Amendments to the Low Carbon Fuel Standard Regulation

Submitted to <https://ww2.arb.ca.gov/applications/public-comments>

Dear Chair Randolph and Honorable Board Members:

CalETC appreciates this opportunity to SUPPORT the Low Carbon Fuel Standard (LCFS) regulation and provide feedback for CARB Board member consideration. As discussed in detail below, CalETC largely supports the proposed draft regulation order ("draft order") August 12, 2024, version ("15-day changes"). However, we are urging CARB to make critical modifications to the regulation in order ensure that the utilities will be able to effectively administer the programs funded by LCFS proceeds. Attached to this letter is our February 20 letter which we are resubmitting as Appendix B and slightly changed recommended amendments in Appendix A. The changes we request are critical to ensuring the success of the LCFS program. Below we also provide additional justification for the recommendations in our February 20 letter.

CalETC is a non-profit association committed to the successful introduction and large-scale deployment of all forms of electric transportation including plug-in electric vehicles of all weight classes, transit buses, port electrification, off-road electric vehicles and equipment, and rail. Our board of directors includes Los Angeles Department of Water and Power, Pacific Gas and Electric, Sacramento Municipal Utility District, San Diego Gas and Electric, Southern California Edison, Northern California Power Agency, and the Southern California Public Power Authority. Our membership also includes major automakers, manufacturers of zero-emission trucks and buses, developers and operators of charging stations and other industry leaders supporting transportation electrification. CalETC supports and advocates for the transition to a zero-emission transportation future to spur economic growth, fuel diversity and energy independence, ensure clean air, and combat climate change. This letter is submitted on behalf of the CalETC board of directors and covers issues specific to the utility interests in LCFS. Also see our joint letter with the EV Charging Association for our comments on the non-utility provisions in the 15-day change package.

Over the past few years, the CalETC board has worked closely with the CARB LCFS staff to provide suggested amendments to the LCFS regulations. We appreciate the tremendous effort and accessibility of CARB staff during the extensive public process regarding this regulation.

Additional rational for our February 20 letter recommendations:

- 103.1 1. **Requesting a clearer list of eligible Holdback Programs.** The current list of proposed holdback projects is confusing. Utilities and their regulators need this list to be as clear as possible to help remove any ambiguity for staff and decisionmakers at CARB, CPUC, and Publicly Owned Utilities (POU). The Appendix to our February 20 letter provides our recommended amendments and detailed justification (See Appendices A and B to this letter). These recommendations also consider the needs of the dozens of medium and small EDUs in California that are at a very different stage of EV program implementation than the large EDUs. These recommended edits are necessary to make the project review and approval process simpler and to help the utilities implement equity projects:

Having one list instead of the current two lists improves clarity and allows for the implementation of more equity projects such as vehicle grid integration projects for low-income individuals and others who meet the equity definition.

- 103.2 *Allowing eMHDVs anywhere in California to clearly count as equity* is necessary as the current language is open to interpretation. Improving clarity here will allow projects supporting eMHDVs (e.g., grid side upgrades, panel upgrades, the eMHDV Clean Fuel Reward etc.) to count as equity. See Appendices A and B for more on this topic.

- 103.3 *Requiring large IOUs¹ to utilize their holdback credit revenues to fund a minimum of three program options* is necessary as there are increasingly diversified needs in transportation electrification over large service areas. Including this requirement to fund a minimum of three program options will help ensure that the large IOUs consider these diverse needs and will prevent a situation in which the large IOUs are compelled to spend all of their holdback funds on one program. The list of holdback expenditures is appropriately lengthy, in part, to meet the diverse and varied needs of priority communities and address equity. For example, the holdback list allows spending on light-, medium- and heavy duty EVs and off road EVs too. Proceeds also can be spent on projects for chargers, vehicle-grid integration, grid side upgrades, ridesharing, transit, EV rebates, micromobility, reskilling and workforce development and others. All of these are important projects. Requiring spending on at least three programs will ensure programmatic diversity and equity. CalETC proposes to limit this requirement to only the large IOUs as the other EDUs may not have enough funds to do three programs, especially with low credit prices. See Appendix A for recommended edits.

- 103.4 *The project list should preserve a narrowly focused project category for direct multilingual education, and outreach serving equity communities.* The preservation of this category is not intended to include general marketing or advertising. It is only intended to allow for multilingual education and outreach to equity communities for specific projects. The 15-day changes allow this for automaker programs, but not the EDU holdback programs. Deleting

¹ Under the proposed definitions, this would only include SCE and PG&E.

the multilingual education and outreach project category in the regulation will hurt efforts by many EDUs to reach hard-to-serve markets who speak little or no English, many of whom are low-income individuals. See Appendix A for recommended edits.

103.5 *The project list should explicitly allow for upgrades to electric panels*, which are prerequisites to transportation electrification for many customers living in older buildings that have not had recent updates. Upgrades to panels can have other benefits but are primarily to enable transportation electrification. Naming this clearly in the regulation will also help develop equity projects to serve low-income individuals with panel upgrades. See Appendix A for recommended edits.

103.6 For simplicity and clarity, *the project list should be consolidated under the recommended projects for electric mobility solutions* as there are two list items that appear to overlap regarding mobility alternatives. See Appendix A for recommended edits.

103.7 *The list of agencies that may be consulted in the creation of workforce development projects should be expanded to include other pertinent entities*, such as California Community Colleges, community-based organizations, and POU Governing Boards.

103.8 CalETC thanks CARB Staff for harmonizing the definitions of equity communities and individuals in the proposed amendments with those detailed in AB 841 and CPUC Decision D.20-12-027. However, the language requires a slight modification. AB 841 defines this as "a community located on lands belonging to a federally recognized California Indian tribe, " and *the proposed order should align with AB 841 in order to ensure simplicity*. Note the proposed amendments include term "state and federally recognized" instead of the AB 841 language.

103.9 *"Off Road Vehicle" should be defined in LCFS for clarity* because it is not obvious that vessels, aircraft, and other transportation or mobile sources qualify under that term. Off-road vehicle projects are needed in many areas including construction sites, factories, warehouses, seaports, railyards, airports and farms. Adding a definition will improve the clarity of the holdback program's list of eligible projects. See Appendix A for recommended edits.

103.10 2. **Requesting an increased cap on administrative costs for utility Holdback Programs and statewide Clean Fuel Rewards.** While we appreciate that CARB increased the administrative costs for electric distribution utility (EDU) holdback programs to seven percent, we do not support this change, and request 1) that the seven percent administrative cost cap for utility holdback programs be raised to ten percent and 2) the five percent administrative cost cap for the electric medium-and heavy duty vehicle Clean Fuel Reward be raised to ten percent. We note this recommendation is a simpler solution than the recommendations from our previous letter (see Appendix B):

a. As we explain in Appendix B, administrative cost caps are a complex issue. And this issue has not been workshopped. Given the complexity, we recommend maintaining

the current 10 percent administration cost cap on holdback programs and statewide Clean Fuel Reward. It is important to note that the CPUC has decades of experience in regulating billions of dollars in energy efficiency program portfolios and their requirements on administrative costs, marketing, education and outreach costs, and related costs are both thoughtful and strict. They require a ten percent administrative cost cap for energy efficiency programs which is appropriate for CARB's regulation of LCFS programs too. Additionally, as the EDU's LCFS programs grow in size and amount spent, we expect many projects will be added, and many additional partners (community-based, equity-oriented organizations) will be engaged. In that scenario, the EDUs may require a cap of more than 10 percent for holdback programs. Regarding examples on why a 10 percent administrative cost cap is needed for utility holdback programs please see August 27 letters to CARB from individual utilities. Also, the February 20 letter to CARB from CalETC ([Appendix B](#)) provides additional justification, and [Appendix A](#) in this letter on this topic is slightly different than our proposed amendments in our February 20 letter.

- b. The proposed statewide Clean Fuel Reward for electric medium and heavy duty EVs (eMHDVs) is a new program that should not be hampered by a five percent administrative cost cap especially since this market is complex with many submarkets and types of customers that will be hard to reach with rewards. We note that CARB's concerns about administrative costs were addressed when the CPUC authorized the utilities to implement the Clean Fuel Reward in 2019, finding that "a 10% cap of administrative funds is generally within the range of spending for other customer programs the utilities implement," and ordered SCE in Resolution E-5015 to "administer no more than 10% of the total Clean Fuel Reward program budget on administrative and marketing, education, & outreach spending, which must include all administrative spending related to the Clean Fuel Rewards program." The CPUC found that including ME&O in the 10% cap was reasonable for a program of this size; the potential scale of the Clean Fuel Reward is no larger today than it was in 2019, and the same rationale should apply today. In addition, the utilities should not have a lower cap (i.e., five percent) for this program than the automakers (i.e., seven percent) for a similar program for light duty EVs. An additional rationale for our recommendation is in [Appendix B](#).

- 103.11 3. **Clarifying that Publicly Owned Utilities must spend 50% of holdback funds on equity projects, consistent with the intent in the 45-day package.** Appendix E in the 45-day LCFS proposed order gives the rationale for 50%, and we understand that 50% allocation was CARB's intent. This change is necessary to eliminate the inconsistency. Moreover, maintaining a 50% equity spending requirement is appropriate for POUs, as further detailed in [Appendix B](#) to this letter.

103.12

4. Update the EDU definition based on 2022 sales data, clarifying that San Diego Gas & Electric Company is a “medium-sized” utility under the regulation for all the reasons listed in [Appendix B](#). Appendix E in the 45-day LCFS proposed order gives the rationale for San Diego Gas & Electric Company (SDG&) as a medium-sized EDU, and we understand that was CARB’s intent. In general, CARB should use GWh definitions consistent with the 2022 EDU annual sales data in the California Energy Commission’s 2023 Integrated Energy Policy Report’s Planning Forecast. This report makes clear that SDG&E is a medium-sized utility with a similar volume of sales as the Los Angeles Department of Water and Power. We recommend small POUs be defined as having less than 5,000 GWh annual sales. See proposed amendments in [Appendix A](#).

103.13

5. Exempt holdback programs administered by EDUs with less than 2000 GWhs of annual sales from a cap on administrative costs, or make them subject to a higher cap, such as 20%. While small EDUs can design and implement programs specifically tailored to their community needs, administrative costs for these EDUs may naturally result in a higher percentage of costs due to the small scale of programs and the utility’s limited staff resources, particularly if the definition of administrative costs is expanded. We do not support the alternative solution of having a process where small EDUs would seek an exemption (EO approval) due to the cost and time burden. Small EDUs have very different LCFS program needs due to their very small size and lack of budget and staff.

103.14

6. Make edits to the regulation that will assist smaller utilities, potentially allowing them to participate in LCFS. See the rationale for our proposal in [Appendix B](#) and proposed amendment in [Appendix A](#). Our proposal would support approximately twenty small rural utilities who cover about one percent of California to opt-into LCFS.
7. Modifying the utility reporting requirements to better track deployment of funds to impacted communities, align with the reporting framework required by the California Public Utilities Commission (CPUC), and simplify reporting for smaller utilities. See the rationale for our proposal in [Appendix B](#) and proposed amendment in [Appendix A](#). CARB and the CPUC currently measure equity in very different ways, and our proposal would harmonize with how this is done by the two agencies. In addition, our proposal benefits the POUs with a simpler, more practical way to report compliance with the LCFS equity provisions.

CalETC appreciates the opportunity to provide comments on this important regulation. If you have any questions, please do not hesitate to contact me at any time.

Best,

A handwritten signature in black ink, appearing to be 'LR', followed by a horizontal line.

Laura Renger
Executive Director

cc: Rajinder Sahota
Matthew Botill
Jordan Ramalingam

Appendix A (note: slightly different than CalETC's February 20th letter)

New or updated Defined Terms to be added to the Regulation's Definitions and Acronyms

~~[New term] "EDU Program Administrative Costs" are all costs associated with implementing LCFS-funded programs incurred by an EDU to pay for its staff, 3rd party implementers, non-incentive implementation costs (rebates processing, application verification, etc.) websites, application portals, and other direct program costs required to operate the program. EDU Program Administrative Costs do not include marketing, education and outreach costs.~~

[Updated term] "Clean Fuel Reward" is a statewide program established by EDUs to provide a reduction in price ~~on new light duty EV purchases or leases~~ for new and/or used commercial medium- or heavy-duty electric vehicles that are not subject to the High Priority and Federal Fleets requirements as specified in, title 13, California Code of Regulations, section 2015(a)(1) in California. The Clean Fuel Reward is funded exclusively through LCFS proceeds generated by EDUs from electricity fuel.

[New term] "Commercial vehicle" for the purposes of this program means any vehicle used by a business, public or governmental agency, or non-profit to carry people, property, or hazardous materials.²

~~"Rural Area" means a census tract with at least 75 percent of its population identified as rural non urban by the latest US Census data.~~

[New term] "Off road vehicle" is a piece of equipment that is moved over distances in order to transport goods or people from one physical location to another and is not primarily operated on roads established for automotive transport (e.g. fields, waterways, construction sites, airports, airways, etc.).

Recommendations for edits to the holdback program

5. *Restrictions on the Use of Holdback Credits.* Documentation of adherence to the following restrictions must be included in the annual report submitted pursuant to section 95491(e)(5)(A).
 - a. *Holdback Credit Equity Projects.* Effective January 1, 2022~~5~~, at least 75 percent in year one, 40 percent in year two, and 50 percent in subsequent years of holdback credit ~~proceeds~~ annual spending for large and medium investor owned EDUs and 50 percent of holdback credit annual spending for all other EDUs must be used to support transportation electrification for underserved individuals and

² HVIP FY22-23 Implementation Manual, Definitions, page 52 [HVIP-FY22-23-Implementation-Manual.pdf \(californiahvip.org\)](https://californiahvip.org)

communities. Any project from sections 95483(c)(5)(a)(i), (viii), or (xi) shall be considered a holdback credit equity project; all other projects described in this paragraph may be considered holdback credit equity projects provided they are for the primary benefit of or primarily serving disadvantaged communities and/or low-income communities and/or rural areas or low-income individuals eligible under California Alternative Rates for Energy (CARE) or Family Electric Rate Assistance Program (FERA) or the definition of low-income in Health and Safety code section 50093 or the definition of low-income established by a POU's governing body or a community in which at least 75 percent of public school students in the project area are eligible to receive free or reduced-price meals under the National School Lunch Program, or a community located on lands belonging to a ~~state and~~ federally recognizes California Indian tribe.

If an EDU fails to spend the required percentage on equity projects in a calendar year, the shortfall of spending, in dollars, will be added to their total equity spending requirement for the following year.

~~a.~~

~~b.~~ EDUs must use their holdback credits to implement additional projects that further transportation electrification efforts in California. Project costs may include incentives; infrastructure installation; administration; marketing, education, and outreach (ME&O); evaluation; and other cost categories as needed. Equity projects as defined in this paragraph must be selected from the options of projects listed in i-x below. Non-equity projects may be selected from the options on this list, or any alternative provided the EDU meets the requirements of 95491(e)(5) without further CARB approval. The large investor-owned utilities must implement at least three different holdback projects. Equity holdback project options are listed below: ~~These projects may include:~~

- ~~i.~~ Electrification and battery swap programs for school or transit buses.
- ~~ii.~~ Electrification of drayage trucks as well as other medium-, heavy-duty, or off-road vehicles including school and transit buses.
- ~~iii.~~ Investment in public EV charging infrastructure and EV charging infrastructure in multi-family residences.
- ~~iv.~~ Investment in electric mobility solutions, such as EV sharing and ride hailing programs.

- ~~v.~~ Multilingual marketing, education, and outreach designed to increase awareness and adoption of EVs and clean mobility options and including information about: the environmental, economic, and health benefits of EV transportation; basic maintenance and charging of EVs; electric rates designed to encourage EV use; and local, state, and federal incentives available for purchase of EVs.
- vi. *[Revised Subsection v. renumber as iii]* ~~Multilingual marketing, education, and outreach~~ community education events located within communities listed in 95483(c)(1)(A) designed to increase awareness and adoption of EVs and clean mobility options, and outreach in coordination with community-based organizations, including but not limited to neighborhood canvassing, community listening sessions, and needs assessments, focused in communities listed in 95483(c)(1)(A), to inform the development of projects and programs tailored to community needs. ~~including information about: the environmental, economic, and health benefits of EV transportation; basic maintenance and charging of EVs; electric rates designed to encourage EV use; and local, state, and federal incentives available for purchase of EVs.~~ Education and outreach do not include general marketing or advertising campaigns.
- ~~vii.~~
- ~~viii.~~ ~~iv.~~ Additional rebates and incentives ~~for low-income individuals~~ beyond existing local, federal and State rebates and incentives ~~including the Clean Fuel Reward~~ for: purchasing or leasing new or previously owned EVs; installing EV charging infrastructure in residences, including panel and service upgrades; ~~promoting use of public transit and other clean mobility solutions;~~ and offsetting costs for residential or nonresidential EV charging.
- v. Investing in, or promoting the ~~Promoting~~ use of, and additional incentives for use of public transit and other clean mobility solutions, via charging equipment or infrastructure for the following categories such as:

- I. EV sharing and ride hailing programs,
- II. Electrification of public transit and school buses, including battery swap programs, and
- III. Use or ownership of neighborhood electric vehicles, eBikes, eScooters, eMotorcycles, and other micromobility solutions.
- IV. Charging equipment or infrastructure for any of the above.
- vi. Re-skilling and workforce development for transportation electrification and electric vehicle infrastructure applications, developed in coordination with the California Workforce Development Board, ~~or~~ local workforce development agencies, a community-based organization, a California Community College, or a workforce strategy adopted by the Board of a POU.
- vii. Investments in grid-side distribution infrastructure necessary for ~~medium and heavy duty~~ EV charging.
- viii. Transportation Electrification projects that are identified in, or consistent with, a Community Emission Reduction Plan created in response to AB 617.
- ix. Support for vehicle-grid integration with projects such as:
 - I. Encouraging the optimization of EV charging through education in the following areas: peak demand, rate pricing, grid emergencies, potential power shutoffs, infrastructure deferral, renewable integration, and/or other signals and grid needs to provide grid and customer benefits.
 - II. Providing program incentives to encourage driver participation in monitored/managed charging, demand response, or vehicle-to-

load / vehicle-to- grid applications.

III. Supporting the deployment and installation of bidirectional charging equipment.

IV. Other innovative approaches to promoting and managing EV charging and discharging provide benefits to customers and the grid.

X. Hardware and software that decrease the cost of or avoid updates to infrastructure, including load management software or outlet splitting.

~~vii.~~xi. Alternatively, EDUs, in coordination with local environmental justice advocates, local community-based organizations, and local municipalities, may develop and implement other projects that promote transportation electrification in disadvantaged and/or low-income communities and/or rural areas or for low-income individuals. These alternative projects are subject to approval by the Executive Officer. Applications submitted to the Executive Officer must include, and will be evaluated for approval based on, a complete description of the project, demonstration that the project promotes transportation electrification in disadvantaged and/or low-income communities and/or rural areas or provides increased access to electric transportation for low-income individuals, and evidence that the project was developed in coordination with local environmental justice advocates, local community-based organizations, and local municipalities.

b. ~~*Additional Reporting Requirements for Holdback Credit Equity Projects.*~~ As part of annual reporting required pursuant to section 95491(d)(3)(A)5., EDUs must include a discussion on how their portfolio of holdback credit equity projects is consistent with the findings and recommendations of the SB 350 Low Income Barriers Study, Part B report prepared by CARB (rev. Feb. 2018), incorporated herein. This discussion must include, as applicable, a description of how the projects:

support increased access to clean transportation and mobility options; consider, and to the extent feasible, either complement or build upon existing CARB, other State, or local incentive projects to diversify and maximize benefits from statewide investments; demonstrate partnership and support from local community based organizations; and meet community identified clean transportation needs.

~~b. Other Holdback Projects. Holdback projects that are not specified in subsection 95483(c)(1)(A)6.a. must follow the requirements specified in 95491(e)(5). Below are examples of pre-approved uses for these other holdback credit proceeds:~~

~~i. Investments in grid side distribution infrastructure necessary for EV charging.~~

~~ii. Support for vehicle grid integration with projects such as:~~

~~I. Encouraging the optimization of EV charging through education in the following areas: peak demand, rate pricing, grid emergencies, potential power shutoffs, infrastructure deferral, renewable integration, and/or other signals and grid needs to provide grid and customer benefits.~~

~~II. Providing program incentives to encourage driver participation in monitored/managed charging, demand response, or vehicle to load /vehicle to grid applications.~~

~~III. Supporting the deployment and installation of bidirectional charging equipment.~~

~~IV. Other innovative approaches to promoting and managing EV charging and discharging that provides benefits to customers and the grid.~~

~~iii. Hardware and software that decrease the cost of or avoid updates to infrastructure, including load management software or outlet splitting.~~

b. Administrative Costs of Holdback Credit Equity Projects. With the exception of EDUs with annual sales of less than 2000 GWh, EDU Program administrative costs to support the ~~development and~~ implementation of holdback credit equity projects excluding start-up costs (those costs associated with setting up the program and incurred prior to issuing incentives), must not exceed 10.7 percent of total spending on holdback credit equity projects annually unless the EDU contracts with a community-based organization, and the exceedance is approved in advance by the Executive Officer. The request for administrative cost exceedance for a calendar year must be submitted by September 30th of the prior year. The request must include, and will be evaluated for approval based on, a complete description of the equity projects planned by the EDU, an estimate of total administrative costs relative to total spending on the projects, and evidence that the community-based organization is a non-profit organization focused on serving disadvantaged and/or low-income groups.

Within 30 days of receiving a request for higher administrative costs, the Executive Officer will inform the EDU of its decision in writing. If the request is rejected the Executive Officer will provide a rationale for the decision. If the rejection is due to insufficient information, the EDU may resubmit the request after addressing the deficiencies identified in the Executive Officer decision.

Recommended amendments on administrative cost

§95483(c)(1)(A)(4) Combined Administrative and marketing, education and outreach costs, excluding start-up costs (those costs associated with setting up the program and incurred prior to issuing rewards), to support any Clean Fuel Reward program funded by LCFS credit proceeds may not exceed 5.10 percent of LCFS credit proceeds contributed to the Clean Fuel Reward program annually, unless approved in advance by the Executive Officer.

§95483(c)(1)(A)(4)(a) A request to exceed 5.10 percent administrative and marketing education and outreach costs must be submitted by the administrator of the Clean Fuel Reward program to the Executive Officer by September 30 of the prior year.

Recommended edits to the definition of “Electrical Distribution Utility.”

§95481. Definitions and Acronyms

“Electrical Distribution Utility” means an entity that owns or operates an electrical distribution system, including:

- (1) a public utility as defined in the Public Utilities Code section 216 (referred to as an Investor-Owned Utility, or IOU); or
- A. “Large Investor-owned Utility” means an IOU with annual load served equal to or more than 10,000 25,000 Gigawatt-hours (GWh) in 2017 2022;
- B. “Medium Investor-owned Utility” means an IOU with annual load served of less than 10,000 25,000 GWh and equal to or more than 700 15,000 GWh in 2017 2022;

- C. “Small Investor-owned Utility” means an IOU with annual load served equal to or less than ~~700~~ 15,000 GWh in ~~2017~~ 2022.

or

- (2) a local publicly owned electric utility (POU) as defined in Public Utilities Code section 224.3;
- A. “Large Publicly owned Utility” means a California POU with annual load served equal to or more than ~~10,000~~ 15,000 Gigawatt-hours (GWh) in ~~2017~~ 2022;
- B. “Medium Publicly owned Utility” means a California POU with annual load served of less than ~~10,000~~ 15,000 GWh and equal to or more than 7005,000 GWh in ~~2017~~ 2022;
- C. “Small Publicly owned Utility” means a California POU with annual load served of less than ~~700~~ 5,000 GWh in ~~2017~~ 2022. Or
- D. (C) an Electrical Cooperative (COOP) as defined in Public Utilities Code section 2776

Recommended amendments for a new Small EDU program

[New provision – exact location TBD] §95483(c)(1)(A) XXXX Proceeds from non-opt-in EDU base credits that were allocated to the Large EDUs beginning with the deposit of Q2 2019 credits through the deposit of Q2 2024 credits and the transferred to the Clean Fuel Reward program pursuant to section 95483 (c)(1)(A) may be transferred by the Clean Fuel Reward Program Administrator to small EDUs opted in to the LCFS program by March 31, 2025. Any base credit proceeds reallocated in this manner must be spent by the recipient small EDU in accordance with sections 95491 (e)(5) and 95483 (c)(1)(A). The Executive Officer must approve the Clean Fuel Reward Program Administrator’s plan for distribution of previously unallocated base credit proceeds prior to any transfers.

Appendix B- CalETC Board's February 2024 Letter

February 20, 2024

Honorable Chair Liane Randolph and Honorable Board Members California Air Resources Board
1001 I Street
P.O. Box 2815
Sacramento, CA 95812

Re: Proposed Amendments to the Low Carbon Fuel Standard Regulation

Submitted to <https://ww2.arb.ca.gov/applications/public-comments>

Dear Chair Randolph and Honorable Board Members:

CalETC appreciates this opportunity to SUPPORT the Low Carbon Fuel Standard (LCFS) regulation and provide feedback for CARB Board member consideration. As discussed in detail below, CalETC largely supports the proposed draft regulation order ("draft order"), however, we are urging CARB to make some modifications to ensure that the utilities will be able to effectively administer the programs funded by LCFS proceeds. These changes are critical to ensuring the success of the LCFS program.

CalETC is a non-profit association committed to the successful introduction and large-scale deployment of all forms of electric transportation including plug-in electric vehicles of all weight classes, transit buses, port electrification, off-road electric vehicles and equipment, and rail. Our board of directors includes Los Angeles Department of Water and Power, Pacific Gas and Electric, Sacramento Municipal Utility District, San Diego Gas and Electric, Southern California Edison, Northern California Power Agency, and the Southern California Public Power Authority. Our membership also includes major automakers, manufacturers of zero-emission trucks and buses, developers and operators of charging stations and other industry leaders supporting transportation electrification. CalETC supports and advocates for the transition to a zero-emission transportation future to spur economic growth, fuel diversity and energy independence, ensure clean air, and combat climate change. This letter is submitted on behalf of the CalETC board of directors and covers issues specific to the utility interests in LCFS.

Over the past few years, the CalETC board has worked closely with the CARB LCFS staff to provide suggested amendments to the LCFS regulations. We appreciate the tremendous effort and accessibility of CARB staff during the extensive public process regarding this regulation.

I. Executive Summary of CalETC Utility Comments

CalETC requests specific changes to the draft order to ensure that the utilities will be able to effectively administer programs funded by LCFS proceeds. These changes include: (1) ensuring that the cap on administrative costs for both holdback programs and the statewide California Clean Fuel Reward (CCFR) program is clearly defined and set at a reasonable amount; (2) simplifying and clarifying the language in the proposed regulation pertaining to utility “holdback” (holdback) programs; (3) clarifying that Publicly Owned Utilities must spend 50% of holdback funds on equity projects, as opposed to 75%; (4) clarifying that San Diego Gas and Electric is a “medium-sized” utility under the regulation; (5) making edits to the regulation that will assist smaller utilities, potentially allowing them to participate in LCFS; (6) modifying the utility reporting requirements to better track deployment of funds to impacted communities, align with the reporting framework required by the California Public Utilities Commission (CPUC), and simplify reporting for smaller utilities; (7) requesting that the regulation allow the Executive Officer to approve certain modifications to the CCFR that can improve program responsiveness and efficacy; and (8) requesting implementation assistance on the Credit Clearance Market (CCM). All of these modifications are discussed in Section II, below.

CalETC supports many provisions in the draft order including, but not limited to: (1) the current program design with utilities generating the “base” LCFS residential credits; (2) the provision of more credits to the utility holdback programs; and (3) the establishment of a statewide medium-and-heavy-duty electric vehicle rebate program for new and used vehicles. A detailed description of the rationale behind CalETC’s support positions is included in Section III, below.

II. CalETC Requests the Following Important Changes to the Draft Order

CalETC respectfully requests that the following changes be made to the Draft Order:

(1) CalETC opposes the proposed 5% cap on administrative costs for both holdback programs and the statewide California Clean Fuel Reward and recommends that the cap remain at 10%

Based on how utilities currently track and report program administrative costs, the reduction of allowable administrative costs for utility holdback programs from 10% to 5% in the proposed amendments will make it extremely difficult, if not impossible, to administer these programs. Given their focus on addressing the most underserved individuals and communities, utility holdback programs are necessarily more expensive to operate than broad, unrestricted incentive programs given higher levels of customer support and additional expenses like income verification needed to ensure the funding is reaching the people that most need it. Additionally, smaller utilities may only be able to implement a portfolio of small programs that will never benefit from the economies of scale that larger programs achieve. While there is an option in the Regulation that allows the utilities to exceed the administrative cost caps with advanced approval from the Executive Officer, this is likely to create administrative challenges for CARB and utility staff if each utility must make a request each year that they expect to exceed the proposed 5% cap.

CalETC acknowledges, however, that there may be differences in how CARB Staff and the electrical distribution utilities (EDUs) interpret “administrative costs” as this is not a defined term in the Regulation. While CARB Guidance 20-03 does provide some insight into what might be considered administrative costs, it appears to be inclusive only of the utility’s administrative staff costs (salary, benefits, training, travel, etc.) and does not mention other program-specific costs that have typically been reported as “administrative costs” in past and current utility LCFS programs to CARB and the CPUC . These include critical program activities such as third-party administrative costs, rebate processing fees, applicant and income verification costs, website licenses and fees, and other direct, but non-incentive, program costs. It has been customary for the IOUs to report all these additional costs as “administrative costs” to both CARB and the CPUC in their annual LCFS reports based on the history of discussion in various CPUC Decisions and their experience with other customer programs.³

So, while it may be possible to implement utility Holdback programs with a 5% administrative cost cap under the narrow definition considered in Guidance 20-03, CalETC recommends that, with the exception of small EDUs that have annual electricity sales of less than 2000 GWh, the cap on equity holdback administrative costs should revert to 10% as allowed in the current Regulation, and that the definition should be expanded to include all associated program administrative costs, with the exception of start-up costs and education and outreach costs. Start-up costs, defined as set-up costs that occur before any incentives can be paid, are already excluded from the CCFR. Because costs before program launch are almost 100% administrative, it is nearly impossible to meet any administrative cap in the year a program is being set up. For small EDUs, CalETC proposes that they are not subject to a cap on administrative costs. To this end, CalETC has proposed a definition of EDU Program Administrative Costs in Appendix B that should be included in the Definitions and Acronyms section of the Regulation.

For small EDUs, CalETC proposes that they are not subject to a cap on administrative costs, or are subject to a higher cap, such as 20%. While Small EDUs are able to design and implement programs specifically tailored to their community needs, administrative costs for these EDUs may naturally result in a higher percentage of costs due to the small scale of programs and the utility’s limited staff resources, particularly if the definition of administrative costs is expanded. The 2000 GWh exemption makes sense as a natural break in utility sizes when looking at 2022 CEC data on total electricity sales. While there is a process for EO approval of administrative costs exceeding 10%, the process would place yet another administrative burden on small EDUs to go through the process annually and require additional LCFS Staff time. Furthermore, the process requires a contract with a community-based organization, which is limiting. Many small EDU equity projects incorporate partnerships and collaboration with a CBO without a formal contract.

To further illustrate how other program operating costs are different than the definition of administrative costs in Guidance 20-03, consider the investor-owned utilities (IOUs) energy efficiency program portfolios, which have administered billions of dollars of incentive funds

³ See D.14-12-083, D.20-12-027, and CPUC Resolution E-5015.

throughout the state with oversight from the CPUC, are operated under guidelines established in the Energy Efficiency Policy Manual⁴. As shown in the Table below, Appendix C of the Energy Efficiency Policy Manual lists the cost caps (hard requirements) and targets that the CPUC established for the operations of these programs.

Appendix C Table: Energy Efficiency Policy Manual APPENDIX C Cost Category Caps

Budget Categories	Cap	Target
Utility program administrative costs	10%	
Third-party / Gov't partnership administrative costs		10%
Marketing & outreach costs		6%
Direct implementation non-incentive (DINI) costs		20%
Evaluation, measurement & verification (EM&V) costs	4%	

In addition to being separate from ME&O costs, administrative costs, as defined in the Energy Efficiency Policy Manual, explicitly exclude third party implementer fees, and also exclude direct implementation non-incentive (DINI) costs (which include activities such as software licenses, rebate processing, contractor training, etc.). CalETC's request to expand the definition of administrative costs to include things such as third-party implementer costs and DINI costs while imposing a cap of 10% is more conservative than the requirements of the Energy Efficiency Policy Manual while still allowing the utilities the budgets needed to effectively operate their LCFS-funded programs.

CalETC has confirmed with CARB staff that ME&O costs for holdback are not included as part of administrative costs in any LCFS guidance document. In addition, as noted above, the CPUC does not include ME&O as part of administrative costs for other programs, including current LCFS programs. We recommend that ME&O should be excluded from administrative costs in the new LCFS regulation to reduce uncertainty and improve clarity. See Appendix B for our proposed amendments.

With this expanded definition of administrative costs, CalETC also recommends that the allowable cost cap for the statewide Clean Fuel Reward, which currently includes ME&O costs, be reverted to 10% from the 5% that is in the proposed regulation. While CARB Staff have expressed reasonable concerns that the potential size of the Clean Fuel Reward could allow for very large administrative and ME&O budgets, it should be noted that these same concerns were addressed when the CPUC authorized the utilities to implement the Clean Fuel Reward in 2019, finding that "a 10% cap of administrative funds is generally within the range of spending for other customer programs the utilities implement," and ordered SCE in Resolution E-5015 to "administer no more than 10% of the total Clean Fuel Reward program budget on administrative and marketing, education, & outreach spending, which must include all administrative spending related to the Clean Fuel Rewards program." The CPUC found that including ME&O in the 10% cap was reasonable for a program of this size; the potential scale of the Clean Fuel Reward is no larger today than it was in

⁴ Version 6 located at [6442465683-ee-policy-manual-revised-march-20-2020-b.pdf \(ca.gov\)](https://www.cpuc.ca.gov/6442465683-ee-policy-manual-revised-march-20-2020-b.pdf)

2019, and the same rationale should apply today. Further, we do not believe that either the Clean Fuel Reward or holdback programs will grow so large in the near term that the administrative costs will be too large. CARB will be doing another LCFS rulemaking in a few years and should closely monitor administrative costs and address if there is a problem.

Therefore, the proposed amendment's 5% cap should be rejected, and instead should revert to 1) the 10% allowable administrative costs for utility equity holdback programs, excluding startup costs and ME&O, as this is currently accepted by both CARB and the CPUC, 2) the 10% cap on allowable combined administrative and ME&O costs for the Clean Fuel Reward programs, as authorized in the current version of the LCFS Regulation and concurrent CPUC Resolutions, and 3) a more expansive definition of administrative costs that explicitly excludes ME&O should be added to the regulation. CalETC has provided recommended language for the relevant sections of the Regulation in Appendix B that implement these recommendations. Additional details on administrative costs should continue to be in an updated guidance document.

(2) CalETC recommends simplifying and clarifying the language in the proposed regulation pertaining to utility holdback programs

CalETC supports the staff's efforts to develop a recommended list in the proposed regulation of activities for holdback projects to make it easier for all stakeholders (e.g., the CPUC, CARB Staff, municipal utility governing boards, and utility program developers) to have a clear understanding of how CARB intends utility LCFS Holdback funds to be used. While we appreciate that many new project types have been included in the proposed amendments at the recommendation of CalETC and its members, several updates to the Holdback project list in the proposed amendments are needed for the sake of simplicity and to provide clarity on what is or is not considered a holdback equity project while also providing consistency of interpretation through the regulation itself.

The proposed amendments contain two lists: one which CARB Staff has indicated must be used for equity projects and another which are "good ideas" for non-equity projects. However, this makes it unclear if a utility could implement a project on the "equity" list – such as deploying charging stations at a multifamily property – as part of its non-equity project spending, and it also implies that a project on the "good ideas" list – such as optimized EV charging – could not be considered as counting towards a utility's equity spending requirements even if that project was directly reducing the energy bill of a low-income customer. Further uncertainty exists around the incentivization of medium- and heavy-duty (MDHD) vehicles: should projects supporting MDHD electrification only be considered equity projects if the vehicles are domiciled, or fueling located in, impacted communities, or always be considered equity projects since the pollutants from these vehicles disproportionately impact equity communities (i.e., disadvantaged rural, tribal and low-income communities) regardless of where they are domiciled or fueled?

CalETC recommends that the two lists be consolidated into one and that project spending be considered towards the utilities' equity allocation compliance requirements if it benefits the communities and individuals defined in the equity holdback section. To ensure that the utilities are only deploying projects that CARB supports for equity communities and individuals, CalETC

recommends that the single project list must be used for equity projects and may be used for non-equity projects in addition to other non-equity projects that further transportation electrification in California as defined by 95491(e)(5). This approach is more straightforward, minimizes opportunity for conflicting interpretations, and provides certainty on expectations around CARB's priorities while still allowing flexibility for utilities to propose non-equity programs that are best suited to their specific service areas and customers. CalETC also recommends that any project that furthers the deployment of electric MDHD vehicles be considered as an equity project, as the electrification of trucking almost always benefits low-income individuals and disadvantaged communities with criteria pollutant and GHG reductions even when the primary charging / ownership location is outside of the disadvantaged community, low-income community, tribal area, or rural area (See CalETC's comments on the definition of rural in bullet 8 below).

Additionally, CalETC recommends several smaller changes to the proposed regulation below with proposed amendments in Appendix B:

1. The regulation should include a requirement for large IOUs (SCE and PG&E in CalETC's comments below) to utilize their holdback credit revenues to fund a minimum of three program options as there are increasingly diversified needs in transportation electrification over large service areas. Including this requirement to fund a minimum of three program options will help ensure that the large IOUs consider the diverse needs of their customers and are not compelled by stakeholders to focus on a single project.
2. While we agree with the proposed regulation's deletion of broad-based ME&O (e.g., television and radio), the regulation, rather than Guidance Document 20-03, should clearly allow ME&O for specific projects.
3. The project list should explicitly allow for upgrades to electric panels, which are prerequisites to transportation electrification for many customers living in older buildings that have not had recent updates. Upgrades to panels can have other benefits but are primarily to enable transportation electrification.
4. For simplicity and clarity, the project list should be consolidated on the recommended projects for electric mobility solutions as there are two list items that appear to overlap regarding mobility alternatives.
5. The project list should preserve a narrowly focused project category for direct multilingual education and outreach serving equity communities. The preservation of this category is not intended to include general marketing or advertising. It is only intended to allow for multilingual education and outreach to equity communities.
6. The list of agencies that may be consulted in the creation of workforce development projects should be expanded to include other pertinent entities, such as California Community Colleges, community-based organizations, and publicly-owned utilities (POUs) Governing Boards.
7. CalETC thanks CARB Staff for harmonizing the definitions of equity communities and individuals in the proposed amendments with those detailed in AB 841 and CPUC Decision D.20-12-027. However, the language requires a slight modification. AB 841 defines this as

"a community located on lands belonging to a federally recognized California Indian tribe."⁵ The proposed amendments include "state and federally recognized".

8. The definition of "rural" needs to be updated as the U.S. Census Bureau no longer reports rural percentages for census tract population. The Census Bureau now defines rural as "all population, housing, and territory not included within an urban area."⁶
9. "Off Road Vehicle" should be defined for clarity because it is not obvious that vessels, aircraft, and other transportation qualify under that term. CalETC has provided recommended edits to this section of the proposed amendments in Appendix B to this letter.

(3) CalETC requests clarification that POUs must spend 50% of holdback funds on equity projects, as opposed to 75%

CalETC notes a discrepancy between the proposed LCFS requiring 75% of holdback funds for equity projects compared to Appendix E "Purpose and Rationale for Low Carbon Fuel Standards Amendments," which calls for 50% for POUs. We recommend that POUs have a 50% requirement for equity holdback. We understand there are almost 30 POUs that have opted into LCFS and potentially another fifteen could opt in. The POUs are very diverse and represent specific and limited territories within the State, with a wide variety of populations, EV densities, rural/urban splits, percentages of DACs and community needs. POUs are also uniquely in tune with local needs. Designing and implementing effective transportation electrification programs for low-income, rural and/or disadvantaged communities can be challenging, and the uptake and timing of projects is difficult to predict. In addition, there will be natural fluctuations in program spending year-to-year, and an annual requirement of 50% allows for better planning to maximize the impact of equity spending. In addition, we recommend the 50% equity requirement for the three small IOUs (instead of the 75% in the proposed LCFS). These small IOUs are not opted into LCFS, and a 75% equity holdback requirement creates practical challenges at start up that make it difficult for them to opt-in to LCFS.

(4) CalETC requests clarification that San Diego Gas and Electric is a "medium-sized" utility under the regulation

CalETC notes that the regulatory package has conflicting information regarding the size of San Diego Gas and Electric (SDG&E) and its requirements under CCFR and holdback programs. Specifically, in *Appendix E: Purpose and Rationale of Proposed Amendments for the Low Carbon Fuel Standard Requirements*, CARB staff states, "San Diego Gas & Electric is re-defined to have a comparable contribution to the statewide program to similarly sized public utilities." However, this change is not in the proposed regulation. In discussion with CARB staff, we understand that they intend to categorize SDG&E as the same size as Los Angeles Department of Water and

⁵ Bill Text: CA AB841 | 2019-2020 | Regular Session | Amended | LegiScan at 1601.(e)(5)

⁶ See <https://www.census.gov/programs-surveys/geography/guidance/geo-areas/urban-rural.html>

Power based on their similar total 2022 electricity sales (annual GWh). CalETC supports these two utilities having the same contribution to the CCFR in the final LCFS, as their size is very similar, and SDG&E is substantially smaller than the two large IOUs. This change will allow SDG&E to have more meaningful holdback programs.

CalETC may have further comments on the definition of EDUs based on annual GWhs in the future, as we understand that staff plans to propose amendments to these definitions (e.g., improved data, new thresholds for large, medium, and small EDUs) in an upcoming 15-day comment period.

(5) CalETC requests edits to the regulation that will assist smaller utilities, potentially allowing them to participate in LCFS

CalETC requests the LCFS include a program to encourage small EDUs who have not opted-into LCFS to do so and expand programs by small EDUs who have recently opted in. There are over 50 EDUs in California, and we understand from staff that about thirty have opted in to LCFS. Our proposal would support approximately twenty small rural utilities who cover about one percent of California.

We propose that the LCFS have new regulatory language that allows the CCFR Steering Committee to work with the Executive Officer to design one-time grants to incent the small, mostly rural EDUs that have not yet opt into the LCFS to opt-in and also to provide additional funding to EDUs that have recently opted in. The goal of the program would be to have almost all California utilities participate in the LCFS and provide holdback programs to provide better coverage in underserved areas.

Specifically, we request funding for our recommended program to come from funds that non-opt in EDUs have been providing to the CCFR since 2020 per Section 95486.1 (c) (1) (A) paragraph 2.⁷ Our informal survey of these small EDUs found that they often only have a handful or a few hundred EVs which is not enough to justify a program. Under our proposal, a start-up grant would be enough for a small EDU to start or expand a basic program to help their customers and CARB would provide approvals and oversight to the CCFR Steering Committee and Program Administrator. Our recommended amendment is in Appendix B.

(6) CalETC requests the regulation modify the utility reporting requirements to better track deployment of funds to impacted communities, align with the reporting framework required by CPUC, and simplify reporting for smaller utilities

CalETC appreciates the areas where CARB Staff have made efforts to harmonize the regulatory and reporting requirements of the LCFS Regulations with other regulatory bodies, such as the CPUC. One such area was increasing the equity allocation requirement of utility Holdback

⁷ All base credits for any EDU that is not eligible to receive base credits pursuant to this provision will be allocated to the Clean Fuel Reward program pursuant to section 95486.1(c)(1)(A) paragraph 2.

programs for the Large IOUs from 50% to 75%. Yet, while increasing the equity requirement to 75% appears to align with the CPUC's requirements in D.20-12-027, CARB and the CPUC currently measure this metric in very different ways. CARB counts percent of proceeds earned in a calendar year, which was clarified by guidance document 20-03 to include percent of proceeds either spent or encumbered (i.e., budgeted or set aside) to an equity program. The CPUC, however, counts spending that occurs during the calendar year, regardless of when the credits were earned. This is subtle but, as a result, the IOUs are often reporting entirely different data to demonstrate compliance to each agency in their annual reports⁸.

Tracking compliance against the percentage of annual proceeds creates many operational difficulties. For example, if the combination of on-road EV charging and credit prices-- both of which are beyond the utilities' control -- evolve over a year such that a utility generates double the proceeds it expected to generate, then a utility may be faced with two options to maintain compliance based on percent of annual proceeds: double the spending of its in-market programs or encumber those funds, without actually spending them, in some combination of those programs. The first may not be practical as it is difficult to increase operational capacity of a program in real time; the second achieves compliance but it does not necessarily allow the utility to assess where it should best allocate its holdback funds in the coming calendar year as they will have been encumbered to a specific program for the sake of compliance.

Tracking on how LCFS proceeds are actually returned to Californians, is a more effective metric to track how LCFS dollars actually flow to benefit underserved communities over time and is consistent with the metric used by the CPUC to ensure compliance⁹. However, in recognition that the balance between equity and non-equity spending may necessarily vary in a given year, the regulation should specify that any "underspend" in annual equity spending will carry over to the next calendar year(s) in the form of increased equity spending requirements.¹⁰ The recommended language has been provided in Appendix B as part of the updates to the holdback program section.

Compliance based on spend, when coupled with the rollover of any "underspending" on equity in a given year, also helps smaller utilities, by providing an option, to save up holdback proceeds for several years to accumulate a large enough bank to implement a program without "pre-deciding" how to allocate their funds into a program until they are ready to spend them, in addition to the option of saving up for large equity spending projects through the rollover provision. Further, compliance based on spend makes it easier to account for the reality of utility programs, which often have both equity and non-equity recipients, as the utilities can simply report how much of the annual spend went to each type of recipient in a calendar year, rather than managing set asides in intra-program budgets.

⁸ See Decision D.14-12-083 Ordering Paragraph 4, requiring reporting on annual expenditures.

⁹ Decision D.20-12-027 Ordering Paragraph 1

¹⁰ For example, if a large IOU spent \$10 million in one year, \$7.5 million of that would be required for equity. However, if only \$7 million was spent on equity (70%), the \$500,000 underspend would be added to the following year's compliance such that they would need to spend 75% plus \$500,000.

Therefore, CalETC recommends that the utility holdback project equity allocation requirements be updated to percent of annual spend rather than percent of annual proceeds. Further, CalETC proposes that if a utility underspends on equity projects in a given year, the amount that it underspends will be carried forward to the next year. This aligns the LCFS Regulation's requirements with the obligations that the CPUC has already placed on the IOUs, improves tracking of how LCFS funding is actually being deployed into impacted communities, and simplifies accounting for CARB, CPUC, and utility staff. CalETC has proposed language that would implement these recommendations in Appendix B to this letter as part of its other recommendations for updates to the holdback section.

(7) CalETC requests that the regulation allows the Executive Officer to approve certain modifications to the CCFR that can improve program responsiveness and efficacy

The LCFS is a powerful tool for incentivizing the adoption of low carbon technologies to support the technologies called for in the 2022 Scoping Plan. Because the Scoping Plan calls for the adoption of new zero emission technologies, the LCFS regulatory framework must allow for some flexibility in response to changing market conditions and needs. As such, CalETC respectfully requests that the final regulation allow the Executive Officer to make modifications to the electricity provisions of the LCFS, including the ability to add tools other than rebates or new technologies (such as financing assistance) to the statewide Clean Fuel Reward program if requested by the Clean Fuel Reward Steering Committee. CalETC also respectfully requests that such exception requests from the Executive Officer be handled expeditiously, and staff be adequately resourced to handle these exceptions.

(8) CalETC requests implementation assistance on the Credit Clearance Market (CCM)

CalETC's members include large EDUs who will be impacted by the CCM. We respectfully ask for a guidance document (or, if appropriate, a user guide or FAQ) on the mechanics of the CCM. For example, what do deficit/credit holders functionally do once a CCM / Advanced Crediting phase is declared? Also, given the proposed increase from ten million to thirty million credits in the CCM, we request further discussion regarding possible practical issues down the road if only a small number of EDUs are trying to transact such a large volume in a mandatory compressed timeframe.

III. CalETC largely supports the proposed order

CalETC applauds CARB's efforts to amend this important and complicated regulation. In particular, CalETC supports the following provisions of the proposed order:

(1) CalETC supports the continued allocation of base residential charging credits to the electric distribution utilities (EDUs) which fund important statewide and individual utility programs

CalETC strongly supports the continued allocation of the residential base credits generated by electricity used to fuel electric vehicles to the electric utilities. This is appropriate and leads to the most efficient, equitable, and market-stimulating distribution of the proceeds.

1. *The utilities are subject to extensive regulatory oversight, ensuring that the proceeds are spent in a manner that aligns with the state's goals.*

The electric utilities are subject to extensive reporting and compliance requirements, ensuring that the distribution of LCFS proceeds is open and transparent. Furthermore, the utilities have a duty to serve all customers, including populations that have been slower to adopt EVs including those residing in disadvantaged communities (DAC), low-income renters and multi-unit dwellings (MUD). Residents of DACs and MUDs are utility customers, and as such the utilities are incentivized to assist those customers in transitioning to electric transportation. The electric utilities can use the proceeds gained from base residential credits to establish holdback programs that enable charging at MUDs, for renters, and in equity communities. Similarly, utilities can leverage credits generated across the entire customer base to fund programs incentivizing adoption in DACs and low-income communities. Utilities are the only entity able to use credits generated from residential light-duty EV charging to support heavy-duty or off-road vehicle electrification, an increasingly urgent issue in decreasing the transportation sector's air pollution and greenhouse gas emissions.

California's electric utilities are uniquely positioned to support and enable additional load from electric vehicles because electric vehicle load is flexible and when used off peak makes more efficient use of the electric system which puts downward pressure on electric rates for all other customers. Because of this, California's electric utilities are the only entities that have the primary goal of ensuring accessible infrastructure and affordable electricity, making them uniquely positioned to receive and manage base residential credits.

2. *The electric utilities have been a long-time partner in the state's decarbonization efforts and are by definition located in California.*

Unlike other entities, the electric distribution utilities (EDUs) must always be located locally, within California, to provide a critical and essential service. The size of utilities varies dramatically, with the larger utilities having the staff and resources necessary to work cohesively with the other EDUs to efficiently run statewide programs. Some examples of efforts to collectively enable market transformation include programs in energy efficiency, renewable energy and most recently, the California Clean Fuel Reward. The utilities are equipped to handle the very large-scale proceeds generated by the LCFS. They are experienced, efficient administrators and have a long history of designing large-scale, stable successful programs and have shown they can quickly implement statewide and individual utility programs.

Additionally, all Californians have an electric utility provider and are used to working with their utility to support their energy needs. This name recognition and familiarity is necessary for getting reluctant customers to adopt new technologies. Finally, the electric utilities have provided service to their customers for decades and will continue to serve their territories for

many decades to come, providing the stability needed to positively contribute to the wholesale market transformation required by the switch to electrified transportation.

3. *Electric utilities are able to implement programs that address the needs of all aspects of electric vehicle adoption and at the scale needed to support CARB's scoping plan.*

Unlike other important players in the electric vehicle industry, electric utilities can administer programs involving all aspects of the transportation electrification ecosystem. The utilities can provide rebates for chargers, rates designed to incentivize adoption, vehicle incentives, grid upgrades to support increased beneficial electrification, and have decades of experience implementing programs targeted to benefit lower-income and disadvantaged customers. Having the ability to address all aspects of electric vehicle adoption allows for flexibility in how the money is spent. Furthermore, a properly designed program can afford the utilities the ability to act quickly and to adjust program design when external factors change. This is increasingly important as state, local and federal funding sources and tax breaks tend to shift over time.

Electric utilities also provide service to all electric vehicle segments and classes. The utilities serve light, medium- and heavy-duty vehicles, individually owned vehicles, last-mile vehicles, and fleets. With the increase of electrification, upgrades to the electric grid will be necessary. Utilities will need information about the location of all electric vehicles so that they can adequately upgrade the grid and provide vehicle/grid integration services. Finally, serving all vehicle classes allows the electric utilities to provide programs for both the light-duty and medium-and-heavy-duty sectors. This allows the utilities to utilize the funding from the sectors that are first to electrify (light-duty) to incentivize and support the sectors that are harder to electrify (e.g., medium-and-heavy-duty).

Allowing the utilities to receive the residential base credits also supports individual utility programs which are necessary for meeting local needs and hard-to-reach markets such as medium- and heavy-duty EVs, off-road EVs and infrastructure for renters (homes, apartments, etc.) that are identified in the Scoping Plan, Advanced Clean Cars, and Advance Clean Fleets. Individual utility programs can be nimble and respond to the complex, ever-changing incentive landscape for EV and infrastructure incentives.

4. *Keeping the current structure prevents a complicated system where both utilities and non-utilities receive base residential credits.*

The current structure supports large-scale, statewide programs linked to the State's equity and climate goals. Diluting the credits coming to utilities makes both individual utility and large-scale statewide programs very difficult to implement and harder for CARB to regulate. Also, the current structure enables and funds active utility involvement, especially for small POUs, and encourages more small EDUs to join LCFS and create custom programs to support their customers. The current LCFS is a well-crafted system that allows site-hosts, automakers, charging providers and utilities to all receive LCFS credits.

CalETC also supports the proposed provision requiring entities “generating credits from electricity to use all credit proceeds to further transportation electrification efforts in California and include in their annual compliance report an itemized summary of efforts and costs associated with meeting this requirement.” Ensuring that all the proceeds from the electricity LCFS credits are put back into programs and projects that incentivize the adoption of transportation electrification is essential to effectuating the goals of CARB’s Scoping Plan.

(2) CalETC supports staff’s proposal for EDUs to spend more of their LCFS proceeds on holdback programs

Under the proposed order § 95483(c)(1)(A)(2), the required contribution to CCFR and remaining allocation to holdback programs would be changed as follows:

EDU Category	Holdback Allocation (%)	
	Proposed	Previous
Large Investor-owned Utilities	50	33
Large Publicly Owned Utilities	75	55
Medium Investor-Owned Utilities	75	75
Medium Publicly Owned Utilities	90	75
Small Publicly Owned Utilities and Small Investor-owned Utilities	100	98

CalETC strongly supports these changes, with the exception discussed above regarding San Diego Gas and Electric. Funding from base residential credits for holdback programs and CCFR are directly linked. With the proposed regulation increasing holdback funding percentages, the percentages allocated to the CCFR will decrease. This change is appropriate because the proposed CCFR is for the much smaller market of medium- and heavy-EVs vs. the larger light-duty market in the current CCFR.¹¹ Similarly, removing very small EDUs from contributing to the CCFR is appropriate because a two percent contribution is not meaningful and results in administrative inefficiencies for both the CCFR Program Administrator and the very small EDUs.

(3) CalETC supports the proposed shift in the California Clean Fuel Reward (CCFR) from being a reduction in the purchase or lease price of new light-duty electric vehicles (EVs) to being a reduction in the purchase or lease prices of new electric medium- and heavy-duty EVs

CalETC supports CARB’s proposed amendments that will transition the statewide Clean Fuel Reward program from an incentive for all new passenger EVs to one that will support the adoption of electric MDHD vehicles in the coming decade. We also agree that the new Clean Fuel Reward

¹¹ The California Energy Commission anticipates that the adoption of medium- and heavy-duty vehicles as follows: 27,000 by 2025, 155,000 by 2030 and 377,000 by 2035. See Assembly Bill 2127 Second Electric Vehicle Charging Infrastructure Assessment Revised Staff Report.

should be in line with the needs of CARB's Scoping plan - and primarily benefiting equity communities - and believe the new proposal¹² achieves this goal. However, as the Clean Fuel Reward Program Administrator (SCE) has commented, minor updates to the vehicle eligibility in the proposed amendments are needed to ensure that that new Clean Fuel Reward program can effectively implement CARB's ambitious plans for the commercial vehicle sector.

For example, in *Appendix E: Purpose and Rationale of Proposed Amendments for the Low Carbon Fuel Standard Requirements*, CARB Staff states that the "Clean Fuel Reward will change from a universal new light-duty EV rebate to be focused on new and used rebates for medium- and heavy-duty trucks." However, the proposed amendments define the Clean Fuel Reward as applying only to new vehicles. CalETC believes that "used" was accidentally omitted from the proposed amendments and has provided recommended language that includes used vehicles in Appendix B to this letter.

Additionally, CalETC is concerned that definitions for medium-or-heavy duty vehicle in the proposed amendments do not necessarily align with CARB's stated intentions. Defining these solely by weight class, as the current proposed amendments do, means that the Clean Fuel Reward program may be required to provide incentives for all vehicles that have a GVWR greater than or equal to 8,501, which includes many passenger vehicles such as the Rivian line of products, the extended range Ford F-150 Lightning, the electric Chevrolet Silverado, and the electric Hummer to name a few. Based on CARB Staff's published rationale, CalETC believes these vehicles should be incentivized by the Clean Fuel Reward only if they are purchased for use as commercial vehicles. CalETC agrees with the Program Administrator's proposal that the definition of Clean Fuel Reward be updated to specify that it is for commercial vehicles only, and the Regulation should also include a definition for commercial vehicle in the Definitions and Acronyms section for clarity and completeness. For consistency, CalETC proposes that the LCFS Regulation adopt the same definition for commercial vehicles utilized by the Hybrid and Zero-Emissions Truck and Bus Voucher Incentive Project (HVIP). Both these definitions are included in Appendix B to this letter, and CalETC believes that these minor modification to the proposed amendments will empower the new Clean Fuel Reward program to be a vital tool in the state's efforts to decarbonize heavy-duty trucking.

¹² "Clean Fuel Reward" is a statewide program established by EDUs to provide a reduction in price on new light-duty EV purchases or leases for new medium- or heavy-duty electric vehicles that are not subject to the High Priority and Federal Fleets requirements as specified in, title 13, California Code of Regulations, section 2015(a)(1) in California.

CalETC appreciates the opportunity to provide comments on this important regulation. If you have any questions, please do not hesitate to contact me at any time.

Best,

A handwritten signature in dark ink, appearing to be 'LR', with a long horizontal flourish extending to the right.

Laura Renger
Executive Director

cc: Rajinder Sahota
Matthew Botill
Jordan Ramalingam
Jacob Englander

Comment Log Display

Here is the comment you selected to display.

Comment 104 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Bruce
Last Name	Hata
Email Address	bruhabox-carb@yahoo.com
Affiliation	
Subject	LCFS Credits Affecting Light Duty Hydrogen Stations

Comment

104.1

I am merely a fuel cell EV owner and, unfortunately, the technicalities of the LCFS rules are over my head. However, I do understand that the current regulations are the cause of the high prices at the light duty hydrogen stations as well as the pause/stoppage in the construction of new stations.

I have been one of the lucky few FCEV drivers over the past 6-1/2 years who have been able to ride the ups and downs of the hydrogen infrastructure. There were slow improvements and expansion being made, but it wasn't until the price of hydrogen increased did the sales of FCEVs start to drop as well as the stoppage of station construction. I am now very concerned that without changes to the LCFS regulations the expansion and improvements made since 2015 will all be for naught and light duty hydrogen stations will not survive.

Please do not throw away all the work of the past 10+ years. Please do not emphasize heavy duty stations over light duty stations as both are important. Please do not let bio-diesel or any other renewable carbon producing fuels overthrow the future of a truly clean fuel that is hydrogen.

Regards,
Bruce Hata

Attachment

Original File Name

**Date and Time Comment Was
Submitted**

2024-08-27 13:41:02

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

August 27, 2024

California Air Resources Board
1001 I Street
Sacramento, CA 95814
Via Online Submission

Comments on Proposed Low Carbon Fuel Standard Amendments

Dear California Air Resources Board (CARB) Low Carbon Fuel Standard Program Staff:

Thank you for the opportunity to provide comments in response to the proposed amendments to the Low Carbon Fuel Standard.

As background, Oberon is an innovative California company founded in San Diego 13 years ago with a focus on decarbonizing the global LPG/propane industry while laying the foundation for renewable hydrogen. We are accomplishing this today by producing renewable dimethyl ether (DME) at our Brawley, California production facility. Oberon's rDME® brand fuel can be made from various in-state waste streams (*e.g.*, dairy manure biogas, waste water treatment biogas), which can enable smaller, often stranded, biogas suppliers to participate in the LCFS program and produce low carbon DME.¹ Oberon's rDME fuel can reduce the carbon footprint of transportation when used as a: 1) blending agent with Liquid Petroleum Gas (LPG)/propane; 2) hydrogen carrier to power the growing fuel-cell electric vehicle and stationary source market; and 3) diesel substitute. This range of creative applications that clean fuels, such as DME, can support is underscored in the 2022 Scoping Plan Update—DME along with other clean alternatives to petroleum are a key part of the solution for the state to reach its legislatively-mandated greenhouse gas reduction targets.

Responses to Draft Amendments

Oberon supports the proposed amendment package and appreciates the significant efforts that have gone into developing these changes. In the 'Other Comments' section below we offer suggestions for further clarity where the proposed amendments may benefit from a more fulsome consideration of rapidly developing technology and commercial practices.

We also express our gratitude for your engagement and support for DME and we note with pleasure the inclusion of DME on *Table 4. Energy Densities and Conversion Factors for LCFS Fuels and Blendstocks*.

¹ The California Air Resources Board has estimated dairy biogas-based DME made by the Oberon process has a carbon intensity of -278. rDME® is a trademark of Oberon Fuels, Inc.

Other Comments

- **Carbon Intensity (CI) Benchmarks**

105.1 Oberon strongly supports the increased stringency to a 9% carbon intensity reduction in 2025 from the 5% originally proposed in the 45-day package. This adjustment reflects a necessary step toward more robust climate action. This single adjustment will translate into millions of additional tons of GHG emission reductions and act as a supportive market signal for new clean fuel projects that have been or are being constructed to bring more clean fuels to market.

105.2 Additionally, we commend CARB for the inclusion of the Auto Acceleration Mechanism as a forward-thinking measure to ensure the program's dynamism. The AAM is a necessary compliment to the CI target adjustment and as designed, will send a clear, supportive, and unambiguous market signal to continue investments in clean fuels by tightening the program in the event overperformance occurs. Adoption and implementation of this mechanism will ensure that potential emission reductions are not left on the table and will help California reach its climate goals faster if triggered.

- **Avoided Methane Crediting**

105.3 Oberon strongly supports the inclusion of avoided methane crediting in the proposed changes. Avoided methane emissions are a critical part of science-based life cycle assessments, and their inclusion in CI scores is consistent with internationally recognized standards of carbon accounting. While we understand CARB's intention is to better align the proposed end dates for avoided emission pathways with its mobile source regulations focused on transitioning to electric vehicles, we are concerned about CARB's proposed limitation on the number of crediting periods for avoided methane emissions projects, reducing it from three to two consecutive 10-year periods for pathways breaking ground before January 1, 2030. This change negatively impacts these projects, particularly those that are already in development or near completion that were funded with the expectation they would be eligible for up to three 10-year crediting periods. The reduced crediting period could undermine the financial viability of these initiatives, which rely heavily on LCFS credits to justify the significant investments required. We urge CARB to reconsider this reduction, as it may inadvertently discourage the development of methane mitigation projects that are crucial to achieving California's climate goals. Instead, maintaining the original structure of three crediting periods for these projects would provide the necessary support to ensure the long term viability of these projects and their continued contribution to reducing greenhouse gas emissions.

- **Sustainability Requirements – Biomass for a Feedstock or Process Fuel**

105.4 We appreciate CARB's commitment to ensuring that forestry biomass projects are conducted in an environmentally responsible manner, contributing to both forest health

and the state's climate objectives. As industry continues to advance in this area, we believe it is essential to consider the progress made in sustainable forestry practices over recent decades, which has laid a strong foundation for the responsible utilization of forestry biomass.

The proposed definitions notably narrow the scope of feedstock material availability by excluding industrial lands, which remain undefined, and limiting the sources of material to those derived solely from fuel reduction or restoration projects. These terms, "fuel reduction" and "restoration projects," are themselves undefined, further complicating their application. By excluding other silvicultural treatments, the proposed language unnecessarily restricts the types of forest management practices that can contribute to low carbon fuel production. The added restrictions provide no incremental benefits, particularly in light of the new sustainability provisions CARB is proposing.

Section 95488.9(g), originally designed to ensure the sustainability of crop-based fuels, has been expanded to cover a wider range of waste biomass. While these requirements are suitable for purpose-grown crops, they are not applicable to agricultural or forest residues, where the feedstock is a waste product and fuel producers have no control over crop growing practices. Applying the same standards to agricultural or forest residues as to purpose-grown crops could hinder the production of fuels from these residues. The proposed rules could also restrict the use of previously approved waste feedstocks for process heat in biofuel production unless they can be proven to originate from certified sustainable operations.

- **Book-and-Claim – RNG Deliverability**

105.5

We recognize and appreciate CARB's efforts to enhance the integrity and accuracy of the proposed RNG deliverability requirements, consistent with RPS eligibility rules. While we support the intent behind these changes, we have concerns regarding the potential impact on investment in RNG projects under the proposed framework for *Book-and-Claim Accounting for Pipeline-Injected Biomethane Used as a Transportation Fuel or to Produce Hydrogen*. Particularly, the language concerning "if the Executive Officer approves a gas system map by July 1, 2026", as this proposal introduces a level of uncertainty that poses challenges for stakeholders considering investments in RNG projects. The lack of clarity on which pipelines will meet the new criteria until the map is finalized creates a precarious environment for project developers and investors, who require certainty and predictability to commit substantial resources.

This uncertainty could inadvertently disincentivize investment in RNG projects, as stakeholders may be reluctant to move forward without a clear understanding of directional flow-based deliverability requirements. Such ambiguity could stall progress in expanding RNG production, which is essential for meeting California's ambitious climate goals. We highly encourage CARB to provide more immediate and transparent guidelines coupled with a transparent public process to provide investors the confidence

needed to continue supporting RNG development in the state. We look forward to discussing these provisions with CARB staff in the coming year and highly encourage CARB to conduct a full and transparent public process to inform any gas maps the Executive Officer may consider.

- **Renewable Hydrogen Proposed Definition**

105.6

The 15-day changes propose an updated definition to “Renewable Hydrogen”. We specifically wish to comment on the language in item (2) which identifies “steam methane reforming of biomethane or other renewable hydrocarbons” as a qualifying process. While we support the explicit inclusion of “other renewable hydrocarbons”, we believe that this definition should also include renewable oxygenates, such as renewable DME, which serve the same function and purpose as renewable hydrocarbons in the production of renewable hydrogen via steam reforming. To better reflect the versatility of renewable feedstocks used in renewable hydrogen production, we recommend that CARB amend the language to include renewable oxygenates. For example, the phrase could be revised to “steam methane reforming of biomethane or other renewable hydrocarbons or oxygenates” or “steam methane reforming of biomethane, renewable hydrocarbons, or renewable oxygenates”. This change would ensure that the definition accurately reflects the range of renewable sources that can be used with steam reforming technologies to maximize renewable hydrogen production, while promoting technology neutrality and innovation in hydrogen production technologies.

- **Credit True-up**

105.7

Oberon strongly supports CARB’s proposal to expand the LCFS credit true-up provisions to include periods using temporary pathway CIs after annual verification. This is a highly positive change, particularly for projects that operate with conservative, temporary CI scores. By allowing these projects to reconcile their credits based on verified CI data, this helps to protect the financial viability of low carbon fuel projects by allowing them to recover lost value that might otherwise be forfeited due to conservative early reporting. Moreover, it promotes greater accuracy and transparency in the program, ensuring that stakeholders are rewarded based on their true environmental performance. This adjustment ultimately strengthens the LCFS program by fostering a more accurate and equitable system. We commend CARB for recognizing the importance of this adjustment and for taking steps to support the integrity and financial viability of renewable fuel projects. The proposal also includes true-up provisions that adjust credits based on verified operational CIs relative to certified CIs, applying a penalty of four times the spread for shortfalls. However, the justification for this 4X multiplier is unclear, as a smaller multiplier, such as 2X, would still effectively discourage overconfidence in CI analysis.

- **Stakeholder Engagement – Source Specific Feedstocks**

105.8

While we sincerely appreciate the efforts CARB has made in developing the proposed changes, we are concerned about the inclusion of several items in the proposed changes that were not previously discussed or evaluated with stakeholders. Specifically, CARB failed to hold a workshop to address the complexities associated with forest biomass during this rulemaking process. This significant change to eligible forest biomass was included in the 15-Day Changes (i.e., §95488.8(g)(1)(A)(3) and §95488.9(g)) without the benefit of stakeholder engagement, in stark contrast to CARB's long-standing transparent approach when considering amendments to the LCFS as well as other regulations.

To maintain the integrity of the rulemaking process and ensure that final regulations are both effective and equitable, we strongly urge a review of these changes with a focus on promoting environmentally sustainable practices in the management of industrial forests. Limiting source-specified forest biomass feedstock to "non-industrial forestlands" could inhibit the use of these materials from a fate of productive use as a renewable feedstock, where the alternative is destruction or disposal. Waste and residues from industrial forestlands play a critical role in providing the reliable long-term supply agreements necessary for biofuel project success.

Proper review to allow for the necessary scrutiny and input that these proposed items deserve will ensure the final rule is based on robust data and stakeholder consensus. It is imperative that stakeholders have the opportunity to thoroughly review and provide feedback on such changes, particularly those that could have significant implications. As noted above, transparency and stakeholder engagement have always been cornerstones of California's environmental policy success, and it is critical that this process upholds those values to sustain the credibility and effectiveness of which the program is built upon and globally regarded for.

Recommendations for Future Action

Oberon encourages CARB to ensure there continues to be a market for low-CI liquid and gaseous fuels as they are an important decarbonization tool, especially in sectors that are hard to decarbonize. Oberon recommends that CARB send a clear policy signal that biofuels (e.g., biomethane, renewable propane, renewable DME) are necessary and effective decarbonization strategies in these other sectors (e.g., residential, commercial, industrial) and are fundamental to the state meeting its ambitious GHG reduction targets.

As the state transitions out of combustion in the transportation space gaseous and liquid fuels will continue to support the industrial, commercial, and residential sectors with escalating pressure to drive down GHG emissions. One approach for doing so is stronger signals and incentives for the production and use of low-CI fuels in those sectors.

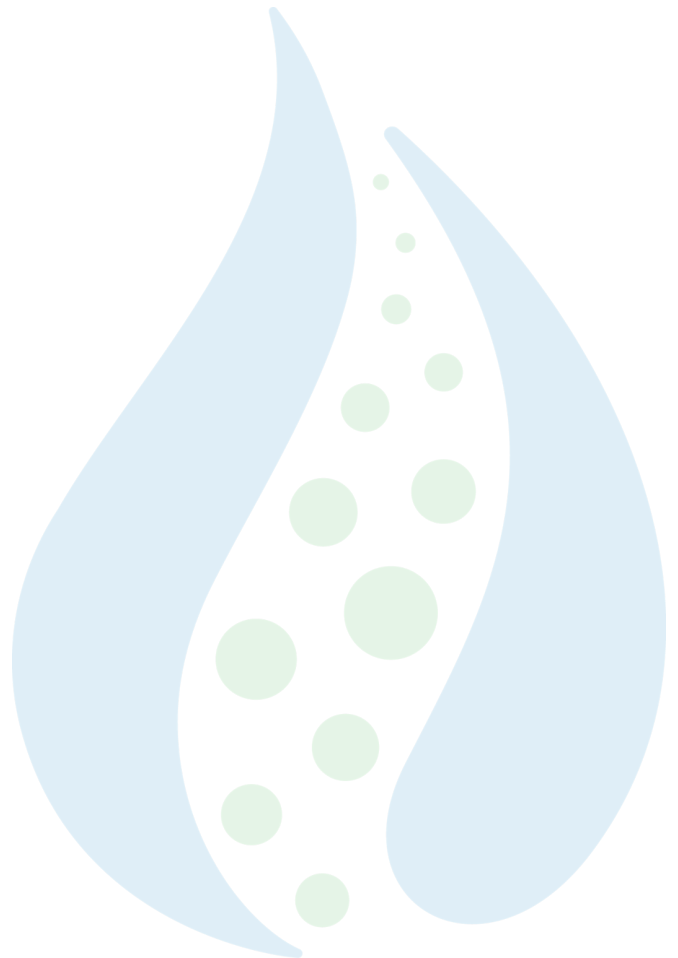
Expanding the LCFS or creating a LCFS-like structure to help facilitate decarbonization of other gasoline-, diesel-, fossil natural gas-, and propane-fueled applications in residential, commercial, and industrial markets is an opportunity that merits attention. Doing so would reward investments and use of cleaner fuels by these legacy sectors that are not anticipated to be electrified for many decades. In the last year new domestic and international policies have been established to apply the LCFS approach beyond transportation fuels such as Vermont's Clean Heat Standard, the Canadian Clean Fuel Regulation, and the EU ETS II which cover both transportation and non-transportation fuel. Policy expansion, as signaled in the Initial Statement of Reasons for the proposed LCFS amendments, will support additional reductions in greenhouse gas emissions by further accelerating the market development of low carbon fuels such as renewable DME.

Thank you for your time and consideration. Please do not hesitate to contact me at cristin.reno@oberonfuels.com with any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Cristin Reno", written in a cursive style.

Cristin Reno
Manager, Regulatory Affairs
Oberon Fuels





August 27th, 2024

Matt Botill
Chief, Industrial Strategies Division
California Air Resources Board
1001 I Street, Sacramento, CA 95814

Mr. Botill and CARB Staff,

I am writing to you on behalf of Generate Capital, PBC ("Generate") regarding the latest proposals for amendments to the Low Carbon Fuel Standard ("LCFS"). As a leading sustainable infrastructure company based in San Francisco, Generate is dedicated to building, owning, operating, and financing infrastructure solutions that address critical needs across clean energy, transportation, water, waste, agriculture, and smart cities. Since our founding in 2014, we have partnered with technology- and project developers to deliver sustainable resources to over 2,000 customers, including companies, communities, school districts, and universities.

We greatly appreciate the California Air Resources Board's ongoing efforts to refine and strengthen the LCFS program. Your openness to stakeholder feedback and your commitment to creating a robust and impactful policy framework have been instrumental in maintaining California's status as a leader in climate policy. CARB's stewardship of this program – which has stimulated billions of dollars of private capital and which has decarbonized California's transportation sector faster and to a greater extent than was considered possible – is a credit to the hard and too-often-underappreciated work of CARB staff and leadership.

We acknowledge the complexity and challenges associated with the LCFS rulemaking process and would like to offer our perspective on the latest proposed changes. In the following sections of this letter, we outline our support for specific aspects of the proposal while highlighting areas where we believe further adjustments could better serve California's long-term climate goals and foster continued investment in low-carbon infrastructure.

Thank you once again for your diligent work on these critical issues and for considering our comments as part of your decision-making process. We would be happy to discuss the views included in this letter and other aspects of the LCFS program with CARB staff over the coming weeks as the rulemaking process reaches its conclusion.

Sincerely,

A handwritten signature in cursive script that reads 'Asher Goldman'.

Asher Goldman
Vice President
Generate Capital

Support for the Increase to the 2025 CI Reduction Target

106.1 We strongly support CARB's proposal to increase the 2025 carbon intensity reduction target by 9%. This adjustment is a crucial step toward restoring balance in the LCFS market, which has faced challenges due to oversupply and low credit prices. By setting a more stringent CI reduction target, CARB is sending a clear signal to the market that it remains committed to driving meaningful reductions in carbon emissions. This move is likely to invigorate investment in low-carbon technologies, ensuring that California continues to lead in the fight against climate change.

While the 9% reduction is a positive and much-needed step, we believe it represents the minimum necessary to achieve market equilibrium and will not undo the growth in the credit bank seen over the last several years. A larger step-down should be considered to address the large reserve of supply in the credit bank. The credit bank is more than three times larger than it was 3 years ago, and we anticipate that 2024 data will show further acceleration to the bank's growth. By increasing the step-down to 10% or 11%, CARB could more effectively reduce the excess credit supply and provide a stronger foundation for future investments in sustainable infrastructure.

Concerns Regarding Proposed Changes to Renewable Natural Gas Treatment

106.2 *Avoided Methane Crediting:* The proposed changes to the treatment of Renewable Natural Gas ("RNG") present significant challenges that could undermine both economic and environmental goals. Specifically, the proposal to remove a full crediting period from existing RNG assets is deeply concerning. These investments were made under the assumption of a stable and predictable regulatory framework, and retroactively altering this framework risks creating substantial uncertainty for investors. Such changes would lead to project disruptions, as well as diminished trust in CARB's commitment to maintaining consistent policy guidelines. This uncertainty extends beyond RNG projects and would negatively impact other areas where CARB is attempting to motivate investment. This includes electric vehicle charging infrastructure where the economic proposition is heavily dependent on the investors' trust that CARB will not change the rules in the future.

While the proposal to limit avoided methane crediting is most concerning for existing assets, the rule would also result in substantial negative outcomes by limiting the development of new assets. CARB has been highly effective in motivating private actors to prevent methane emissions. By limiting avoided methane crediting to a shorter period of time, CARB will be kneecapping one of the most powerful tools it has to limit the emissions of short-lived climate pollutants in support of SB1383. At the very least, this shortened crediting period should be conditional on California implementing policy in support of alternative end markets for RNG (e.g. hard to decarbonize sectors like glass and steel manufacturing) to ensure there is not a stark increase in methane emissions if these assets were to lose their economic incentive to continue operating and as a result be forced to shutter.

106.3 *Deliverability:* In the August 12 guidance, CARB staff proposed to add a condition for out-of-state gas to be injected into a pipeline with "majority directional flow" towards California. The first issue is that the proposed requirement fails to consider the operational realities of the American natural gas distribution system. The system is designed around a balancing mechanism rather

than a point-to-point delivery model – that is, the entire system is similar to the existing book-and-claim accounting mechanism. By mandating physical deliverability of RNG, CARB would be treating fossil natural gas – which is currently and would continue to be book-and-claimed into California – preferentially to low-carbon natural gas.

Second, this change would stifle investment into methane abatement solutions. Given the uncertainty that the proposal would create, with a lack of regulatory clarity until at least 2026 on which (if any) projects would meet the conditions of this proposal, investment into all RNG projects would slow or stop. If CARB is serious about hitting the proposed long-term CI reduction targets or abating meaningful volumes of short-lived climate pollutants, a cessation of new RNG projects is not a viable solution.

Lastly, the proposal would not serve any actual environmentally beneficial purpose. Not only is there no GHG emission benefit when requiring physical delivery of RNG compared to using a book-and-claim mechanism, there is likely to be an increase in emissions resulting from a delivery mandate as (needlessly) moving molecules around requires energy input. What the LCFS program solves for is a reduction in carbon emissions from fuels; by determining which projects are “in” and which are “out” based on a factor which has no relationship to lifecycle carbon emissions, CARB deviates meaningfully from the intent of the LCFS program.

The proposed deliverability requirement would increase costs and complexity without delivering corresponding environmental benefits, ultimately discouraging investment in low-carbon fuel projects. We believe that a more nuanced understanding of the natural gas distribution system is necessary to create policies that truly advance California’s climate goals.

We recommend that CARB reconsider these changes. The two proposals discussed do not aid CARB in the goal to decarbonize transportation, but instead serve only to add complexity and friction to the system. Instead, we suggest that CARB focus on policies that provide stability and predictability for investors and developers to be able to deploy much needed infrastructure. By ensuring that existing assets are treated consistently and that new requirements are aligned with the realities of the energy market, CARB can foster continued investment into effective, proven climate solutions at scale.

Concerns Regarding the Definitional Change for “Food Scraps”

We would like to address the definitional change included in the current rulemaking regarding “Food Scraps.” As proposed, the definition effectively removes credit for processing organic waste that comes directly from food manufacturers. This waste stream typically consists of off-spec products or excess supply that needs to be disposed of in a sustainable manner. While the ideal solution would be to re-purpose this material—such as by converting it into animal feed—this is often not feasible due to various logistical and regulatory challenges.

When direct alternative uses are not possible, the next best sustainable option is to divert this organic waste away from landfills to compost and anaerobic digestion facilities. The proposal from August 12, however, appears to exclude this type of waste from qualifying as “Food Scraps,” potentially discouraging its beneficial use in energy production and nutrient recycling. This exclusion runs counter to the principles of waste reduction and sustainable resource management that underpin California’s broader environmental goals, such as those articulated

in SB1383. If implemented as proposed, the narrow definition for “Food Scraps” would make meeting the requirements of SB1383 even more challenging than they are already proving to be.

We recommend that CARB adjust the definition of “Food Scraps” to include food waste from food manufacturers that cannot be beneficially reused for human or animal consumption. By doing so, CARB can ensure that all feasible routes for sustainably processing organic waste are supported under the LCFS, thereby promoting a more comprehensive approach to waste management and further reducing the environmental impact of California’s critical food production sector.

Impact of Removing Fossil Jet Fuel as a Deficit Generator

106.5 The decision to remove fossil jet fuel as a deficit generator within the LCFS program is a major concern, as it puts a significant source of transportation emissions outside of this program and would fail to force polluters to account for the cost of those emissions. Fossil jet fuel was expected to generate tens of millions of deficits over the next 20 years, playing a critical role in incentivizing the adoption of sustainable aviation fuels (SAFs) and other low-carbon alternatives. By removing this fuel class from the deficit generation framework, CARB would weaken the economic incentives for the aviation industry to transition to cleaner fuels, thus slowing progress toward the state’s broader climate goals.

The rationale behind this decision appears to overlook the importance of LCFS in pricing carbon emissions effectively. In the documentation published on August 12, CARB stated “[p]ublic commenters noted that the original proposal did not guarantee that airlines would procure and use alternative jet fuel”. The LCFS program’s strength lies in its ability to internalize the cost of carbon emissions, making high-carbon fuels less competitive and low-carbon alternatives more. We only have to look at the last five years of the diesel pool to see this in action: a low-CI diesel mandate or a cap on fossil diesel would not have resulted in nearly as much fossil diesel reduction as the price signals from the LCFS program effectuated by incentivizing the private sector to invest in new production capacity for fossil diesel alternatives. By removing fossil jet fuel as a deficit generator, CARB risks diluting this crucial price signal – both through the elimination of the cost on fossil jet fuel use and through the reduced benefit to SAF as a result of a lower LCFS price – which would hinder the adoption of SAF and delay the decarbonization of the aviation sector.

We strongly urge CARB to reconsider this decision and to explore ways in which the LCFS program can continue to drive emissions reductions in the aviation sector. A more integrated approach, where the LCFS framework works alongside an aviation sector GHG reduction mandate, would provide the strongest incentives for the industry to reduce its carbon footprint.

Recommendation for the 2030 CI Reduction Target

106.6 Given the substantial increases to the credit bank over the last 3 years, the removal of fossil jet fuel as a deficit generator, and the impact of other regulatory measures such as Advanced Clean Cars II, Advanced Clean Fleets, and Advanced Clean Trucks, we believe that the currently proposed 2030 CI reduction target of 30% is insufficient both as a matter of ensuring a stable market and to ensure California meets its climate goals. The latest market performance data

suggests that the LCFS program is on track to exceed the 30% CI reduction target well before 2030, which would result in unnecessary market volatility and could trigger the Auto Acceleration Mechanism (AAM). To avoid this outcome, we recommend extending the 2030 CI reduction target to 35%, a level that would better align with the state's decarbonization objectives and the realities of the LCFS market.

As the LCFS program continues to evolve, it is important that CARB sets targets that are both ambitious and achievable, ensuring that the program remains a driving force for decarbonization in California's transportation sector. We have recently experienced the outcome of setting the targets too low, which has resulted in diminished capital investment into climate solutions for the last several years. With the consequences of climate change more apparent today than ever before, California cannot afford the cost of any more avoidable delays.



California Air Resources Board
1001 I Street
Sacramento, CA 95814

August 27, 2024

SUBMITTED ELECTRONICALLY AT: www.arb.ca.gov/applications/public-comments?utm_medium=email&utm_source=govdelivery

Re: Notice of Public Availability of Modified Text and Availability of Additional Documents and Information for the Proposed Low Carbon Fuel Standard Amendments

To Chair Randolph, Honorable Members of the California Air Resources Board (“CARB”), and Staff,

Rivian Automotive, LLC, (“Rivian”) appreciates the opportunity to submit 15-day comments in **strong support** of the modified text released on August 12th as part of the proposed Low Carbon Fuel Standard (“LCFS”) amendments. The LCFS is a proven emissions reduction policy and a powerful enabler of transportation electrification. As an EV manufacturer and charging provider, we strongly support the policy primarily because of what it offers our customers, our business, and our industry as we work to achieve scale and profitability. To date, the policy has generated more than a billion dollars in value in support of transportation electrification and this figure is poised to grow significantly in the coming years. These are dollars that can be leveraged by the private sector and would otherwise not exist to support the state’s EV transition. This is why the future of the regulation, as determined by this rulemaking, is so important.

Rivian strongly supports several key aspects of the latest modifications. We recommend finalizing this package to strengthen the 2025 carbon intensity target, make valuable changes to the regulation’s infrastructure crediting provisions, and introduce an encouraging new opportunity for EV manufacturers to share in residential base credit generation. Our comments below elaborate on our support for these specific aspects of the newly modified regulation, while also suggesting minor improvements or additional changes that could be made in the interest of clarity and maximizing impact. We also reintroduce a few additional changes that the modified text does not effectuate but that merit continued discussion.



About Rivian

Founded in 2009, Rivian is an independent U.S. company headquartered in California. With over 16,000 employees across the globe, Rivian's mission is to Keep the World Adventurous Forever. Rivian's focus is the design, development, manufacture, and distribution of all-electric adventure vehicles, specifically pickups, sport utility vehicles ("SUVs"), and commercial vans. Key to the success of our mission, these vehicles will displace some of the most polluting conventional vehicles on the road today.

Rivian brought the first modern electric pickup to market in 2021 when we launched the R1T from our manufacturing facility in Normal, Illinois, followed shortly thereafter by the R1S SUV and the EDV commercial van for Amazon. The R1T and R1S provide all-electric options in segments where added utility is a necessity. The R1T has an EPA-certified range of up to 410 miles. The R1S is certified at up to 400 miles. The truck also features 11,000lbs of towing capacity, while the R1S is a seven-passenger full-sized SUV. Both are well-equipped for off-roading in a range of climates. Separately, our Class 2b commercial vans eliminate tailpipe emissions from last-mile delivery. Rivian is committed to producing 100,000 vans for our launch customer, Amazon, with more than 15,000 already in service in 800+ U.S. cities. The van is now also available for purchase by other fleet customers beyond Amazon and is eligible for HVIP support. Beyond our vehicle lineup, Rivian is also building a network of DC fast chargers across the country known as the Rivian Adventure Network ("RAN"). Fifteen RAN sites are up and running in California alone.

To Continue the LCFS' Success, Rivian Strongly Supports Key Changes Proposed in the Modified Text

The LCFS is a keystone regulation in California's portfolio of climate policies. As the 2022 Scoping Plan stated, the LCFS "is the primary mechanism for transforming California's transportation fuel pool" in service of the state's climate goals.¹ Indeed, as an electric vehicle manufacturer and charging provider, the LCFS is a priority for Rivian precisely because of the role it plays in speeding the transition toward renewable fuels in the transportation and electricity sector.

¹ CARB, *2022 Scoping Plan for Achieving Carbon Neutrality*, 190.



The LCFS has been tremendously successful, so much so that changes have become urgently necessary to ensure that the policy keeps pace with the progress made by industry toward a low-carbon transportation future. To that end, Rivian has actively participated in CARB workshops and the rulemaking process to amend and update the LCFS. We greatly appreciate the staff's commitment to this process and the time they have dedicated to this proposal and stakeholder engagement.

Rivian welcomes the modified text and this additional opportunity to provide comment. We strongly support key changes proposed by the amended language and urge CARB to finalize these changes at its hearing in November.

Finalize the Newly Proposed 2025 Carbon Intensity Benchmark

Short-term conditions in the LCFS credit market are a top concern for businesses like ours that earn credits under the program. Rivian has consistently supported a one-time stepdown in the 2025 carbon intensity ("CI") benchmark to course-correct the credit market, which currently suffers from a glut of credits stemming from a sustained period of overcompliance.

As of Q1 2024, the cumulative credit bank stood at approximately 26 million metric tons ("MT"). Moreover, the bank has grown extremely quickly over the past two years.² Based on the trend since the start of 2020, we estimate that the bank could total approximately 35 million MT by the end of 2024, immediately preceding the earliest opportunity for regulatory amendments to take effect.

We appreciate the staff's efforts to address this overcompliance with a one-time stepdown. Rivian provided extended feedback on the magnitude of the stepdown after both the ISOR and the April workshop, arguing that the previously proposed adjustments to the CI curve were not sufficient to rebalance the market.

Rivian welcomes the progress made in the newly modified amendments, which now call for a 9-percentage point stepdown in 2025. This is a big step forward and we are grateful to the staff for proposing this. Importantly, the initial market reaction to the proposal was positive. **We respectfully urge the Board to implement this change as a necessary step toward rebalancing the LCFS program and credit market.**

² California Air Resources Board, *LCFS Data Dashboard*, available at www.arb.ca.gov/resources/documents/lcfs-data-dashboard.



107.2

At the same time, we encourage the staff and the Board to continue weighing the benefits of a stepdown that is yet larger. While we welcome the 9-percentage point adjustment, the reality is that the credit bank continues to grow quickly. We find that the market could accommodate even more significant action than what has been proposed—accounting for the possibility that current modeling underestimates potential credit generation—and set the program up for success in the coming years.

We appreciate concerns about the potential risks of a larger stepdown, namely the possibility of ‘over-obligating’ industry and creating the conditions for an excessive runup in compliance costs. However, the policy’s existing cost containment provisions adequately safeguard the market and broader public, preventing runaway increases in credit prices. In our view, there are far greater risks attached to an overly conservative adjustment to the CI benchmark curve that fails to fully rebalance the credit-to-deficit ratio, including chilled investment in EV charging networks and slower growth in EV sales.

107.3

Finalize the Proposed Changes to Residential Base Credits

Rivian finds the proposed amendments to base credit generation very encouraging, reflecting fresh thinking about this critical aspect of the LCFS. Clean fuels policies are intended to be market-based systems that create incentive structures for private sector investments by the providers and users of clean transportation fuels. In the light-duty vehicle sector, the two most important market participants are vehicle manufacturers and their customers. Consistent with the core principles of the LCFS, we have long argued that the policy should encourage the participation of these market actors and reward them for making investments in EVs that displace as much fossil fuel use as possible.

To that end, **Rivian applauds the newly proposed amendments that would—subject to certain conditions and the Executive Officer’s approval—allow for EV manufacturers to share in base credit generation.** The proposed rules represent a valuable evolution of the LCFS’ residential credit pathway, positioning the policy to play an even more meaningful role in the growth of California’s EV market at a pivotal moment. In fact, we believe the proposal promises at least two key benefits.

1. Allowing automakers to earn a share of base credits establishes an incentive for automakers to go above and beyond minimum sales requirements. This is important for achieving climate and air quality goals on an accelerated timeline while also positioning the state to achieve its longer-term EV sales targets as the market grows into the mainstream.



2. Vehicle manufacturers enjoy close relationships with their customers and are the best positioned entities to effectively and efficiently pass through credit value in the form of market-enhancing investments. By establishing a 'menu' of investment options, the proposal establishes important flexibility in this regard while establishing clear guardrails around credit revenue spending. Whether in the form of consumer rebates, charging infrastructure investments, new spending on marketing, or other approved projects, EV makers like Rivian stand ready to reliably and impactfully invest base credit revenue for the benefit of our customers and the EV market.

For these reasons, **we strongly support the proposed modifications and urge the Board to approve these provisions at the November hearing.**

Should market conditions trigger these provisions, Rivian would look forward to engagement with the Executive Officer and the staff—as well as more formal agency guidance—to inform implementation. Among other things, we would encourage a focus on stability and predictability in the base credit allocation. We support leaving that allocation to the Executive Officer's discretion, but to best aid industry in making investment with credit revenue, CARB should provide automakers with as much notice as possible of base credit allocations and make adjustments on a reasonable and consistent timeline—not more than annually, in our view—and on a predictable basis.

CARB could take other steps now to prepare for a smooth implementation of these provisions. To be consistent with existing practice and to avoid the need for reregistration of vehicles by market participants, **we recommend that the regulation specify that an OEM or their designee may register with the Executive Officer** to generate the allowed share of base credits.

Fast Charging Infrastructure ("FCI") Pathway Rules are Much Improved

Rivian welcomes the changes made to the provisions governing the FCI pathway. We find that establishing a *light- and medium-duty* ("LMD") FCI pathway is reasonable and appropriate given the similarities in charging behavior and need across those classes, while other changes in the modified text helpfully streamline and simplify the eligibility criteria for LMD FCI sites. Specifically, we welcome the following changes:

- Increasing the per-site power limit from 1 MW to 2.5 MW;
- Removing the geographic limits;



- Matching the credit life for the FCI and hydrogen refueling infrastructure (“HRI”) programs at 10 years (fair regulatory treatment of electricity and hydrogen remains an important principle, more on which below); and,
- Allowing stations installed after 2022 to apply.

Perhaps most importantly, the staff restored the cap to 2.5 percent of prior quarter deficits—a significant improvement over the prior proposal that will avoid undercutting the FCI pathway’s effectiveness.

Combined, these modifications meaningfully improve prospects for participation by EV charging providers, which is key for accelerating the expansion of charging networks into every corner of the state. We look forward to leveraging the FCI pathway to expand the footprint of RAN into high-need regions across California and therefore **urge the Board to finalize the proposed LMD FCI provisions.**

107.5

To strengthen the FCI pathway yet further and to ensure fair treatment across both the FCI and HRI pathways, **we also recommend that the final language be amended to allow FCI credit generators to claim capacity-based credits at zero CI if the site’s charging activity is matched with renewable energy.** Under the regulation, the CI used for HRI crediting is equal to the companywide average CI for dispensed hydrogen in the quarter “or 0 g/MJ, whichever is greater.”³ But the CI used for FCI crediting is “the California average grid” CI with no option to generate credits at zero CI like that available to HRI claimants.⁴ If charging network providers are sourcing renewable energy to power their sites, the regulation should permit them to earn capacity-based credits at zero CI, just as in the HRI pathway. This will only enhance the impact of the LCFS on clean grid buildout. We respectfully encourage the staff and Board to consider this modification.

³ 17 C.C.R. §95486.2(a)(5).

⁴ 17 C.C.R. §95486.2(b)(5).



Rivian Encourages Continued Deliberation on Other Topics

Third-Party Verification Requirements for Certain Electricity Credit Pathways Remain a Concern

The Initial Statement of Reasons (“ISOR”) proposed to introduce third-party verification requirements for an expanded list of electricity credit pathways. The latest package of modified text does not appear to have changed these requirements. Therefore, as currently proposed, electricity credit generators would require third-party verification of credit claims associated with non-residential charging and metered residential charging, despite the significant compliance burden this poses without commensurate benefits in return.

We urge CARB to reconsider the proposals and establish pragmatic requirements that account for real-world implementation concerns.

107.6

- **Third-party verification of non-residential charging by desktop review should suffice.** Existing regulations govern EV charger accuracy and practical considerations call into question the feasibility of comprehensive site visitation to fuel supply equipment. If site visitation remains a priority for CARB, we recommend at least reducing the site visit burden using a reasonable sampling approach and/or authorizing third-party verifiers to exercise discretion in determining when a site visit to a specific location is warranted. The latter approach would align with a recent proposal by Oregon DEQ for its Clean Fuel Program.⁵
- **Metered residential charging should be entirely exempt from site visit requirements.** Site visits to many thousands of residential locations would be highly impractical, raise privacy concerns, and incur significant costs that would significantly erode the economics of the incremental credit pathway. The implications of potentially disincentivizing automaker generation of incremental credits include relatively more carbon-intense EV charging, diminished market pressure to accelerate the development of renewable electricity generation, and the potential loss of the best available data on residential EV charging, which CARB now uses to establish base

⁵ Oregon Department of Environmental Quality, *Oregon Clean Fuels Program 2024 Rulemaking: Rulemaking Advisory Committee Meeting #2* (Meeting Slides), August 14, 2024, slide 17, available at www.oregon.gov/deq/rulemaking/pages/cfp2024.aspx.



credit volumes. CARB can achieve this with a small modification to the final regulatory language in §95500(c)(1)(E)(1) to state (new text in italics),

“EV Charging except as specified under 95491(d)(3)(A) *and 95491(d)(3)(B).*”

This would exempt both metered and non-metered residential charging from third-party verification.

Updates to the Light-Duty (“LD”) EER and Geofencing Radius Still Merit Consideration

Rivian has previously raised the need to implement technical adjustments to the LD EV EER and geofencing radius used to identify eligible telematics-recorded charging activity. Unfortunately, the latest package of modified text does not include any discussion of potential changes to these aspects of the LCFS.

We acknowledge that updating the EER would represent a relatively substantial change at this stage in the rulemaking process. Nonetheless, we want to take this opportunity to reiterate a summary of our findings in this regard and encourage continued deliberation on this important aspect of the regulation. If the staff consider proposing further modifications to the regulatory text before the hearing, we recommend an update to the EER be included.

At the same time, we believe it is not yet too late to update the geofencing radius, which CARB specifies through guidance. While relatively minor in administrative complexity, a change to agency guidance in this respect would be significant in its real-world impact on credit generators.

- **Revise the LD EER.** The current value of 3.4 stems from a determination originally made by CARB in the 2011 rulemaking—and is thus now more than a decade old.⁶ Continuing to use an outdated EER systematically undervalues the real-world displacement of fossil fuels achieved by EVs, and the true role EVs play in decarbonizing the transportation fuel pool in support of the LCFS’ objectives. Examples of more appropriate EER values exist. For instance:

⁶ California Air Resources Board, *Appendix A: Proposed Regulation Order*, October 26, 2011, available at www.arb.ca.gov/sites/default/files/barcu/regact/2011/lcfs2011/lcfsappa.pdf.



- A National Renewable Energy Laboratory analysis of the U.S. passenger vehicle fleet found an EER of 4.4.⁷
- Canada's clean fuels regulation specifies an EER of 4.1 for LD vehicles.⁸
- Rivian compared the R1S to comparable three-row internal combustion engine ("ICE") SUVs and estimated an EER of 4.05.⁹

We encourage CARB to take this opportunity to calculate a revised EER.

- **Update the Geofencing Radius.** To avoid double-counting, CARB currently requires that vehicle charging sessions recorded using telematics that occur within 220m of a non-residential charging station be excluded from reporting for residential incremental credits.¹⁰ As the density of public charging networks continues to increase, a 220m geofencing radius risks excluding a growing share of incremental charging claims. Moreover, contemporary GPS accuracy, usually accurate to within 2 meters, means that such a generous radius is no longer necessary nor justifiable.¹¹ Rivian recommends that CARB amend the geofencing radius as part of this rulemaking. At a minimum, we suggest aligning with the 110m radius established by Washington's Clean Fuel Standard guidance but encourage CARB to consider an even smaller figure.¹²

⁷ Mark Singer, Caley Johnson, Edward Rose, Erin Nobler, and Luna Hoopes, National Renewable Energy Laboratory, *Electric Vehicle Efficiency Ratios for Light-Duty Vehicles Registered in the United States*, March 2023.

⁸ Environment and Climate Change Canada, *Clean Fuel Regulations: Specifications for Fuel LCA Model CI Calculations, Version 2.0*, January 2023, p. 85, available at www.data-donnees.az.ec.gc.ca/data/regulatee/climateoutreach/carbon-intensity-calculations-for-the-clean-fuel-regulations/en/Resources/?lang=en.

⁹ Rivian analysis of fuel economy data for a range of ICE vehicles relative to Rivian's R1S. ICE vehicles examined include the Jeep Grand Wagoneer, Chevrolet Suburban, and Ford Expedition. In all cases, Rivian selected the most fuel-efficient variants of the ICE vehicles and excluded plug-in hybrid vehicles from the analysis.

¹⁰ California Air Resources Board, *Low Carbon Fuel Standard (LCFS) Guidance 19-03: Reporting for Incremental Credits for Residential EV Charging*, June 2019.

¹¹ National Oceanic and Atmospheric Administration, *Official U.S. Government Information about the Global Positioning System (GPS) and Related Topics*, March 3, 2002, available at <https://www.gps.gov/systems/gps/performance/accuracy/>.

¹² Washington Department of Ecology, *Clean Fuel Standard Participation Guidance: Claiming Incremental Credits for Metered Residential EV Charging*, December 2023, available at www.apps.ecology.wa.gov/publications/documents/2314029.pdf.



Conclusion

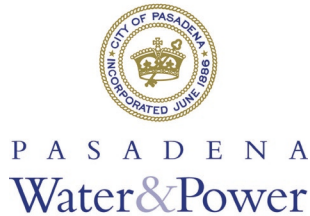
Rivian greatly appreciates the hard work of staff in developing the modified text for the proposed LCFS amendments. We welcome and applaud key changes in the latest round of proposals and respectfully urge the Board to finalize them at its November hearing. Rivian is particularly supportive of the proposed base credit generation opportunity for automakers. This is an important evolution of the LCFS' residential charging provisions that we believe is not just consistent with the policy's foundational principles but also potentially a significant catalyst for accelerated growth in California's EV market. **The LCFS has been very successful. The proposed rulemaking will ensure that success continues.**

At the same time, we encourage the staff and Board members to continue reflecting on the burdens credit generators will incur under the proposed requirements for third-party verification of certain electricity credit claims. We do not believe third-party verification as proposed is appropriate or necessary in these contexts and that CARB's objectives can be met through other means, including desktop verification procedures and reasonable sampling. We also believe there is still an opportunity to update the geofencing radius used for certain electricity credit claims and, if further regulatory amendments are proposed, to revisit the outdated LD EV EER.

Please do not hesitate to reach out with any questions about our comments. We look forward to strongly supporting the proposed amendments at the November hearing.

Sincerely,

Tom Van Heeke
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Rivian Automotive, LLC
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August 27, 2024

Clerk's Office
California Air Resources Board
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Sacramento, CA 95814

Submitted electronically via: <https://ww2.arb.ca.gov/applications/public-comments>

Re: Proposed Amendments to the Low Carbon Fuel Standard Regulation

Dear Chair Randolph and Honorable Board Members:

This letter is submitted on behalf of Los Angeles Department of Water and Power, Pacific Gas and Electric Company, Sacramento Municipal Utility District, San Diego Gas & Electric Company, Southern California Edison Company, Burbank Water and Power, Pasadena Water and Power, and the Northern California Power Agency ("the CA Utilities"). We appreciate this opportunity to comment on the Proposed Low Carbon Fuel Standard Amendments ("15-day changes").

108.1 The CA Utilities are also members of the California Electric Transportation Coalition ("CalETC") and support the positions taken in the CalETC Board Letter that was submitted on August 27, 2024. The CA Utilities urge CARB to adopt all the recommendations outlined in the CalETC Board Letter. In addition, these comments focus on a key issue not addressed therein pertaining to the potential assignment of base credits to Original Equipment Manufacturers ("OEMs" or "automakers"). To summarize, the CA Utilities urge CARB to resolve these critical issues to ensure that the final regulation is clear and efficacious:

- 108.2 ➤ Establish that individual and aggregate utility holdback credits will not be reduced if the Executive Officer redirects credits from the Clean Fuel Reward ("CFR") program to OEMs.
- 108.3 ➤ Establish a one-time deadline of March 15, 2025, for the Executive Officer's determination whether to reallocate base credits to the OEMs and clarify that utility contributions to the CFR would cease.
- Ensure Board oversight of the Executive Officer's discretion to reallocate base credits to the OEMs.

These issues are discussed further below, accompanied by proposed redline changes to the relevant sections of the 15-day changes in Appendix A and the CalETC Board Letter in Appendix B.

I. Discussion

The CA Utilities support many provisions in the Proposed Regulation Order, as discussed in comments filed through CalETC in February 2024. However, the CA Utilities share significant concerns about the newly proposed option for the Executive Officer to assign base credits to OEMs. The CA Utilities also remain concerned about the omission of key clarifications and revisions to the 45-day proposed amendments necessary to ensure effective implementation, as detailed in the CalETC Board letter in Appendix A.

108.2 cont

Reallocating the base residential credits away from the utilities – the fuel providers that are required to spend at least half of their funds on equity projects – to the non-fuel supplying automakers that will use the funds to incentivize the purchase of new cars, is a significant departure from both CARB’s and the state’s equity goals. The proposal in the 15-day changes to provide the option for allocation of electric distribution utility (“EDU” or “utility”) base residential credits to the automakers is contrary to the intent and purpose of the LCFS and sets a concerning precedent. The entire premise of the LCFS is that clean fuel providers earn credits for the production and supply of low-carbon fuels, and high-carbon fuel providers must purchase credits to offset the carbon-emitting fuels from which they profit at the cost of all Californians, especially those in disadvantaged communities. By allocating credits to the automakers – entities that are not fuel providers – CARB is directly undermining the premise of the regulation. Siphoning credits earned by a clean fuel provider such as utilities disincentivizes low-carbon fuel suppliers from further investing in low carbon fuel technologies, infrastructure, and programs.

The CA Utilities are particularly concerned that throughout the robust, deliberative, and multi-year regulatory process, this concept has neither previously been introduced nor vetted. We urge CARB to reconsider the potential consequences of such a drastic change before adopting this language. However, if CARB does go forward, specific changes must be made to the 15-day changes to maintain the integrity of the LCFS program and ensure that the utilities will be able to effectively administer programs funded by LCFS proceeds, as discussed below.

1) CARB Should Establish that Individual and Aggregate Utility Holdback Credits Will Not Be Reduced if the Executive Officer Redirects Credits from the Statewide Clean Fuel Reward Program to the OEMs

The Draft Order provides that, “If the Executive Officer directs base credits to eligible OEMs, the requirements of section 95483(c)(1)(A)2. do not apply.”¹ Put simply, the requirements for EDU contributions to the CFR do not apply. However, those requirements include a table specifying the EDUs’ contribution towards the statewide program:

¹ Draft Order, at section 95483(c)(1)(B).

EDU Category	% Contribution
Large Investor-owned Utilities	50%
Large Publicly-owned and Medium Investor-owned Utilities	25%
Medium Publicly-owned Utilities	10%
Small Publicly-owned Utilities and Small Investor-owned Utilities	0%

The requirements provide a level of clarity regarding proportionality that is absent from the carveout for OEMs. There is no mention of how base credits would be redirected from the EDUs to support the OEM allocation. For example, according to the table above, small publicly owned utilities and small investor-owned utilities have 0% contribution to the statewide program. Without additional clarity on the contribution process, there is concern that CARB will take 45% from each EDU's base credits to support the OEMs effectively reducing the holdback credits available to many utilities.

The determination of individual EDU allocations is based on section 95486.1(c)(1)(A), or the ratio of non-metered residential EVs assigned to an EDU over total number of non-metered residential EVs. Under the proposed 15-day changes, if the total base credit equals 100 million metric tons ("MMT"), OEMs will get 45 MMT, and EDUs will get the remaining 55 MMT. For example, if large POU's make up approximately 10% of the base credits they would receive 5.5 MMT for holdback. In contrast, under the 45-Day proposal, large POU's would contribute 25% to CFR and keep 75% or 7.5 MMT for holdback.

This scenario would significantly affect EDUs. For example, a medium-sized utility like Burbank would expect to receive 25% fewer credits, even though their contribution to the CFR program would cease. This would make it difficult, if not impossible, for some EDUs to conduct their holdback and equity holdback programs. Because all of Burbank's TE programs and infrastructure projects are funded by LCFS proceeds, a reduction in the credits could result in:

- Fewer investments in TE customer programs and public TE infrastructure projects.
- An impact on electric rates, if ratepayer funds need to be used to partially fund the TE programs and projects.

Similarly, SMUD, as a large POU, would expect to contribute 25% of its base credits to the CFR and retain 75% for holdback under the proposed regulation. However, if 45% of SMUD's base credits were reassigned to OEMs, the holdback percentage would drop to 55%. Like many POU's, SMUD's transportation electrification programs are primarily supported through LCFS credit revenues. Such a reduction would, for example, challenge already stressed budgets and jeopardize SMUD's ability to maintain transportation electrification programs, expand EV charging infrastructure, increase electric mobility investments in low-income and equity communities, and avoid or limit rate impacts from distribution grid upgrades to support long-term growth in EV charging.

This problem is even more exaggerated for small POUs such as the City of Ukiah, the City of Lompoc and the City of Lodi. Under current regulation, small POUs are not required to remit any percentage of their credit proceeds to the CFR and if the regulation is adopted as written, they will receive 45% fewer credits.

Therefore, CARB should (1) establish in the regulation that individual and aggregate utility holdback credits will not be reduced as a result of this directive, and (2) clarify in the regulation that in redirecting credits to the OEMs, the Executive Officer would allocate only that portion of the credits dedicated for CFR according to the table in section 95483(c)(1)(A)(2), but not to exceed 45% of the total base credits. The CA Utilities propose such clarifications in Appendix A.

2) The Regulation Should Establish a Deadline of March 15, 2025, for the Executive Officer's Discretion to Reallocate Base Credits to the OEMs and Clarify that EDU Contributions to CFR Would Cease

Should the final order allow the Executive Officer the discretion to allocate base credits to OEMs, a shot clock is necessary to provide certainty and transparency regarding the Executive Officer's decision and the impact on the CFR program. It must be clear in the regulation that this potential allocation is a one-time option that must be executed by March 15, 2025. If it is not executed by March 15, 2025, this option expires. This deadline is necessary for the utilities to develop and implement the proposed statewide eMDHD CFR program without the looming possibility that some unknown percentage of funds may be redirected at any future time via a nontransparent and arbitrary process. In addition, the CFR Governance Agreement requires medium and large EDUs to transfer credit proceeds to the CFR program by March 31. In addition, if this provision is enacted CARB must clarify no further contributions to the Clean Fuel Reward program shall be made, and the administrator of the Clean Fuel Reward program shall implement the windup procedures set forth in the statewide program Governance Agreement.

Requiring the Executive Officer's decision by March 15 will ensure that the EDUs have enough time to initiate a timely transfer of credit proceeds to the CFR program, if needed. To remedy this situation, the CA Utilities request that CARB modify §95483(c)(1)(B) as shown in Appendix A.

3) The Regulation Should Ensure Board Oversight of the Executive Officer's Discretion to Reallocate Base Credits to the OEMs

Reallocating the base residential credits away from the utilities – the fuel providers that are required to spend at least half of their funds on equity projects – to the non-fuel supplying automakers that will use the funds to incentivize the purchase of new cars, is a huge departure from both CARB's and the state's equity goals. As such, checks and balances are needed in the form of ongoing Board oversight. There is precedent for Board oversight of program implementation in the current regulation under §95483(c)(1)(A)(2) regarding the utilities' implementation of the CFR program:

The Executive Officer will review the implementation of any Clean Fuel Reward program, including the actual credit value contribution of each utility to the program, and present a report to the Board by January 1, 2027, with recommendations for further increasing utility contributions to the Clean Fuel Reward program.

Given that the EDUs' implementation of the CFR could essentially be replaced via an OEM allocation of base credits, then so too should the CARB Board have oversight here. Specifically, the final order should require the Executive Officer to review the implementation of any OEM program and present a report to the Board annually, beginning January 1, 2027, with recommendations for continuing or decreasing allocations to the OEMs. To remedy this situation, the EDUs request that CARB modify §95483(c)(1)(B) as shown in Appendix A.

II. Conclusion

The CA Utilities appreciate the opportunity to provide comments on this important regulation. Due to the severity of the changes proposed by CARB in the 15-day changes and the criticality of having clarity on these changes to effectively administer the eMDHD CFR and utility holdback programs, the utilities request that CARB staff address each of these issues in detail in the next round of 15-day changes.

Respectfully,

The CA Utilities

cc: Rajinder Sahota
Matthew Botill
Jordan Ramalingam

Appendix A
Proposed Revisions to Draft Order

Proposed text deletions are in bold and strikethrough (~~**abcd**~~)

Proposed text additions are in bold and underlined (**abcd**)

Appendix A

Proposed Revisions

The CA Utilities propose the following modifications to the Draft Order (additions in underline and deletions in ~~strikeout~~ format; numeration follows that of the Draft Order):

Section 95483(c)(1)

- A. *Base Credits to EDUs.* The EDU or its designee is the credit generator for base credits for the portion of residential EV charging assigned to that EDU by the Executive Officer, except for any portion of base credits that the Executive Officer assigns to OEMs pursuant to section 95483(c)(1)(B). ~~If the Executive Officer assigns a portion of base credits to OEMs pursuant to section 95483(c)(1)(B), the EDUs are assigned the remaining base credits.~~ The EDU may authorize a third party to sell the EDU's credits. The EDU or its designee must meet the requirements set forth in paragraphs 1. through 5. below, and 95491(e)(5).
- B. *Base Credits to OEMs.* No later than March 15, 2025, ~~the~~ the Executive Officer may reallocate some or all of the EDUs' credits that would have otherwise been allocated to the Clean Fuel Rewards contributions, not to exceed ~~direct up to~~ 45% of base credits, to eligible OEMs, if the share of new zero emission vehicle sales for model year 2024 zero emission vehicles certified under California Code of Regulations, title 13, section 1962.2 is less than 30 percent. If the Executive Officer directs base credits to eligible OEMs, the following provisions apply:
- i. Each EDU's base credits shall be reduced by no more than the percent contribution for the applicable EDU category as specified in section 95483 (c)(1)(A)2.
 - ii. ~~The~~ The requirements of section 95483(c)(1)(A)2 ~~do not~~ shall no longer apply.
 - iii. No further contributions to the Clean Fuel Reward program shall be made, and the administrator of the Clean Fuel Reward program shall implement the windup procedures set forth in the statewide program Governance Agreement.
 - iv. The OEM is the credit generator for base credits for the portion of residential EV charging assigned to that OEM by the Executive Officer pursuant to 95486.1(c)(1)(A).
 - v. The OEM must meet the requirements set forth in paragraphs 1. through 3. below, and 95491(e)(5).
- C. *OEM Eligibility.* The OEM must identify itself to the Executive Officer as eligible to generate base credits. The Executive Officer may revoke the eligibility of an OEM to generate base credits if it fails to sell base credits and spend the proceeds within three years of base credit issuance. An OEM must submit any request to change base credit generation eligibility status for base credit generation by the end of the first month of the prior quarter.
- D. *Reporting Requirements.* The Executive Officer shall review the implementation of any OEM program and present a report to the Board annually, beginning January 1, 2027, with recommendations for continuing or decreasing allocations to the OEMs. Documentation of adherence to the following restrictions must be included in the annual report submitted pursuant to section 95491(e)(5)(A).

Appendix B
CalETC Board Letter



August 27, 2024

Honorable Chair Liane Randolph and Honorable Board Members California Air Resources Board
1001 I Street
P.O. Box 2815
Sacramento, CA 95812

Re: Proposed 15-day Change Amendments to the Low Carbon Fuel Standard Regulation

Submitted to <https://ww2.arb.ca.gov/applications/public-comments>

Dear Chair Randolph and Honorable Board Members:

CalETC appreciates this opportunity to SUPPORT the Low Carbon Fuel Standard (LCFS) regulation and provide feedback for CARB Board member consideration. As discussed in detail below, CalETC largely supports the proposed draft regulation order ("draft order") August 12, 2024, version ("15-day changes"). However, we are urging CARB to make critical modifications to the regulation in order ensure that the utilities will be able to effectively administer the programs funded by LCFS proceeds. Attached to this letter is our February 20 letter which we are resubmitting as Appendix B and slightly changed recommended amendments in Appendix A. The changes we request are critical to ensuring the success of the LCFS program. Below we also provide additional justification for the recommendations in our February 20 letter.

CalETC is a non-profit association committed to the successful introduction and large-scale deployment of all forms of electric transportation including plug-in electric vehicles of all weight classes, transit buses, port electrification, off-road electric vehicles and equipment, and rail. Our board of directors includes Los Angeles Department of Water and Power, Pacific Gas and Electric, Sacramento Municipal Utility District, San Diego Gas and Electric, Southern California Edison, Northern California Power Agency, and the Southern California Public Power Authority. Our membership also includes major automakers, manufacturers of zero-emission trucks and buses, developers and operators of charging stations and other industry leaders supporting transportation electrification. CalETC supports and advocates for the transition to a zero-emission transportation future to spur economic growth, fuel diversity and energy independence, ensure clean air, and combat climate change. This letter is submitted on behalf of the CalETC board of directors and covers issues specific to the utility interests in LCFS. Also see our joint letter with the EV Charging Association for our comments on the non-utility provisions in the 15-day change package.

Over the past few years, the CalETC board has worked closely with the CARB LCFS staff to provide suggested amendments to the LCFS regulations. We appreciate the tremendous effort and accessibility of CARB staff during the extensive public process regarding this regulation.

Additional rationale for our February 20 letter recommendations:

1. **Requesting a clearer list of eligible Holdback Programs.** The current list of proposed holdback projects is confusing. Utilities and their regulators need this list to be as clear as possible to help remove any ambiguity for staff and decisionmakers at CARB, CPUC, and Publicly Owned Utilities (POU). The Appendix to our February 20 letter provides our recommended amendments and detailed justification (See Appendices A and B to this letter). These recommendations also consider the needs of the dozens of medium and small EDUs in California that are at a very different stage of EV program implementation than the large EDUs. These recommended edits are necessary to make the project review and approval process simpler and to help the utilities implement equity projects:

Having one list instead of the current two lists improves clarity and allows for the implementation of more equity projects such as vehicle grid integration projects for low-income individuals and others who meet the equity definition.

Allowing eMHDVs anywhere in California to clearly count as equity is necessary as the current language is open to interpretation. Improving clarity here will allow projects supporting eMHDVs (e.g., grid side upgrades, panel upgrades, the eMHDV Clean Fuel Reward etc.) to count as equity. See Appendices A and B for more on this topic.

Requiring large IOUs¹ to utilize their holdback credit revenues to fund a minimum of three program options is necessary as there are increasingly diversified needs in transportation electrification over large service areas. Including this requirement to fund a minimum of three program options will help ensure that the large IOUs consider these diverse needs and will prevent a situation in which the large IOUs are compelled to spend all of their holdback funds on one program. The list of holdback expenditures is appropriately lengthy, in part, to meet the diverse and varied needs of priority communities and address equity. For example, the holdback list allows spending on light-, medium- and heavy duty EVs and off road EVs too. Proceeds also can be spent on projects for chargers, vehicle-grid integration, grid side upgrades, ridesharing, transit, EV rebates, micromobility, reskilling and workforce development and others. All of these are important projects. Requiring spending on at least three programs will ensure programmatic diversity and equity. CalETC proposes to limit this requirement to only the large IOUs as the other EDUs may not have enough funds to do three programs, especially with low credit prices. See Appendix A for recommended edits.

The project list should preserve a narrowly focused project category for direct multilingual education, and outreach serving equity communities. The preservation of this category is not intended to include general marketing or advertising. It is only intended to allow for multilingual education and outreach to equity communities for specific projects. The 15-day changes allow this for automaker programs, but not the EDU holdback programs. Deleting

¹ Under the proposed definitions, this would only include SCE and PG&E.

the multilingual education and outreach project category in the regulation will hurt efforts by many EDUs to reach hard-to-serve markets who speak little or no English, many of whom are low-income individuals. See Appendix A for recommended edits.

The project list should explicitly allow for upgrades to electric panels, which are prerequisites to transportation electrification for many customers living in older buildings that have not had recent updates. Upgrades to panels can have other benefits but are primarily to enable transportation electrification. Naming this clearly in the regulation will also help develop equity projects to serve low-income individuals with panel upgrades. See Appendix A for recommended edits.

For simplicity and clarity, *the project list should be consolidated under the recommended projects for electric mobility solutions* as there are two list items that appear to overlap regarding mobility alternatives. See Appendix A for recommended edits.

The list of agencies that may be consulted in the creation of workforce development projects should be expanded to include other pertinent entities, such as California Community Colleges, community-based organizations, and POU Governing Boards.

CalETC thanks CARB Staff for harmonizing the definitions of equity communities and individuals in the proposed amendments with those detailed in AB 841 and CPUC Decision D.20-12-027. However, the language requires a slight modification. AB 841 defines this as "a community located on lands belonging to a federally recognized California Indian tribe, " and *the proposed order should align with AB 841 in order to ensure simplicity*. Note the proposed amendments include term "state and federally recognized" instead of the AB 841 language.

"Off Road Vehicle" should be defined in LCFS for clarity because it is not obvious that vessels, aircraft, and other transportation or mobile sources qualify under that term. Off-road vehicle projects are needed in many areas including construction sites, factories, warehouses, seaports, railyards, airports and farms. Adding a definition will improve the clarity of the holdback program's list of eligible projects. See Appendix A for recommended edits.

2. **Requesting an increased cap on administrative costs for utility Holdback Programs and statewide Clean Fuel Rewards.** While we appreciate that CARB increased the administrative costs for electric distribution utility (EDU) holdback programs to seven percent, we do not support this change, and request 1) that the seven percent administrative cost cap for utility holdback programs be raised to ten percent and 2) the five percent administrative cost cap for the electric medium-and heavy duty vehicle Clean Fuel Reward be raised to ten percent. We note this recommendation is a simpler solution than the recommendations from our previous letter (see Appendix B):
 - a. As we explain in Appendix B, administrative cost caps are a complex issue. And this issue has not been workshopped. Given the complexity, we recommend maintaining

the current 10 percent administration cost cap on holdback programs and statewide Clean Fuel Reward. It is important to note that the CPUC has decades of experience in regulating billions of dollars in energy efficiency program portfolios and their requirements on administrative costs, marketing, education and outreach costs, and related costs are both thoughtful and strict. They require a ten percent administrative cost cap for energy efficiency programs which is appropriate for CARB's regulation of LCFS programs too. Additionally, as the EDU's LCFS programs grow in size and amount spent, we expect many projects will be added, and many additional partners (community-based, equity-oriented organizations) will be engaged. In that scenario, the EDUs may require a cap of more than 10 percent for holdback programs. Regarding examples on why a 10 percent administrative cost cap is needed for utility holdback programs please see August 27 letters to CARB from individual utilities. Also, the February 20 letter to CARB from CalETC ([Appendix B](#)) provides additional justification, and [Appendix A](#) in this letter on this topic is slightly different than our proposed amendments in our February 20 letter.

- b. The proposed statewide Clean Fuel Reward for electric medium and heavy duty EVs (eMHDVs) is a new program that should not be hampered by a five percent administrative cost cap especially since this market is complex with many submarkets and types of customers that will be hard to reach with rewards. We note that CARB's concerns about administrative costs were addressed when the CPUC authorized the utilities to implement the Clean Fuel Reward in 2019, finding that "a 10% cap of administrative funds is generally within the range of spending for other customer programs the utilities implement," and ordered SCE in Resolution E-5015 to "administer no more than 10% of the total Clean Fuel Reward program budget on administrative and marketing, education, & outreach spending, which must include all administrative spending related to the Clean Fuel Rewards program." The CPUC found that including ME&O in the 10% cap was reasonable for a program of this size; the potential scale of the Clean Fuel Reward is no larger today than it was in 2019, and the same rationale should apply today. In addition, the utilities should not have a lower cap (i.e., five percent) for this program than the automakers (i.e., seven percent) for a similar program for light duty EVs. An additional rationale for our recommendation is in [Appendix B](#).
3. **Clarifying that Publicly Owned Utilities must spend 50% of holdback funds on equity projects, consistent with the intent in the 45-day package.** Appendix E in the 45-day LCFS proposed order gives the rationale for 50%, and we understand that 50% allocation was CARB's intent. This change is necessary to eliminate the inconsistency. Moreover, maintaining a 50% equity spending requirement is appropriate for POUs, as further detailed in [Appendix B](#) to this letter.

4. **Update the EDU definition based on 2022 sales data, clarifying that San Diego Gas & Electric Company is a “medium-sized” utility under the regulation for all the reasons listed in [Appendix B](#).** Appendix E in the 45-day LCFS proposed order gives the rationale for San Diego Gas & Electric Company (SDG&E) as a medium-sized EDU, and we understand that was CARB’s intent. In general, CARB should use GWh definitions consistent with the 2022 EDU annual sales data in the California Energy Commission’s 2023 Integrated Energy Policy Report’s Planning Forecast. This report makes clear that SDG&E is a medium-sized utility with a similar volume of sales as the Los Angeles Department of Water and Power. We recommend small POUs be defined as having less than 5,000 GWh annual sales. See proposed amendments in [Appendix A](#).
5. **Exempt holdback programs administered by EDUs with less than 2000 GWhs of annual sales from a cap on administrative costs, or make them subject to a higher cap, such as 20%.** While small EDUs can design and implement programs specifically tailored to their community needs, administrative costs for these EDUs may naturally result in a higher percentage of costs due to the small scale of programs and the utility’s limited staff resources, particularly if the definition of administrative costs is expanded. We do not support the alternative solution of having a process where small EDUs would seek an exemption (EO approval) due to the cost and time burden. Small EDUs have very different LCFS program needs due to their very small size and lack of budget and staff.
6. **Make edits to the regulation that will assist smaller utilities, potentially allowing them to participate in LCFS.** See the rationale for our proposal in [Appendix B](#) and proposed amendment in [Appendix A](#). Our proposal would support approximately twenty small rural utilities who cover about one percent of California to opt-into LCFS.
7. **Modifying the utility reporting requirements to better track deployment of funds to impacted communities, align with the reporting framework required by the California Public Utilities Commission (CPUC), and simplify reporting for smaller utilities.** See the rationale for our proposal in [Appendix B](#) and proposed amendment in [Appendix A](#). CARB and the CPUC currently measure equity in very different ways, and our proposal would harmonize with how this is done by the two agencies. In addition, our proposal benefits the POUs with a simpler, more practical way to report compliance with the LCFS equity provisions.

CalETC appreciates the opportunity to provide comments on this important regulation. If you have any questions, please do not hesitate to contact me at any time.

Best,

A handwritten signature in black ink, appearing to be 'LR', followed by a horizontal line.

Laura Renger
Executive Director

cc: Rajinder Sahota
Matthew Botill
Jordan Ramalingam

Appendix A (note: slightly different than CalETC's February 20th letter)

New or updated Defined Terms to be added to the Regulation's Definitions and Acronyms

~~[New term] "EDU Program Administrative Costs" are all costs associated with implementing LCFS-funded programs incurred by an EDU to pay for its staff, 3rd party implementers, non-incentive implementation costs (rebates processing, application verification, etc.) websites, application portals, and other direct program costs required to operate the program. EDU Program Administrative Costs do not include marketing, education and outreach costs.~~

[Updated term] "Clean Fuel Reward" is a statewide program established by EDUs to provide a reduction in price ~~on new light duty EV purchases or leases~~ for new and/or used commercial medium- or heavy-duty electric vehicles that are not subject to the High Priority and Federal Fleets requirements as specified in, title 13, California Code of Regulations, section 2015(a)(1) in California. The Clean Fuel Reward is funded exclusively through LCFS proceeds generated by EDUs from electricity fuel.

[New term] "Commercial vehicle" for the purposes of this program means any vehicle used by a business, public or governmental agency, or non-profit to carry people, property, or hazardous materials.²

~~"Rural Area" means a census tract with at least 75 percent of its population identified as rural non urban by the latest US Census data.~~

[New term] "Off road vehicle" is a piece of equipment that is moved over distances in order to transport goods or people from one physical location to another and is not primarily operated on roads established for automotive transport (e.g. fields, waterways, construction sites, airports, airways, etc.).

Recommendations for edits to the holdback program

5. *Restrictions on the Use of Holdback Credits.* Documentation of adherence to the following restrictions must be included in the annual report submitted pursuant to section 95491(e)(5)(A).
 - a. *Holdback Credit Equity Projects.* Effective January 1, 2022~~5~~, at least 75 percent in year one, 40 percent in year two, and 50 percent in subsequent years of holdback credit ~~proceeds~~ annual spending for large and medium investor owned EDUs and 50 percent of holdback credit annual spending for all other EDUs must be used to support transportation electrification for underserved individuals and

² HVIP FY22-23 Implementation Manual, Definitions, page 52 [HVIP-FY22-23-Implementation-Manual.pdf \(californiahvip.org\)](https://californiahvip.org)

communities. Any project from sections 95483(c)(5)(a)(i), (viii), or (xi) shall be considered a holdback credit equity project; all other projects described in this paragraph may be considered holdback credit equity projects provided they are for the primary benefit of or primarily serving disadvantaged communities and/or low-income communities and/or rural areas or low-income individuals eligible under California Alternative Rates for Energy (CARE) or Family Electric Rate Assistance Program (FERA) or the definition of low-income in Health and Safety code section 50093 or the definition of low-income established by a POU's governing body or a community in which at least 75 percent of public school students in the project area are eligible to receive free or reduced-price meals under the National School Lunch Program, or a community located on lands belonging to a ~~state and~~ federally recognizes California Indian tribe.

If an EDU fails to spend the required percentage on equity projects in a calendar year, the shortfall of spending, in dollars, will be added to their total equity spending requirement for the following year.

~~a.~~

~~b.~~ EDUs must use their holdback credits to implement additional projects that further transportation electrification efforts in California. Project costs may include incentives; infrastructure installation; administration; marketing, education, and outreach (ME&O); evaluation; and other cost categories as needed. Equity projects as defined in this paragraph must be selected from the options of projects listed in i-x below. Non-equity projects may be selected from the options on this list, or any alternative provided the EDU meets the requirements of 95491(e)(5) without further CARB approval. The large investor-owned utilities must implement at least three different holdback projects. Equity holdback project options are listed below: ~~These projects may include:~~

- ~~i.~~ Electrification and battery swap programs for school or transit buses.
- ~~ii.i.~~ Electrification of drayage trucks as well as other medium-, heavy-duty, or off-road vehicles including school and transit buses.
- ~~iii.ii.~~ Investment in public EV charging infrastructure and EV charging infrastructure in multi-family residences.
- ~~iv.iii.~~ Investment in electric mobility solutions, such as EV sharing and ride hailing programs.

- ~~v.~~ Multilingual marketing, education, and outreach designed to increase awareness and adoption of EVs and clean mobility options and including information about: the environmental, economic, and health benefits of EV transportation; basic maintenance and charging of EVs; electric rates designed to encourage EV use; and local, state, and federal incentives available for purchase of EVs.
- vi. *[Revised Subsection v. renumber as iii]* ~~community education events located within communities listed in 95483(c)(1)(A) designed to increase awareness and adoption of EVs and clean mobility options, and outreach in coordination with community-based organizations, including but not limited to neighborhood canvassing, community listening sessions, and needs assessments, focused in communities listed in 95483(c)(1)(A), to inform the development of projects and programs tailored to community needs. including information about: the environmental, economic, and health benefits of EV transportation; basic maintenance and charging of EVs; electric rates designed to encourage EV use; and local, state, and federal incentives available for purchase of EVs. Education and outreach do not include general marketing or advertising campaigns.~~
- vii.
- ~~viii.~~ ~~iv.~~ Additional rebates and incentives ~~for low-income individuals~~ beyond existing local, federal and State rebates and incentives ~~including the Clean Fuel Reward~~ for: purchasing or leasing new or previously owned EVs; installing EV charging infrastructure in residences, including panel and service upgrades; ~~promoting use of public transit and other clean mobility solutions~~; and offsetting costs for residential or nonresidential EV charging.
- v. Investing in, or promoting the Promoting use of, and additional incentives for use of public transit and other clean mobility solutions, via charging equipment or infrastructure for the following categories such as:

- I. EV sharing and ride hailing programs,
- II. Electrification of public transit and school buses, including battery swap programs, and
- III. Use or ownership of neighborhood electric vehicles, eBikes, eScooters, eMotorcycles, and other micromobility solutions.
- IV. Charging equipment or infrastructure for any of the above.
- vi. Re-skilling and workforce development for transportation electrification and electric vehicle infrastructure applications, developed in coordination with the California Workforce Development Board, ~~or~~ local workforce development agencies, a community-based organization, a California Community College, or a workforce strategy adopted by the Board of a POU.
- vii. Investments in grid-side distribution infrastructure necessary for ~~medium and heavy duty~~ EV charging.
- viii. Transportation Electrification projects that are identified in, or consistent with, a Community Emission Reduction Plan created in response to AB 617.
- ix. Support for vehicle-grid integration with projects such as:
 - I. Encouraging the optimization of EV charging through education in the following areas: peak demand, rate pricing, grid emergencies, potential power shutoffs, infrastructure deferral, renewable integration, and/or other signals and grid needs to provide grid and customer benefits.
 - II. Providing program incentives to encourage driver participation in monitored/managed charging, demand response, or vehicle-to-

load / vehicle-to- grid applications.

III. Supporting the deployment and installation of bidirectional charging equipment.

IV. Other innovative approaches to promoting and managing EV charging and discharging provide benefits to customers and the grid.

X. Hardware and software that decrease the cost of or avoid updates to infrastructure, including load management software or outlet splitting.

~~vii.~~xi. Alternatively, EDUs, in coordination with local environmental justice advocates, local community-based organizations, and local municipalities, may develop and implement other projects that promote transportation electrification in disadvantaged and/or low-income communities and/or rural areas or for low-income individuals. These alternative projects are subject to approval by the Executive Officer. Applications submitted to the Executive Officer must include, and will be evaluated for approval based on, a complete description of the project, demonstration that the project promotes transportation electrification in disadvantaged and/or low-income communities and/or rural areas or provides increased access to electric transportation for low-income individuals, and evidence that the project was developed in coordination with local environmental justice advocates, local community-based organizations, and local municipalities.

b. ~~*Additional Reporting Requirements for Holdback Credit Equity Projects.*~~ As part of annual reporting required pursuant to section 95491(d)(3)(A)5., EDUs must include a discussion on how their portfolio of holdback credit equity projects is consistent with the findings and recommendations of the SB 350 Low Income Barriers Study, Part B report prepared by CARB (rev. Feb. 2018), incorporated herein. This discussion must include, as applicable, a description of how the projects:

support increased access to clean transportation and mobility options; consider, and to the extent feasible, either complement or build upon existing CARB, other State, or local incentive projects to diversify and maximize benefits from statewide investments; demonstrate partnership and support from local community based organizations; and meet community identified clean transportation needs.

~~b. Other Holdback Projects. Holdback projects that are not specified in subsection 95483(c)(1)(A)6.a. must follow the requirements specified in 95491(e)(5). Below are examples of pre-approved uses for these other holdback credit proceeds:~~

~~i. Investments in grid side distribution infrastructure necessary for EV charging.~~

~~ii. Support for vehicle grid integration with projects such as:~~

~~I. Encouraging the optimization of EV charging through education in the following areas: peak demand, rate pricing, grid emergencies, potential power shutoffs, infrastructure deferral, renewable integration, and/or other signals and grid needs to provide grid and customer benefits.~~

~~II. Providing program incentives to encourage driver participation in monitored/managed charging, demand response, or vehicle to load /vehicle to grid applications.~~

~~III. Supporting the deployment and installation of bidirectional charging equipment.~~

~~IV. Other innovative approaches to promoting and managing EV charging and discharging that provides benefits to customers and the grid.~~

~~iii. Hardware and software that decrease the cost of or avoid updates to infrastructure, including load management software or outlet splitting.~~

b. Administrative Costs of Holdback Credit Equity Projects. With the exception of EDUs with annual sales of less than 2000 GWh, EDU Program administrative costs to support the ~~development and~~ implementation of holdback credit equity projects excluding start-up costs (those costs associated with setting up the program and incurred prior to issuing incentives), must not exceed 10.7 percent of total spending on holdback credit equity projects annually unless the EDU contracts with a community-based organization, and the exceedance is approved in advance by the Executive Officer. The request for administrative cost exceedance for a calendar year must be submitted by September 30th of the prior year. The request must include, and will be evaluated for approval based on, a complete description of the equity projects planned by the EDU, an estimate of total administrative costs relative to total spending on the projects, and evidence that the community-based organization is a non-profit organization focused on serving disadvantaged and/or low-income groups.

Within 30 days of receiving a request for higher administrative costs, the Executive Officer will inform the EDU of its decision in writing. If the request is rejected the Executive Officer will provide a rationale for the decision. If the rejection is due to insufficient information, the EDU may resubmit the request after addressing the deficiencies identified in the Executive Officer decision.

Recommended amendments on administrative cost

§95483(c)(1)(A)(4) Combined Administrative and marketing, education and outreach costs, excluding start-up costs (those costs associated with setting up the program and incurred prior to issuing rewards), to support any Clean Fuel Reward program funded by LCFS credit proceeds may not exceed 5.10 percent of LCFS credit proceeds contributed to the Clean Fuel Reward program annually, unless approved in advance by the Executive Officer.

§95483(c)(1)(A)(4)(a) A request to exceed 5.10 percent administrative and marketing education and outreach costs must be submitted by the administrator of the Clean Fuel Reward program to the Executive Officer by September 30 of the prior year.

Recommended edits to the definition of “Electrical Distribution Utility.”

§95481. Definitions and Acronyms

“Electrical Distribution Utility” means an entity that owns or operates an electrical distribution system, including:

- (1) a public utility as defined in the Public Utilities Code section 216 (referred to as an Investor-Owned Utility, or IOU); or
- A. “Large Investor-owned Utility” means an IOU with annual load served equal to or more than 10,000 25,000 Gigawatt-hours (GWh) in 2017 2022;
- B. “Medium Investor-owned Utility” means an IOU with annual load served of less than 10,000 25,000 GWh and equal to or more than 700 15,000 GWh in 2017 2022;

- C. “Small Investor-owned Utility” means an IOU with annual load served equal to or less than ~~700~~ 15,000 GWh in ~~2017~~ 2022.

or

- (2) a local publicly owned electric utility (POU) as defined in Public Utilities Code section 224.3;

- A. “Large Publicly owned Utility” means a California POU with annual load served equal to or more than ~~10,000~~ 15,000 Gigawatt-hours (GWh) in ~~2017~~ 2022;
- B. “Medium Publicly owned Utility” means a California POU with annual load served of less than ~~10,000~~ 15,000 GWh and equal to or more than 7005,000 GWh in ~~2017~~ 2022;
- C. “Small Publicly owned Utility” means a California POU with annual load served of less than ~~700~~ 5,000 GWh in ~~2017~~ 2022. Or
- D. (C) an Electrical Cooperative (COOP) as defined in Public Utilities Code section 2776

Recommended amendments for a new Small EDU program

[New provision – exact location TBD] §95483(c)(1)(A) XXXX Proceeds from non-opt-in EDU base credits that were allocated to the Large EDUs beginning with the deposit of Q2 2019 credits through the deposit of Q2 2024 credits and the transferred to the Clean Fuel Reward program pursuant to section 95483 (c)(1)(A) may be transferred by the Clean Fuel Reward Program Administrator to small EDUs opted in to the LCFS program by March 31, 2025. Any base credit proceeds reallocated in this manner must be spent by the recipient small EDU in accordance with sections 95491 (e)(5) and 95483 (c)(1)(A). The Executive Officer must approve the Clean Fuel Reward Program Administrator’s plan for distribution of previously unallocated base credit proceeds prior to any transfers.

Appendix B- CalETC Board's February 2024 Letter

February 20, 2024

Honorable Chair Liane Randolph and Honorable Board Members California Air Resources Board
1001 I Street
P.O. Box 2815
Sacramento, CA 95812

Re: Proposed Amendments to the Low Carbon Fuel Standard Regulation

Submitted to <https://ww2.arb.ca.gov/applications/public-comments>

Dear Chair Randolph and Honorable Board Members:

CalETC appreciates this opportunity to SUPPORT the Low Carbon Fuel Standard (LCFS) regulation and provide feedback for CARB Board member consideration. As discussed in detail below, CalETC largely supports the proposed draft regulation order ("draft order"), however, we are urging CARB to make some modifications to ensure that the utilities will be able to effectively administer the programs funded by LCFS proceeds. These changes are critical to ensuring the success of the LCFS program.

CalETC is a non-profit association committed to the successful introduction and large-scale deployment of all forms of electric transportation including plug-in electric vehicles of all weight classes, transit buses, port electrification, off-road electric vehicles and equipment, and rail. Our board of directors includes Los Angeles Department of Water and Power, Pacific Gas and Electric, Sacramento Municipal Utility District, San Diego Gas and Electric, Southern California Edison, Northern California Power Agency, and the Southern California Public Power Authority. Our membership also includes major automakers, manufacturers of zero-emission trucks and buses, developers and operators of charging stations and other industry leaders supporting transportation electrification. CalETC supports and advocates for the transition to a zero-emission transportation future to spur economic growth, fuel diversity and energy independence, ensure clean air, and combat climate change. This letter is submitted on behalf of the CalETC board of directors and covers issues specific to the utility interests in LCFS.

Over the past few years, the CalETC board has worked closely with the CARB LCFS staff to provide suggested amendments to the LCFS regulations. We appreciate the tremendous effort and accessibility of CARB staff during the extensive public process regarding this regulation.

I. Executive Summary of CalETC Utility Comments

CalETC requests specific changes to the draft order to ensure that the utilities will be able to effectively administer programs funded by LCFS proceeds. These changes include: (1) ensuring that the cap on administrative costs for both holdback programs and the statewide California Clean Fuel Reward (CCFR) program is clearly defined and set at a reasonable amount; (2) simplifying and clarifying the language in the proposed regulation pertaining to utility “holdback” (holdback) programs; (3) clarifying that Publicly Owned Utilities must spend 50% of holdback funds on equity projects, as opposed to 75%; (4) clarifying that San Diego Gas and Electric is a “medium-sized” utility under the regulation; (5) making edits to the regulation that will assist smaller utilities, potentially allowing them to participate in LCFS; (6) modifying the utility reporting requirements to better track deployment of funds to impacted communities, align with the reporting framework required by the California Public Utilities Commission (CPUC), and simplify reporting for smaller utilities; (7) requesting that the regulation allow the Executive Officer to approve certain modifications to the CCFR that can improve program responsiveness and efficacy; and (8) requesting implementation assistance on the Credit Clearance Market (CCM). All of these modifications are discussed in Section II, below.

CalETC supports many provisions in the draft order including, but not limited to: (1) the current program design with utilities generating the “base” LCFS residential credits; (2) the provision of more credits to the utility holdback programs; and (3) the establishment of a statewide medium-and-heavy-duty electric vehicle rebate program for new and used vehicles. A detailed description of the rationale behind CalETC’s support positions is included in Section III, below.

II. CalETC Requests the Following Important Changes to the Draft Order

CalETC respectfully requests that the following changes be made to the Draft Order:

(1) CalETC opposes the proposed 5% cap on administrative costs for both holdback programs and the statewide California Clean Fuel Reward and recommends that the cap remain at 10%

Based on how utilities currently track and report program administrative costs, the reduction of allowable administrative costs for utility holdback programs from 10% to 5% in the proposed amendments will make it extremely difficult, if not impossible, to administer these programs. Given their focus on addressing the most underserved individuals and communities, utility holdback programs are necessarily more expensive to operate than broad, unrestricted incentive programs given higher levels of customer support and additional expenses like income verification needed to ensure the funding is reaching the people that most need it. Additionally, smaller utilities may only be able to implement a portfolio of small programs that will never benefit from the economies of scale that larger programs achieve. While there is an option in the Regulation that allows the utilities to exceed the administrative cost caps with advanced approval from the Executive Officer, this is likely to create administrative challenges for CARB and utility staff if each utility must make a request each year that they expect to exceed the proposed 5% cap.

CalETC acknowledges, however, that there may be differences in how CARB Staff and the electrical distribution utilities (EDUs) interpret “administrative costs” as this is not a defined term in the Regulation. While CARB Guidance 20-03 does provide some insight into what might be considered administrative costs, it appears to be inclusive only of the utility’s administrative staff costs (salary, benefits, training, travel, etc.) and does not mention other program-specific costs that have typically been reported as “administrative costs” in past and current utility LCFS programs to CARB and the CPUC . These include critical program activities such as third-party administrative costs, rebate processing fees, applicant and income verification costs, website licenses and fees, and other direct, but non-incentive, program costs. It has been customary for the IOUs to report all these additional costs as “administrative costs” to both CARB and the CPUC in their annual LCFS reports based on the history of discussion in various CPUC Decisions and their experience with other customer programs.³

So, while it may be possible to implement utility Holdback programs with a 5% administrative cost cap under the narrow definition considered in Guidance 20-03, CalETC recommends that, with the exception of small EDUs that have annual electricity sales of less than 2000 GWh, the cap on equity holdback administrative costs should revert to 10% as allowed in the current Regulation, and that the definition should be expanded to include all associated program administrative costs, with the exception of start-up costs and education and outreach costs. Start-up costs, defined as set-up costs that occur before any incentives can be paid, are already excluded from the CCFR. Because costs before program launch are almost 100% administrative, it is nearly impossible to meet any administrative cap in the year a program is being set up. For small EDUs, CalETC proposes that they are not subject to a cap on administrative costs. To this end, CalETC has proposed a definition of EDU Program Administrative Costs in Appendix B that should be included in the Definitions and Acronyms section of the Regulation.

For small EDUs, CalETC proposes that they are not subject to a cap on administrative costs, or are subject to a higher cap, such as 20%. While Small EDUs are able to design and implement programs specifically tailored to their community needs, administrative costs for these EDUs may naturally result in a higher percentage of costs due to the small scale of programs and the utility’s limited staff resources, particularly if the definition of administrative costs is expanded. The 2000 GWh exemption makes sense as a natural break in utility sizes when looking at 2022 CEC data on total electricity sales. While there is a process for EO approval of administrative costs exceeding 10%, the process would place yet another administrative burden on small EDUs to go through the process annually and require additional LCFS Staff time. Furthermore, the process requires a contract with a community-based organization, which is limiting. Many small EDU equity projects incorporate partnerships and collaboration with a CBO without a formal contract.

To further illustrate how other program operating costs are different than the definition of administrative costs in Guidance 20-03, consider the investor-owned utilities (IOUs) energy efficiency program portfolios, which have administered billions of dollars of incentive funds

³ See D.14-12-083, D.20-12-027, and CPUC Resolution E-5015.

throughout the state with oversight from the CPUC, are operated under guidelines established in the Energy Efficiency Policy Manual⁴. As shown in the Table below, Appendix C of the Energy Efficiency Policy Manual lists the cost caps (hard requirements) and targets that the CPUC established for the operations of these programs.

Appendix C Table: Energy Efficiency Policy Manual APPENDIX C Cost Category Caps

Budget Categories	Cap	Target
Utility program administrative costs	10%	
Third-party / Gov't partnership administrative costs		10%
Marketing & outreach costs		6%
Direct implementation non-incentive (DINI) costs		20%
Evaluation, measurement & verification (EM&V) costs	4%	

In addition to being separate from ME&O costs, administrative costs, as defined in the Energy Efficiency Policy Manual, explicitly exclude third party implementer fees, and also exclude direct implementation non-incentive (DINI) costs (which include activities such as software licenses, rebate processing, contractor training, etc.). CalETC's request to expand the definition of administrative costs to include things such as third-party implementer costs and DINI costs while imposing a cap of 10% is more conservative than the requirements of the Energy Efficiency Policy Manual while still allowing the utilities the budgets needed to effectively operate their LCFS-funded programs.

CalETC has confirmed with CARB staff that ME&O costs for holdback are not included as part of administrative costs in any LCFS guidance document. In addition, as noted above, the CPUC does not include ME&O as part of administrative costs for other programs, including current LCFS programs. We recommend that ME&O should be excluded from administrative costs in the new LCFS regulation to reduce uncertainty and improve clarity. See Appendix B for our proposed amendments.

With this expanded definition of administrative costs, CalETC also recommends that the allowable cost cap for the statewide Clean Fuel Reward, which currently includes ME&O costs, be reverted to 10% from the 5% that is in the proposed regulation. While CARB Staff have expressed reasonable concerns that the potential size of the Clean Fuel Reward could allow for very large administrative and ME&O budgets, it should be noted that these same concerns were addressed when the CPUC authorized the utilities to implement the Clean Fuel Reward in 2019, finding that "a 10% cap of administrative funds is generally within the range of spending for other customer programs the utilities implement," and ordered SCE in Resolution E-5015 to "administer no more than 10% of the total Clean Fuel Reward program budget on administrative and marketing, education, & outreach spending, which must include all administrative spending related to the Clean Fuel Rewards program." The CPUC found that including ME&O in the 10% cap was reasonable for a program of this size; the potential scale of the Clean Fuel Reward is no larger today than it was in

⁴ Version 6 located at [6442465683-ee-policy-manual-revised-march-20-2020-b.pdf \(ca.gov\)](https://www.cpuc.ca.gov/6442465683-ee-policy-manual-revised-march-20-2020-b.pdf)

2019, and the same rationale should apply today. Further, we do not believe that either the Clean Fuel Reward or holdback programs will grow so large in the near term that the administrative costs will be too large. CARB will be doing another LCFS rulemaking in a few years and should closely monitor administrative costs and address if there is a problem.

Therefore, the proposed amendment's 5% cap should be rejected, and instead should revert to 1) the 10% allowable administrative costs for utility equity holdback programs, excluding startup costs and ME&O, as this is currently accepted by both CARB and the CPUC, 2) the 10% cap on allowable combined administrative and ME&O costs for the Clean Fuel Reward programs, as authorized in the current version of the LCFS Regulation and concurrent CPUC Resolutions, and 3) a more expansive definition of administrative costs that explicitly excludes ME&O should be added to the regulation. CalETC has provided recommended language for the relevant sections of the Regulation in Appendix B that implement these recommendations. Additional details on administrative costs should continue to be in an updated guidance document.

(2) CalETC recommends simplifying and clarifying the language in the proposed regulation pertaining to utility holdback programs

CalETC supports the staff's efforts to develop a recommended list in the proposed regulation of activities for holdback projects to make it easier for all stakeholders (e.g., the CPUC, CARB Staff, municipal utility governing boards, and utility program developers) to have a clear understanding of how CARB intends utility LCFS Holdback funds to be used. While we appreciate that many new project types have been included in the proposed amendments at the recommendation of CalETC and its members, several updates to the Holdback project list in the proposed amendments are needed for the sake of simplicity and to provide clarity on what is or is not considered a holdback equity project while also providing consistency of interpretation through the regulation itself.

The proposed amendments contain two lists: one which CARB Staff has indicated must be used for equity projects and another which are "good ideas" for non-equity projects. However, this makes it unclear if a utility could implement a project on the "equity" list – such as deploying charging stations at a multifamily property – as part of its non-equity project spending, and it also implies that a project on the "good ideas" list – such as optimized EV charging – could not be considered as counting towards a utility's equity spending requirements even if that project was directly reducing the energy bill of a low-income customer. Further uncertainty exists around the incentivization of medium- and heavy-duty (MDHD) vehicles: should projects supporting MDHD electrification only be considered equity projects if the vehicles are domiciled, or fueling located in, impacted communities, or always be considered equity projects since the pollutants from these vehicles disproportionately impact equity communities (i.e., disadvantaged rural, tribal and low-income communities) regardless of where they are domiciled or fueled?

CalETC recommends that the two lists be consolidated into one and that project spending be considered towards the utilities' equity allocation compliance requirements if it benefits the communities and individuals defined in the equity holdback section. To ensure that the utilities are only deploying projects that CARB supports for equity communities and individuals, CalETC

recommends that the single project list must be used for equity projects and may be used for non-equity projects in addition to other non-equity projects that further transportation electrification in California as defined by 95491(e)(5). This approach is more straightforward, minimizes opportunity for conflicting interpretations, and provides certainty on expectations around CARB's priorities while still allowing flexibility for utilities to propose non-equity programs that are best suited to their specific service areas and customers. CalETC also recommends that any project that furthers the deployment of electric MDHD vehicles be considered as an equity project, as the electrification of trucking almost always benefits low-income individuals and disadvantaged communities with criteria pollutant and GHG reductions even when the primary charging / ownership location is outside of the disadvantaged community, low-income community, tribal area, or rural area (See CalETC's comments on the definition of rural in bullet 8 below).

Additionally, CalETC recommends several smaller changes to the proposed regulation below with proposed amendments in Appendix B:

1. The regulation should include a requirement for large IOUs (SCE and PG&E in CalETC's comments below) to utilize their holdback credit revenues to fund a minimum of three program options as there are increasingly diversified needs in transportation electrification over large service areas. Including this requirement to fund a minimum of three program options will help ensure that the large IOUs consider the diverse needs of their customers and are not compelled by stakeholders to focus on a single project.
2. While we agree with the proposed regulation's deletion of broad-based ME&O (e.g., television and radio), the regulation, rather than Guidance Document 20-03, should clearly allow ME&O for specific projects.
3. The project list should explicitly allow for upgrades to electric panels, which are prerequisites to transportation electrification for many customers living in older buildings that have not had recent updates. Upgrades to panels can have other benefits but are primarily to enable transportation electrification.
4. For simplicity and clarity, the project list should be consolidated on the recommended projects for electric mobility solutions as there are two list items that appear to overlap regarding mobility alternatives.
5. The project list should preserve a narrowly focused project category for direct multilingual education and outreach serving equity communities. The preservation of this category is not intended to include general marketing or advertising. It is only intended to allow for multilingual education and outreach to equity communities.
6. The list of agencies that may be consulted in the creation of workforce development projects should be expanded to include other pertinent entities, such as California Community Colleges, community-based organizations, and publicly-owned utilities (POUs) Governing Boards.
7. CalETC thanks CARB Staff for harmonizing the definitions of equity communities and individuals in the proposed amendments with those detailed in AB 841 and CPUC Decision D.20-12-027. However, the language requires a slight modification. AB 841 defines this as

"a community located on lands belonging to a federally recognized California Indian tribe."⁵ The proposed amendments include "state and federally recognized".

8. The definition of "rural" needs to be updated as the U.S. Census Bureau no longer reports rural percentages for census tract population. The Census Bureau now defines rural as "all population, housing, and territory not included within an urban area."⁶
9. "Off Road Vehicle" should be defined for clarity because it is not obvious that vessels, aircraft, and other transportation qualify under that term. CalETC has provided recommended edits to this section of the proposed amendments in Appendix B to this letter.

(3) CalETC requests clarification that POUs must spend 50% of holdback funds on equity projects, as opposed to 75%

CalETC notes a discrepancy between the proposed LCFS requiring 75% of holdback funds for equity projects compared to Appendix E "Purpose and Rationale for Low Carbon Fuel Standards Amendments," which calls for 50% for POUs. We recommend that POUs have a 50% requirement for equity holdback. We understand there are almost 30 POUs that have opted into LCFS and potentially another fifteen could opt in. The POUs are very diverse and represent specific and limited territories within the State, with a wide variety of populations, EV densities, rural/urban splits, percentages of DACs and community needs. POUs are also uniquely in tune with local needs. Designing and implementing effective transportation electrification programs for low-income, rural and/or disadvantaged communities can be challenging, and the uptake and timing of projects is difficult to predict. In addition, there will be natural fluctuations in program spending year-to-year, and an annual requirement of 50% allows for better planning to maximize the impact of equity spending. In addition, we recommend the 50% equity requirement for the three small IOUs (instead of the 75% in the proposed LCFS). These small IOUs are not opted into LCFS, and a 75% equity holdback requirement creates practical challenges at start up that make it difficult for them to opt-in to LCFS.

(4) CalETC requests clarification that San Diego Gas and Electric is a "medium-sized" utility under the regulation

CalETC notes that the regulatory package has conflicting information regarding the size of San Diego Gas and Electric (SDG&E) and its requirements under CCFR and holdback programs. Specifically, in *Appendix E: Purpose and Rationale of Proposed Amendments for the Low Carbon Fuel Standard Requirements*, CARB staff states, "San Diego Gas & Electric is re-defined to have a comparable contribution to the statewide program to similarly sized public utilities." However, this change is not in the proposed regulation. In discussion with CARB staff, we understand that they intend to categorize SDG&E as the same size as Los Angeles Department of Water and

⁵ Bill Text: CA AB841 | 2019-2020 | Regular Session | Amended | LegiScan at 1601.(e)(5)

⁶ See <https://www.census.gov/programs-surveys/geography/guidance/geo-areas/urban-rural.html>

Power based on their similar total 2022 electricity sales (annual GWh). CalETC supports these two utilities having the same contribution to the CCFR in the final LCFS, as their size is very similar, and SDG&E is substantially smaller than the two large IOUs. This change will allow SDG&E to have more meaningful holdback programs.

CalETC may have further comments on the definition of EDUs based on annual GWhs in the future, as we understand that staff plans to propose amendments to these definitions (e.g., improved data, new thresholds for large, medium, and small EDUs) in an upcoming 15-day comment period.

(5) CalETC requests edits to the regulation that will assist smaller utilities, potentially allowing them to participate in LCFS

CalETC requests the LCFS include a program to encourage small EDUs who have not opted-into LCFS to do so and expand programs by small EDUs who have recently opted in. There are over 50 EDUs in California, and we understand from staff that about thirty have opted in to LCFS. Our proposal would support approximately twenty small rural utilities who cover about one percent of California.

We propose that the LCFS have new regulatory language that allows the CCFR Steering Committee to work with the Executive Officer to design one-time grants to incent the small, mostly rural EDUs that have not yet opt into the LCFS to opt-in and also to provide additional funding to EDUs that have recently opted in. The goal of the program would be to have almost all California utilities participate in the LCFS and provide holdback programs to provide better coverage in underserved areas.

Specifically, we request funding for our recommended program to come from funds that non-opt in EDUs have been providing to the CCFR since 2020 per Section 95486.1 (c) (1) (A) paragraph 2.⁷ Our informal survey of these small EDUs found that they often only have a handful or a few hundred EVs which is not enough to justify a program. Under our proposal, a start-up grant would be enough for a small EDU to start or expand a basic program to help their customers and CARB would provide approvals and oversight to the CCFR Steering Committee and Program Administrator. Our recommended amendment is in Appendix B.

(6) CalETC requests the regulation modify the utility reporting requirements to better track deployment of funds to impacted communities, align with the reporting framework required by CPUC, and simplify reporting for smaller utilities

CalETC appreciates the areas where CARB Staff have made efforts to harmonize the regulatory and reporting requirements of the LCFS Regulations with other regulatory bodies, such as the CPUC. One such area was increasing the equity allocation requirement of utility Holdback

⁷ All base credits for any EDU that is not eligible to receive base credits pursuant to this provision will be allocated to the Clean Fuel Reward program pursuant to section 95486.1(c)(1)(A) paragraph 2.

programs for the Large IOUs from 50% to 75%. Yet, while increasing the equity requirement to 75% appears to align with the CPUC's requirements in D.20-12-027, CARB and the CPUC currently measure this metric in very different ways. CARB counts percent of proceeds earned in a calendar year, which was clarified by guidance document 20-03 to include percent of proceeds either spent or encumbered (i.e., budgeted or set aside) to an equity program. The CPUC, however, counts spending that occurs during the calendar year, regardless of when the credits were earned. This is subtle but, as a result, the IOUs are often reporting entirely different data to demonstrate compliance to each agency in their annual reports⁸.

Tracking compliance against the percentage of annual proceeds creates many operational difficulties. For example, if the combination of on-road EV charging and credit prices-- both of which are beyond the utilities' control -- evolve over a year such that a utility generates double the proceeds it expected to generate, then a utility may be faced with two options to maintain compliance based on percent of annual proceeds: double the spending of its in-market programs or encumber those funds, without actually spending them, in some combination of those programs. The first may not be practical as it is difficult to increase operational capacity of a program in real time; the second achieves compliance but it does not necessarily allow the utility to assess where it should best allocate its holdback funds in the coming calendar year as they will have been encumbered to a specific program for the sake of compliance.

Tracking on how LCFS proceeds are actually returned to Californians, is a more effective metric to track how LCFS dollars actually flow to benefit underserved communities over time and is consistent with the metric used by the CPUC to ensure compliance⁹. However, in recognition that the balance between equity and non-equity spending may necessarily vary in a given year, the regulation should specify that any "underspend" in annual equity spending will carry over to the next calendar year(s) in the form of increased equity spending requirements.¹⁰ The recommended language has been provided in Appendix B as part of the updates to the holdback program section.

Compliance based on spend, when coupled with the rollover of any "underspending" on equity in a given year, also helps smaller utilities, by providing an option, to save up holdback proceeds for several years to accumulate a large enough bank to implement a program without "pre-deciding" how to allocate their funds into a program until they are ready to spend them, in addition to the option of saving up for large equity spending projects through the rollover provision. Further, compliance based on spend makes it easier to account for the reality of utility programs, which often have both equity and non-equity recipients, as the utilities can simply report how much of the annual spend went to each type of recipient in a calendar year, rather than managing set asides in intra-program budgets.

⁸ See Decision D.14-12-083 Ordering Paragraph 4, requiring reporting on annual expenditures.

⁹ Decision D.20-12-027 Ordering Paragraph 1

¹⁰ For example, if a large IOU spent \$10 million in one year, \$7.5 million of that would be required for equity. However, if only \$7 million was spent on equity (70%), the \$500,000 underspend would be added to the following year's compliance such that they would need to spend 75% plus \$500,000.

Therefore, CalETC recommends that the utility holdback project equity allocation requirements be updated to percent of annual spend rather than percent of annual proceeds. Further, CalETC proposes that if a utility underspends on equity projects in a given year, the amount that it underspends will be carried forward to the next year. This aligns the LCFS Regulation's requirements with the obligations that the CPUC has already placed on the IOUs, improves tracking of how LCFS funding is actually being deployed into impacted communities, and simplifies accounting for CARB, CPUC, and utility staff. CalETC has proposed language that would implement these recommendations in Appendix B to this letter as part of its other recommendations for updates to the holdback section.

(7) CalETC requests that the regulation allows the Executive Officer to approve certain modifications to the CCFR that can improve program responsiveness and efficacy

The LCFS is a powerful tool for incentivizing the adoption of low carbon technologies to support the technologies called for in the 2022 Scoping Plan. Because the Scoping Plan calls for the adoption of new zero emission technologies, the LCFS regulatory framework must allow for some flexibility in response to changing market conditions and needs. As such, CalETC respectfully requests that the final regulation allow the Executive Officer to make modifications to the electricity provisions of the LCFS, including the ability to add tools other than rebates or new technologies (such as financing assistance) to the statewide Clean Fuel Reward program if requested by the Clean Fuel Reward Steering Committee. CalETC also respectfully requests that such exception requests from the Executive Officer be handled expeditiously, and staff be adequately resourced to handle these exceptions.

(8) CalETC requests implementation assistance on the Credit Clearance Market (CCM)

CalETC's members include large EDUs who will be impacted by the CCM. We respectfully ask for a guidance document (or, if appropriate, a user guide or FAQ) on the mechanics of the CCM. For example, what do deficit/credit holders functionally do once a CCM / Advanced Crediting phase is declared? Also, given the proposed increase from ten million to thirty million credits in the CCM, we request further discussion regarding possible practical issues down the road if only a small number of EDUs are trying to transact such a large volume in a mandatory compressed timeframe.

III. CalETC largely supports the proposed order

CalETC applauds CARB's efforts to amend this important and complicated regulation. In particular, CalETC supports the following provisions of the proposed order:

(1) CalETC supports the continued allocation of base residential charging credits to the electric distribution utilities (EDUs) which fund important statewide and individual utility programs

CalETC strongly supports the continued allocation of the residential base credits generated by electricity used to fuel electric vehicles to the electric utilities. This is appropriate and leads to the most efficient, equitable, and market-stimulating distribution of the proceeds.

1. *The utilities are subject to extensive regulatory oversight, ensuring that the proceeds are spent in a manner that aligns with the state's goals.*

The electric utilities are subject to extensive reporting and compliance requirements, ensuring that the distribution of LCFS proceeds is open and transparent. Furthermore, the utilities have a duty to serve all customers, including populations that have been slower to adopt EVs including those residing in disadvantaged communities (DAC), low-income renters and multi-unit dwellings (MUD). Residents of DACs and MUDs are utility customers, and as such the utilities are incentivized to assist those customers in transitioning to electric transportation. The electric utilities can use the proceeds gained from base residential credits to establish holdback programs that enable charging at MUDs, for renters, and in equity communities. Similarly, utilities can leverage credits generated across the entire customer base to fund programs incentivizing adoption in DACs and low-income communities. Utilities are the only entity able to use credits generated from residential light-duty EV charging to support heavy-duty or off-road vehicle electrification, an increasingly urgent issue in decreasing the transportation sector's air pollution and greenhouse gas emissions.

California's electric utilities are uniquely positioned to support and enable additional load from electric vehicles because electric vehicle load is flexible and when used off peak makes more efficient use of the electric system which puts downward pressure on electric rates for all other customers. Because of this, California's electric utilities are the only entities that have the primary goal of ensuring accessible infrastructure and affordable electricity, making them uniquely positioned to receive and manage base residential credits.

2. *The electric utilities have been a long-time partner in the state's decarbonization efforts and are by definition located in California.*

Unlike other entities, the electric distribution utilities (EDUs) must always be located locally, within California, to provide a critical and essential service. The size of utilities varies dramatically, with the larger utilities having the staff and resources necessary to work cohesively with the other EDUs to efficiently run statewide programs. Some examples of efforts to collectively enable market transformation include programs in energy efficiency, renewable energy and most recently, the California Clean Fuel Reward. The utilities are equipped to handle the very large-scale proceeds generated by the LCFS. They are experienced, efficient administrators and have a long history of designing large-scale, stable successful programs and have shown they can quickly implement statewide and individual utility programs.

Additionally, all Californians have an electric utility provider and are used to working with their utility to support their energy needs. This name recognition and familiarity is necessary for getting reluctant customers to adopt new technologies. Finally, the electric utilities have provided service to their customers for decades and will continue to serve their territories for

many decades to come, providing the stability needed to positively contribute to the wholesale market transformation required by the switch to electrified transportation.

3. *Electric utilities are able to implement programs that address the needs of all aspects of electric vehicle adoption and at the scale needed to support CARB's scoping plan.*

Unlike other important players in the electric vehicle industry, electric utilities can administer programs involving all aspects of the transportation electrification ecosystem. The utilities can provide rebates for chargers, rates designed to incentivize adoption, vehicle incentives, grid upgrades to support increased beneficial electrification, and have decades of experience implementing programs targeted to benefit lower-income and disadvantaged customers. Having the ability to address all aspects of electric vehicle adoption allows for flexibility in how the money is spent. Furthermore, a properly designed program can afford the utilities the ability to act quickly and to adjust program design when external factors change. This is increasingly important as state, local and federal funding sources and tax breaks tend to shift over time.

Electric utilities also provide service to all electric vehicle segments and classes. The utilities serve light, medium- and heavy-duty vehicles, individually owned vehicles, last-mile vehicles, and fleets. With the increase of electrification, upgrades to the electric grid will be necessary. Utilities will need information about the location of all electric vehicles so that they can adequately upgrade the grid and provide vehicle/grid integration services. Finally, serving all vehicle classes allows the electric utilities to provide programs for both the light-duty and medium-and-heavy-duty sectors. This allows the utilities to utilize the funding from the sectors that are first to electrify (light-duty) to incentivize and support the sectors that are harder to electrify (e.g., medium-and-heavy-duty).

Allowing the utilities to receive the residential base credits also supports individual utility programs which are necessary for meeting local needs and hard-to-reach markets such as medium- and heavy-duty EVs, off-road EVs and infrastructure for renters (homes, apartments, etc.) that are identified in the Scoping Plan, Advanced Clean Cars, and Advance Clean Fleets. Individual utility programs can be nimble and respond to the complex, ever-changing incentive landscape for EV and infrastructure incentives.

4. *Keeping the current structure prevents a complicated system where both utilities and non-utilities receive base residential credits.*

The current structure supports large-scale, statewide programs linked to the State's equity and climate goals. Diluting the credits coming to utilities makes both individual utility and large-scale statewide programs very difficult to implement and harder for CARB to regulate. Also, the current structure enables and funds active utility involvement, especially for small POUs, and encourages more small EDUs to join LCFS and create custom programs to support their customers. The current LCFS is a well-crafted system that allows site-hosts, automakers, charging providers and utilities to all receive LCFS credits.

CalETC also supports the proposed provision requiring entities “generating credits from electricity to use all credit proceeds to further transportation electrification efforts in California and include in their annual compliance report an itemized summary of efforts and costs associated with meeting this requirement.” Ensuring that all the proceeds from the electricity LCFS credits are put back into programs and projects that incentivize the adoption of transportation electrification is essential to effectuating the goals of CARB’s Scoping Plan.

(2) CalETC supports staff’s proposal for EDUs to spend more of their LCFS proceeds on holdback programs

Under the proposed order § 95483(c)(1)(A)(2), the required contribution to CCFR and remaining allocation to holdback programs would be changed as follows:

EDU Category	Holdback Allocation (%)	
	Proposed	Previous
Large Investor-owned Utilities	50	33
Large Publicly Owned Utilities	75	55
Medium Investor-Owned Utilities	75	75
Medium Publicly Owned Utilities	90	75
Small Publicly Owned Utilities and Small Investor-owned Utilities	100	98

CalETC strongly supports these changes, with the exception discussed above regarding San Diego Gas and Electric. Funding from base residential credits for holdback programs and CCFR are directly linked. With the proposed regulation increasing holdback funding percentages, the percentages allocated to the CCFR will decrease. This change is appropriate because the proposed CCFR is for the much smaller market of medium- and heavy-EVs vs. the larger light-duty market in the current CCFR.¹¹ Similarly, removing very small EDUs from contributing to the CCFR is appropriate because a two percent contribution is not meaningful and results in administrative inefficiencies for both the CCFR Program Administrator and the very small EDUs.

(3) CalETC supports the proposed shift in the California Clean Fuel Reward (CCFR) from being a reduction in the purchase or lease price of new light-duty electric vehicles (EVs) to being a reduction in the purchase or lease prices of new electric medium- and heavy-duty EVs

CalETC supports CARB’s proposed amendments that will transition the statewide Clean Fuel Reward program from an incentive for all new passenger EVs to one that will support the adoption of electric MDHD vehicles in the coming decade. We also agree that the new Clean Fuel Reward

¹¹ The California Energy Commission anticipates that the adoption of medium- and heavy-duty vehicles as follows: 27,000 by 2025, 155,000 by 2030 and 377,000 by 2035. See Assembly Bill 2127 Second Electric Vehicle Charging Infrastructure Assessment Revised Staff Report.

should be in line with the needs of CARB's Scoping plan - and primarily benefiting equity communities - and believe the new proposal¹² achieves this goal. However, as the Clean Fuel Reward Program Administrator (SCE) has commented, minor updates to the vehicle eligibility in the proposed amendments are needed to ensure that that new Clean Fuel Reward program can effectively implement CARB's ambitious plans for the commercial vehicle sector.

For example, in *Appendix E: Purpose and Rationale of Proposed Amendments for the Low Carbon Fuel Standard Requirements*, CARB Staff states that the "Clean Fuel Reward will change from a universal new light-duty EV rebate to be focused on new and used rebates for medium- and heavy-duty trucks." However, the proposed amendments define the Clean Fuel Reward as applying only to new vehicles. CalETC believes that "used" was accidentally omitted from the proposed amendments and has provided recommended language that includes used vehicles in Appendix B to this letter.

Additionally, CalETC is concerned that definitions for medium-or-heavy duty vehicle in the proposed amendments do not necessarily align with CARB's stated intentions. Defining these solely by weight class, as the current proposed amendments do, means that the Clean Fuel Reward program may be required to provide incentives for all vehicles that have a GVWR greater than or equal to 8,501, which includes many passenger vehicles such as the Rivian line of products, the extended range Ford F-150 Lightning, the electric Chevrolet Silverado, and the electric Hummer to name a few. Based on CARB Staff's published rationale, CalETC believes these vehicles should be incentivized by the Clean Fuel Reward only if they are purchased for use as commercial vehicles. CalETC agrees with the Program Administrator's proposal that the definition of Clean Fuel Reward be updated to specify that it is for commercial vehicles only, and the Regulation should also include a definition for commercial vehicle in the Definitions and Acronyms section for clarity and completeness. For consistency, CalETC proposes that the LCFS Regulation adopt the same definition for commercial vehicles utilized by the Hybrid and Zero-Emissions Truck and Bus Voucher Incentive Project (HVIP). Both these definitions are included in Appendix B to this letter, and CalETC believes that these minor modification to the proposed amendments will empower the new Clean Fuel Reward program to be a vital tool in the state's efforts to decarbonize heavy-duty trucking.

¹² "Clean Fuel Reward" is a statewide program established by EDUs to provide a reduction in price on new light-duty EV purchases or leases for new medium- or heavy-duty electric vehicles that are not subject to the High Priority and Federal Fleets requirements as specified in, title 13, California Code of Regulations, section 2015(a)(1) in California.

CalETC appreciates the opportunity to provide comments on this important regulation. If you have any questions, please do not hesitate to contact me at any time.

Best,

A handwritten signature in dark ink, appearing to be 'LR', with a long horizontal flourish extending to the right.

Laura Renger
Executive Director

cc: Rajinder Sahota
Matthew Botill
Jordan Ramalingam
Jacob Englander

August 27, 2024

The Honorable Liane M. Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: 2024 Low Carbon Fuel Standard Amendments

Dear Chair Randolph:

The undersigned members of the Low Carbon Fuels Coalition's Climate Smart Agriculture Advisory Committee appreciate the opportunity to provide comments regarding the 2024 amendments to the Low Carbon Fuel Standard (LCFS). We strongly support the increased focus by the California Air Resources Board (CARB) on ensuring that the fuels used in the LCFS program are produced in the most sustainable manner. We are strong advocates for rigorous lifecycle accounting (LCA) methods that precisely quantify the lifecycle emissions from biofuels and that recognize and incentivize lower carbon feedstocks. From a LCA perspective, "corn is not just corn." To the contrary, corn and other crops can be grown on soil using a wide variety of techniques and inputs that substantially impact real-world carbon intensity (CI). We encourage the Board to direct staff to dedicate time and resources to analyze the lifecycle issues pertaining to crop-based feedstocks and report back to the Governing Board. This focused research, analysis, and reporting by CARB staff will enable and inform potential expansions to the LCFS regulations to include field-based practices, the recognition of soil organic carbon, and the harnessing of other CI-reducing techniques and technologies with the next update to the LCFS regulations.

The supporters of this letter represent a range of fuels, feedstocks, and technologies including agriculture trade associations, crop input companies, developers of LCFS credits, and other low-carbon fuel industry participants. This diverse group is united in its interest to provide high-quality fuels to the California transportation market with the lowest environmental footprint. This includes practices that encourage producers to reduce nitrous oxide and methane emissions and increase the carbon sequestered in the soil.

In 2018, the Intergovernmental Panel on Climate Change (IPCC) published a Special Report on the impacts of a 1.5°C global warming above pre-industrial levels. This report found that achieving global carbon neutrality by mid-century is critical to avoiding the most catastrophic impacts of climate change.¹ Moreover, the IPCC Sixth Assessment identified land-based emissions mitigation as "the only [sector] in

¹ IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 3-24, doi:10.1017/9781009157940.001.

which large-scale carbon dioxide removal may currently and short term be possible” and that it is “crucial to limit climate change and its impacts.”² The latest science finds that it is increasingly likely that the 1.5°C target will be exceeded³ and that large-scale greenhouse gas (GHG) reductions are critical to meeting the target.⁴

The recent modifications proposed by CARB to the LCFS regulations (the “15-Day Changes”) add stringency and oversight to the LCFS program and have the potential to facilitate more precise and accurate CI analysis. Unfortunately, certain aspects of the 15-Day Changes leverage this precision only to the detriment of biofuel CI scores rather than authorizing the adjustment of CI scores favorably or unfavorably depending on real-world performance. We encourage CARB to continue to embrace the fundamental LCFS principles of technology-neutrality and science-based performance measurement rather than introducing CI bias into the LCFS program structure.

In this final stage of the LCFS rulemaking, CARB has the opportunity to refine the 15-Day Changes so that the LCFS program will disincentivize less-sustainable biofuels and incentivize more-sustainable biofuels. Such an approach has the potential to expand and enhance the global sustainable fuels market and minimize the risk of unintended consequences at a time when the rapid phase down of petroleum-based fuels is an environmental imperative that has been codified into California law.

Already a leader in the response to climate change, CARB’s 2022 Scoping Plan Update details sector-by-sector roadmaps for California to achieve carbon neutrality by 2045 or earlier. One critical roadmap is for the aviation sector, where the scenario includes a transition of 20% of aviation fuel demand to zero-emission technologies by 2045 and sustainable aviation fuel (SAF) for the rest.⁵

109.1

The agriculture sector can play a significant role in helping California meet the goal of generating SAF. Practices including optimizing fertilizer application, reducing tillage, using enhanced-efficiency fertilizers, double-cropping and planting cover crops have the potential to reduce the CI of fuels by more than 40 g CO₂e/MJ.⁶ These practices are not limited to their GHG benefits; they provide “additional ecosystem service benefits, including watershed protection, increased biodiversity, and improved soil health and fertility.”⁷

² Nabuurs, G-J., R. Mrabet, A. Abu Hatab, M. Bustamante, H. Clark, P. Havlík, J. House, C. Mbow, K.N. Ninan, A. Popp, S. Roe, B. Sohngen, S. Towprayoon, 2022: Agriculture, Forestry and Other Land Uses (AFOLU). In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. doi: 10.1017/9781009157926.009

³ Mathews, D.H., Wynes, S. (2022) Current global efforts are insufficient to limit warming to 1.5°C. *Science* 376 (6600) 1404-1409. <https://www.science.org/doi/10.1126/science.abo3378>

⁴ Mace, M.J., Fyson, C.L., Schaeffer, M., Hare, W.L. (2021) Large-Scale Carbon Dioxide Removal to Meet the 1.5°C Limit: Key Governance Gaps, Challenges and Priority Responses. *Global Policy* 12 (51) 67-81. <https://doi.org/10.1111/1758-5899.12921>

⁵ CARB (2022) 2022 Scoping Plan for Achieving Carbon Neutrality. <https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>

⁶ Liu, X. et. al. (2020) Shifting agricultural practices to produce sustainable, low carbon intensity feedstocks for biofuel production. *Environ. Res. Lett.* <https://doi.org/10.1088/1748-9326/ab794e>

⁷ *ibid.*

There is significant opportunity to increase the adoption of these practices on U.S. farmland. A recent study found that no-till or strip-till is practiced on only 30% of cropland.⁸ Furthermore, these practices are not always maintained by farmers. While no-till practices were adopted on almost 8 million acres between 2012 and 2017, farmers on more than 5 million acres discontinued no-till during the same period for a net gain of only 3 million acres.⁹ Another practice that can reduce GHG emissions, the planting and cultivation of cover crops, has an even lower adoption rate than no-till. Unfortunately, only 5.1% of the approximately 300 million cropland acres planted cover crops in 2017.¹⁰ The LCFS program has the potential to provide a strong and long-term incentive for farmers to implement no-till, cover crops, double-cropping and other similar practices.

CARB is also proposing that all crop-based feedstock used for LCFS fuel pathways must obtain third-party sustainability certification by January 1, 2028, under an approved certification system. These certification systems “must consider environmental, social, and economic criteria,” an expansive list that is likely to place a significant financial burden and obligations on farmers that elect to continue to supply feedstocks for biofuels production. Given the broadness of these requirements and the significant additional administrative burden this will impose on farmers and the producers who buy from them, we urge CARB staff to clarify the specific environment, social and governance (“ESG”) criteria that these certifications are meant to address in the context of crop-based feedstocks and to seek further stakeholder feedback on development of these criteria after this rulemaking. This requirement is consistent with the verification of land use under the EU Renewable Energy Directive (RED). Under international polices such as RED, CORSIA, and RenovaBio, fuel producers are required to collect farm level data and are thus able to benefit from improved farming practices. CARB should also provide a 3-year grace period for any certification system that it plans to suspend or remove, to give stakeholders sufficient time to get certified under a different certification system.

Additionally, sustainability certifications that address these ESG criteria will often also include a rigorous GHG accounting for feedstock CI calculation. For example, both the Roundtable for Sustainable Biomaterials (RSB) and the International Sustainability & Carbon Certification (ISCC) are existing sustainability certification systems that may meet the requirements outlined in Section 95488.9(g); both systems have already developed GHG methodologies for feedstock CI calculation.^{11,12} If CARB requires farms to go through the rigorous process of third-party sustainability certification, then we respectfully request that CARB also consider accepting a feedstock CI score that is calculated and verified in accordance with certification system standards. This would provide a mechanism to compensate farmers adopting climate smart practices for the additional work of certification. Specifically, we ask the Board to

⁸ Pannell, D. J., & Claassen, R. (2020). The Roles of Adoption and Behavior Change. *Applied Economic Perspectives and Policy* 42 (1) 31–41.

⁹ Sawadgo, W., & Plastina, A. (2022). The Invisible Elephant: Disadoption of Conservation Practices in the United States. *Choices* 37(1) 1–13.

¹⁰ Wallender, S., Smith, D., Bowman, M., & Claassen, R. (2021). Cover Crop Trends, Programs, and Practices in the United States. <https://www.ers.usda.gov/publications/pub-details/?pubid=100550>

¹¹ RSB GHG Calculation Methodology v2.3 (2017). <https://rsb.org/wp-content/uploads/2020/06/RSB-STD-01-003-01-RSB-GHG-Calculation-Methodology-v2.3.pdf>

¹² ISCC EU 205 Greenhouse Gas Emissions (2021). https://www.iscc-system.org/wp-content/uploads/2022/05/ISCC_EU_205_Greenhouse-Gas-Emissions-v4.0.pdf

direct staff to evaluate existing GHG calculation methodologies and develop guidance around feedstock CI calculation.

109.3

We are asking the Board to direct staff to investigate how the agriculture sector can be optimized to produce low-carbon biofuels to meet the state's SAF goal. Specifically, we are requesting the Board to prioritize policy discussions and the associated technical analysis related to low-carbon feedstocks for the production of SAF. This technical analysis should include a thorough lifecycle analysis to determine the extent to which supplies of sustainable biofuels produced from various feedstocks can be expanded while not converting additional land to agricultural uses. This technical analysis should be informed by the other primary LCA methodologies including Argonne GREET. To ensure the timely analysis of this information, we request that the Board direct staff to report back to the Board by the end of 2025 on the results of lifecycle analysis and progress toward developing policies to encourage the production of SAF.

For the foreseeable future, liquid fuels will be required to power the majority of airflight thus necessitating a rapid expansion in the supply of SAF. In order to create demand for the fuels with the lowest actual CI possible, ARB needs to account for and incentivize field-based practices. Fortunately, the benefits of these sustainable agricultural practices go beyond their GHG savings, positively impacting our water, ecosystems, and soils.

CARB has been an international leader in developing and implementing programs to reduce GHG emissions across the California economy and the inclusion of climate smart agricultural practices will continue the State's leadership throughout the country. We thank CARB for this opportunity to offer these comments and look forward to continued collaboration to implement policies and strategies that further reduce emissions from the transportation sector.

Sincerely,



August 27, 2024

Ms. Rajinder Sahota
Deputy Executive Officer
Climate Change and Research
California Air Resources Board
1001 I St
Sacramento, CA 95814

Re: Comments on Modifications to the Proposed Low Carbon Fuel Standard Amendments Issued August 12, 2024

Dear Ms. Sahota,

The Renewable Fuels Association (RFA) appreciates the opportunity to comment on the modifications to the proposed Low Carbon Fuels Standard (LCFS) amendments released on August 12, 2024. The RFA is the leading trade association for America's ethanol industry. Our mission is to drive growth in sustainable renewable fuels and bioproducts for a better future.

RFA has commented extensively over the last two years during the California Air Resources Board's (CARB) process of modifying and updating the LCFS program. The comments here are responsive to the August 12 proposal and should be considered in conjunction with our other comment letters. In particular, we are attaching to this letter the comments we submitted regarding the April 10, 2024, LCFS workshop in order to ensure that they are part of the formal record.

110.1 **Approval of E15 Is Necessary to Meet the Proposed Increase in Compliance Stringency at the Lowest Practical Cost to California Consumers**

In our last comment letter, RFA supported an increase to a 9% one-time step-down in the compliance curve, contingent on a commitment from CARB to begin the regulatory process to approve E15. While the modifications to the proposed LCFS amendments do include the 9% step-down, a schedule for a rulemaking to approve E15 has not been released.

As RFA has pointed out multiple times, limiting ethanol to a 10% blend not only locks in a 90% petroleum dependence in the gasoline market with myriad negative environmental and public health consequences, but it also severely limits needed credit generation in the gasoline pool. The proposed caps on soybean and canola oil-derived biomass-based diesel (BBD) are likely to slow the generation of excess LCFS credits in

the diesel pool that have been used to cover ever-increasing cumulative net LCFS deficits in the gasoline pool. E15 is a critical near-term strategy for decarbonizing liquid fuels, which will continue to dominate transportation in California for years, if not decades, to come.

From a consumer perspective, E15 offers a unique opportunity to lower the cost of gasoline while cutting emissions of greenhouse gases and criteria pollutants. California drivers could save \$0.20 per gallon if the state allowed gas stations to sell E15 fuel, according to a new study authored by David Zilberman, PhD, a distinguished professor in the Agricultural and Resources Economics Department at the University of California, Berkeley, and Scott Kaplan, PhD, assistant professor in the Economics Department at the U.S. Naval Academy.¹ The study found that the potential savings for California consumers could reach \$2.7 billion annually and that “low-income commuters may stand to gain the most from a transition towards E15,” given their propensity to have longer commutes and less fuel-efficient vehicles.

California is the only state in the U.S. that has not approved E15. The state’s failure to approve the use of E15 essentially amounts to a gas price hike at a time when hard-working Californians can least afford it.

SB 32, which extended the goals of California’s groundbreaking AB 32 legislation, is clear in the mandate for CARB to adopt rules and regulations to “achieve the maximum technologically feasible and cost-effective greenhouse gas emissions reductions.” Expeditiously approving E15 use in California is consistent with that directive and necessary for CARB to comply with state clean-air policies, bringing significant environmental, health, and cost benefits to California citizens.

110.2 **The Primary Rationale for Introducing Biomass Sustainability Requirements in the LCFS Amendments No Longer Exists**

During public workshops held in 2022 and 2023 regarding potential changes to the LCFS, CARB openly considered whether any measures should be taken in response to the growth in the use of crop-based feedstocks for BBD. In the workshop on July 7, 2022, staff noted that CARB had received feedback in which it was “[r]ecommended that CARB set an upper limit on biofuel volumes from lipid-based feedstocks.”² For CARB’s February 22, 2023, workshop, the staff presentation contained three slides showing increases in BBD and related crop-based feedstock usage and then asked, “Are there regulatory mechanisms staff should consider?”³

Rather than imposing a lipid “cap,” CARB established feedstock sustainability requirements in the proposed LCFS amendments issued in December 2023. In the Crop-Based Biofuels Sustainability Criteria section of its Initial Statement of Reasons,

¹ <https://d35t1syewk4d42.cloudfront.net/file/2823/Impact%20of%20Introducing%20E15%20in%20California%207-9-24.pdf>

² https://ww2.arb.ca.gov/sites/default/files/2022-07/LCFSWorkshop_Presentation.pdf

³ https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/lcfs_meetings/LCFSpresentation_02222023.pdf

CARB explained, “To reduce the risk that rapid expansion of biofuel production and biofuel feedstock demand could result in deforestation or adverse land use change, CARB staff are proposing additional guardrails on the use of crop-based feedstocks for biofuel production.”⁴

However, in the 15-day changes to the proposed amendments issued on August 12, 2024, CARB reversed course and capped the generation of credits for BBD from “virgin soybean oil and canola oil” at 20% of annual BBD volumes on a company-wide basis. Yet, CARB did not remove the sustainability requirements, even though they were intended to accomplish the same objective. Instead, CARB doubled down by making the requirements more onerous.

Certification Under the Proposed Sustainability Requirements Is Unnecessary for U.S.-Produced Ethanol

As discussed at length in the attached comments RFA submitted in response to the CARB workshop that was held on April 10, 2024, the risk that U.S. ethanol production will result in adverse outcomes of concern to CARB is essentially nonexistent.

As noted above, the proposed sustainability requirements were intended to reduce the risk associated with a “*rapid expansion* of biofuel production and biofuel feedstock demand.” (Emphasis added.) However, fuel ethanol production has receded since 2018, and the market for ethanol in U.S. road transportation is mature. Moreover, total U.S. cropland has been declining for decades, and the entire increase in U.S. corn production since 2007 has come from rising yields (and switching acreage from other crops), not expanding crop area.

This was implicitly acknowledged by CARB. In the Crop-Based Biofuels Sustainability section of the staff presentation to the April workshop, which was held four months after the proposed amendments were issued, all six of the charts focused on BBD and related feedstocks, especially soybean oil. In the Topics for Discussion slide in that section, the first three bullets addressed BBD and related feedstocks. Notably, however, CARB asked, “Should E15 be considered to help reduce retail gasoline costs?” This indicates that the same concerns did not extend to ethanol.

The Latest Version of the Sustainability Requirements Is Unjustifiably Onerous and Likely Unworkable, Which Could Have Ramifications for the State’s Fuel Supply

The sustainability requirements are scheduled to be phased in over time. Starting in 2026, biofuel producers “must maintain attestations ... and geographical shapefiles or coordinates of plot boundaries (farm, plantation or forest) that are managed to produce the biomass with the annual fuel pathway report.”⁵ However, even this initial phase will be difficult for some ethanol producers and unworkable for others.

⁴ <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>

⁵ https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_atta-1.pdf

For those ethanol producers that predominantly originate corn and sorghum directly from farmers, a typical facility will buy grain from hundreds of growers. And, for those producers that purchase a significant share of their feedstock from grain elevators, the complications of complying with the requirements would be compounded.

Not all farmers will want to share their shapefiles/coordinates with ethanol producers or elevators, and land sales and shifts in rentals from year to year would make it challenging to ensure that all records are up to date. Often, elevators and the grain-purchasing areas of ethanol plants are sparsely staffed and have basic computer systems, and elevators operate on razor-thin margins, making it unattractive to incur additional costs that do not come with associated revenues.

Additionally, an officer of each ethanol company will be required to sign an attestation *under penalty of perjury* that “the biomass used to produce [the fuel] is sourced from land that was cleared or cultivated prior to January 1, 2008, and actively managed or fallow, and non-forested since January 1, 2008. Biomass has not been sourced from land that is protected by international or national law or by the relevant competent authority for nature protection purposes.” He or she must “further certify that geographical shapefiles or coordinates of plot boundaries (farm, plantation or forest) accurately represent the source of biomass used under this fuel pathway.”

However, ethanol facility employees will not have firsthand knowledge of the land history and field dimensions of farms where the feedstock was produced, and they will likely be extremely reluctant or unwilling to sign such an attestation. This requirement is unlike the one for specified source feedstocks (e.g., waste fats, oils, and greases), where suppliers, who are directly responsible for and knowledgeable about the origin and handling of the materials, are required to provide the attestations.

Starting in 2028, biofuel producers are required to meet chain-of-custody requirements similar to those for specified source feedstocks, including feedstock transfer documents. In the case of corn, a highly efficient elevator system, in which grain from numerous origins is commingled, has evolved over decades if not longer. For an ethanol plant that sources a significant share of its grain from one or more elevators (i.e., an elevator is the “first gathering point”), having to “show shipments of feedstock type and quantity directly from point of origin to the fuel production facility” is not workable, at least without receiving a premium for ethanol that would offset the cost of setting up and operating an identity-preservation system. Using a mass-balance approach would at least be theoretically possible, but “material balance or energy balance systems that control and record the assignment of input characteristics to output quantities at relevant points along the feedstock supply chain between the point of origin and the fuel production facility” are not currently in place.

However, some farmers and elevators would not want to go through the extra effort associated with the 2026 and 2028 requirements and would instead sell their grain into other market channels (e.g., for livestock feeding or exports) rather than ethanol. As

discussed in RFA's comments on the April 2024 workshop, if California moves ahead with any feedstock certification program, there should be a provision to designate all U.S.-produced ethanol as already in compliance, so long as aggregate cropland area does not expand beyond a 2007 baseline. This would be consistent with the EPA's approach under the federal Renewable Fuel Standard.

The final set of sustainability requirements to be implemented in 2031 would be extremely onerous for ethanol facilities' purchases of feedstock directly from farmers and completely unworkable for purchases through grain elevators. While the objective underlying the requirement that feedstock "be produced according to best environmental management practices" might be commendable, the four sustainability areas that are addressed (biodiversity, soil quality, "contamination" from fertilizers and other inputs, and water quality) are all-encompassing for farm operations yet barely defined in the CARB proposal.

In 2023, 1.34 billion gallons of corn- and fiber-based ethanol were used in California toward the LCFS.⁶ This represented 8.6% of the ethanol produced in the U.S. During the 2023/24 crop-marketing year, USDA estimates that 35.5% of the U.S. corn crop will be used for ethanol and coproducts.⁷ This means that the equivalent of 3.0% of the U.S. corn crop is used to produce ethanol consumed in California. Given the Advanced Clean Cars II program, it is likely that less ethanol will be consumed in California in 2031—especially if it remains the only state not to allow sales of E15 blends—while corn yields will continue to increase. As a result, on the present trajectory, well under 3% of the U.S. corn crop will be used to provide ethanol to California in 2031.

As a result, a large majority of farmers would have the option not to incur the additional effort and cost of complying with the California sustainability requirements. They are supplying commodity corn that is not receiving a premium, so why would they choose to sell it at a lower profit with a higher administrative burden? They could simply sell it into livestock feeding or export channels—or even to ethanol plants that are not shipping to California.

The same applies to grain elevators. They typically buy from local farmers or from smaller elevators and then commingle the corn that they receive. They do not necessarily know in advance which farms they will originate/handle corn from—and if they buy from a feeder elevator, they might never know. Elevators would suddenly be in the position of having to stipulate in advance to farmers the production practices that must be followed, in addition to undertaking the additional recordkeeping. Again, they are supplying commodity corn that is not receiving a premium, so why would they choose to sell it at a lower profit with a higher administrative burden?

The situation would be exponentially more difficult in a drought year. An ethanol plant in a drought area can have to buy substantial quantities of corn from a distant elevator, rather than purchasing from local farmers and elevators with which they usually do

⁶ <https://ww2.arb.ca.gov/resources/documents/low-carbon-fuel-standard-reporting-tool-quarterly-summaries>

⁷ <https://www.usda.gov/oce/commodity/wasde/wasde0824.pdf>

business. The shift in suppliers is unexpected, so there is no ability to retroactively have the distant elevator inform growers in the area that they will need to meet California's environmental requirements that season.

All of this could cause some ethanol producers to have great difficulty complying with the sustainability criteria in 2028 and 2031—or they could simply not want to incur the potential exposure associated with noncompliance and particularly with signing the attestation. Therefore, they might decide not to sell ethanol to California. From the state's perspective, this could cause volume constraints and price increases in the gasoline pool at a time when California is already concerned about how to avoid problems in the liquid fuel supply during the transition to ZEVs.⁸

If the state is going to consider sustainability criteria, it would be far more reasonable for those to be implemented as part of a program that allows greenhouse gas-reducing feedstock production practices to be recognized in determining the carbon intensity (CI) of the resulting biofuels—after an extensive process of consultation with industry. This would provide an opportunity for a premium to be received for feedstock that would at least offset the additional cost and effort incurred by farmers, elevators, and biofuels producers. It is worth noting that at the federal level the Inflation Reduction Act provided billions of dollars to incentivize farmers to undertake climate-smart agriculture practices, rather than simply mandating that they follow such practices, in order to dramatically kickstart adoption where it was not already occurring.⁹

The New Language Regarding Land Use Change Is Unclear and Potentially Problematic

In the proposed amendments, a column labeled 2015 Region of Analysis was added to Table 6, Land Use Change Values for Use in CI Determination. Ostensibly, this was done to assist in the determination of a land use change (LUC) “value appropriate to use for a region/feedstock/fuel combination not currently listed” in the table.

However, CARB also added the following language about LUC as section 95488.3(d)(2):

The Executive Officer may determine that no value in Table 6 is conservatively representative of a particular region/feedstock/fuel combination and assign a more conservative LUC value. Such determination must be based on the best available empirical data, including but not limited to satellite-based remote sensing data for land cover monitoring, crop yields, and emission factors from the AEZ-EF model or carbon stock datasets. For feedstocks not listed in Table 6, the Executive Officer may determine and assign an appropriate LUC value based on empirical land cover data, crop yields, and emission factors.

⁸ <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/oil/081624-californias-governor-looks-to-regulate-gasoline-price-shocks-during-the-energy-transition-period>

⁹ <https://www.usda.gov/media/press-releases/2024/08/16/fact-sheet-celebrating-two-years-inflation-reduction-act>

The first sentence in the section is open-ended, and only the last sentence refers to a factor (limited to feedstock) that is not listed in Table 6. In order to ensure that this provision cannot be interpreted more broadly, CARB should add language at the beginning of section 95488.3(d)(2) specifying that it only applies to region/feedstock/fuel combinations not listed in Table 6.

It is also notable that the section appears to allow new discretion for the Executive Officer of CARB to unilaterally increase LUC factors but not decrease them. RFA and many other stakeholders have documented how the existing LUC factors for corn ethanol are overstated and should be revised downward.

RFA and others have also provided analysis demonstrating that modern farming practices are capable of significantly decreasing feedstock CI. The federal government is recognizing these benefits in the regulatory framework for tax credits under the Inflation Reduction Act, and CARB should finally move forward with similar recognition under the LCFS.

Thank you for the opportunity to submit these comments. RFA looks forward to working with CARB board members and staff to strengthen and extend the successful LCFS program.

Sincerely,

A handwritten signature in black ink, appearing to read "Scott Richman", with a stylized flourish at the end.

Scott Richman

ATTACHMENT



May 10, 2024

Ms. Rajinder Sahota
Deputy Executive Officer – Climate Change and Research
California Air Resources Board
1001 I St
Sacramento, CA 95814

Re: Comments on April 10, 2024 LCFS Workshop

Dear Ms. Sahota,

The Renewable Fuels Association (RFA) appreciates the opportunity to comment on the Low Carbon Fuel Standard (LCFS) workshop held on April 10, 2024. The RFA is the leading trade association for America's ethanol industry. Our mission is to drive growth in sustainable renewable fuels and bioproducts for a better future.

The RFA supports the LCFS and looks forward to continued engagement in this process to strengthen and extend the program beyond 2030. The RFA is also working around the country in collaboration with other stakeholders to develop and implement clean fuel programs in other states.

The RFA has commented extensively over the last two years during the California Air Resources Board's (CARB) process of modifying and updating the LCFS program. The comments here are responsive to the latest workshop and should be considered in conjunction with our other comment letters.

The one-time step-down should be increased to nine percent, contingent on a commitment from CARB to begin the regulatory process to approve E15.

Overcompliance with the LCFS has accelerated and is stifling the innovation necessary for California to meet its climate goal of carbon neutrality by 2045. At the end of 2023, the credit bank was approaching 24 million metric tons, and it has been growing steadily every quarter for the last two years.

The significant imbalance between credits and deficits has chilled the credit market, with credit pricing this month dropping to the lowest levels since July 2015. Delays in finalizing the modifications to the LCFS program are adding to the market uncertainty. Consequently, the long-term market signals necessary for new investments in low-carbon technologies are lacking, undermining the future success of the program.

The 45-day rulemaking package for the LCFS included a five percent step-down. The April 10th workshop showed modelling for both a seven and nine percent step-down. A strong one-time step-down in the compliance curve of nine percent, combined with the proposed Auto Acceleration Mechanism, would be the most effective and immediate measure CARB can implement to send the appropriate investment signals and restore confidence in the long-term viability of the LCFS program.

Approval of E15 in California would further reduce carbon emissions, support a more stringent LCFS compliance curve, lower criteria pollutant emissions, and reduce consumer fuel costs.

The RFA has been actively working with CARB over the last five years on the process for E15 approval. California is now the only state in the country that does not allow the use of E15 as a legal fuel. The Multi-Media Evaluation required by regulation to certify new fuels in California is complete and is awaiting final approval by the Environmental Policy Council.

E15 certification is the single most effective measure CARB can adopt in the transportation sector to immediately and significantly reduce GHG emissions further, while at the same time reducing criteria pollutant emissions and consumer costs. If all gasoline sold in California today were E15 instead of E10, the state would see an additional decrease in GHG emissions of approximately 2 million metric tons per year.

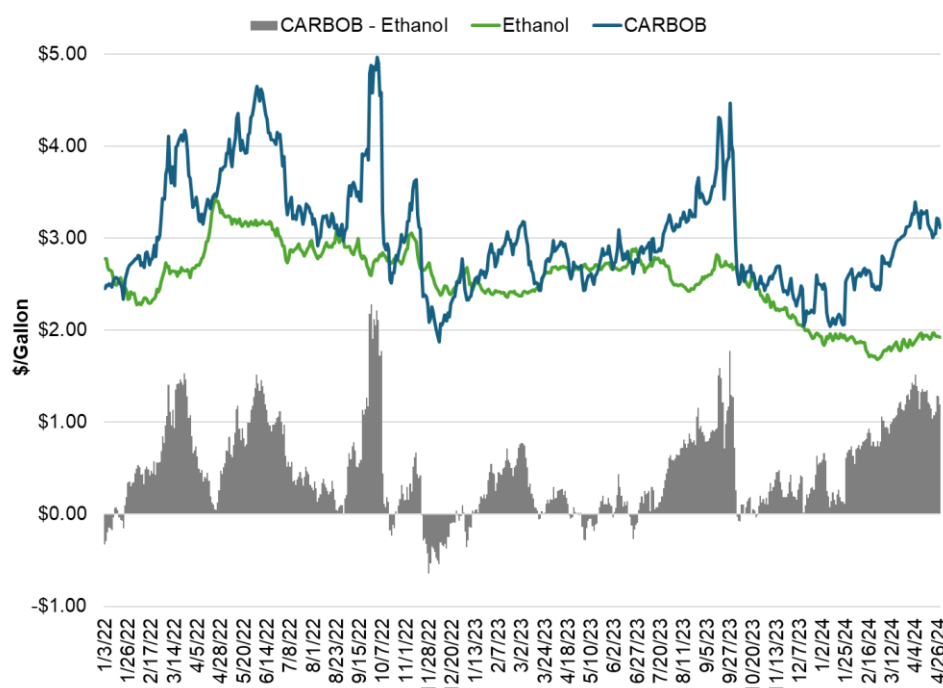
On the cost side, the wholesale price of ethanol in California typically trades at a significant discount to CARBOB, the fuel with which ethanol is blended to make finished California gasoline (Figure 1). In recent months, prices for ethanol sold in California have consistently been \$1 per gallon below the price of CARBOB.

This cost-effective strategy for significant GHG reductions supports a more significant step-down in the LCFS compliance curve while displacing more petroleum and improving public health through lower tailpipe and toxics emissions.

The RFA has been advocating since the beginning of the current LCFS rulemaking for E15 to be a part of this round of program modifications. We appreciate that CARB is now asking for comments on E15 in connection with the April 10th workshop, but since E15 was not part of the 45-rulemaking package we are urging CARB to expeditiously begin a separate rulemaking process to approve E15.

As part of the final LCFS rulemaking, we encourage CARB to include a staff recommendation or a Board resolution to immediately initiate an expedited rulemaking to approve E15 in California. Given the myriad environmental and economic benefits of E15, as well as the time value of near-term carbon reductions, the time to approve E15 in the state is now.

Figure 1: Los Angeles Gasoline Blendstock (CARBOB) vs. Ethanol Prices



Sources: OPIS (ethanol), U.S. Energy Information Administration (CARBOB)

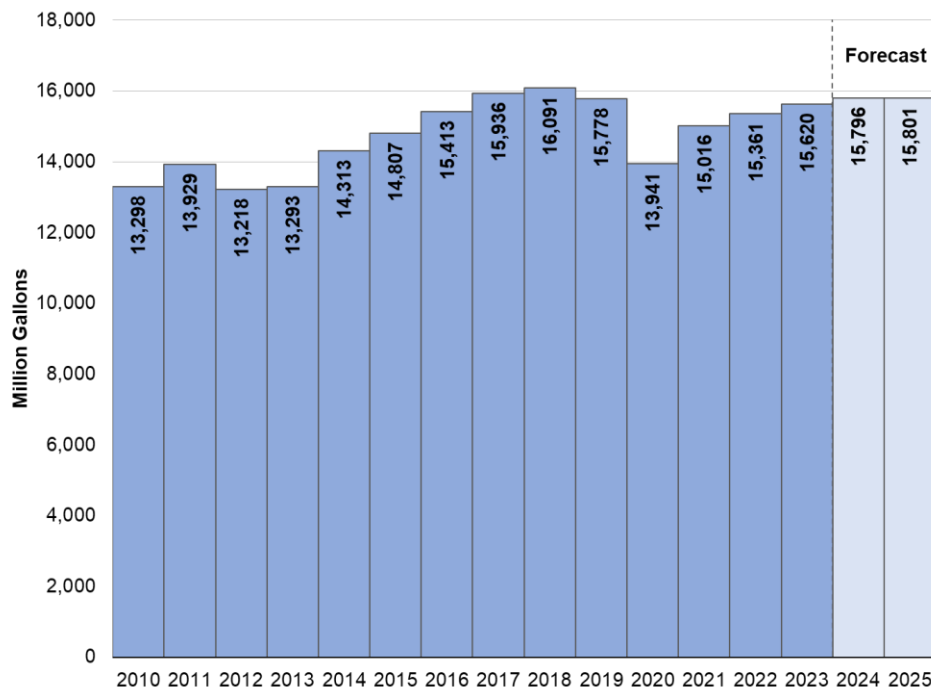
U.S.-produced ethanol already meets the objectives of the proposed sustainability provisions and should not be subject to further certification.

In the Initial Statement of Reasons for the proposed LCFS amendments, CARB provides its rationale for introducing crop-based biofuels sustainability criteria: “To reduce the risk that *rapid expansion* of biofuel production and biofuel feedstock demand could *result in deforestation or adverse land use change*, CARB staff are proposing additional guardrails on the use of crop-based feedstocks for biofuel production.”¹ However, U.S. fuel ethanol production has declined since peaking in 2018, and federal government forecasts do not reflect “rapid expansion,” but rather flat or declining volumes, depending on the timeframe. As a result, there is no risk of associated deforestation or land use change related to U.S. ethanol production.

After reaching 16.1 billion gallons (bg) in 2018, ethanol production slipped to 15.8 bg in 2019 and then fell sharply to 13.9 bg in 2020 as a result of the pandemic, according to the U.S. Energy Information Administration (EIA) (Figure 2). Volumes have recovered somewhat over the last few years, but output was only 15.6 bg in 2023. Moreover, according to EIA’s May 2024 *Short-Term Energy Outlook*, production is forecast to be 15.8 bg in both 2024 and 2025, remaining below the 2017 and 2018 levels. The compound annual growth rate from 2010 to 2025 will have been just 1.2%.

¹ <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf> (emphasis added)

Figure 2: U.S. Fuel Ethanol Production



Source: EIA

The number of vehicle miles traveled in the U.S. has followed a similar pattern over the last five years. Increasing sales of electric vehicles (EVs) and improving fuel economy for vehicles with internal combustion engines have also weighed on ethanol consumption. Trends toward reduced commuting (as people are working from home at least part of the week), higher fuel economy, and expanded EV sales are expected to continue in the future.

Beyond market developments, adoption of EVs will be explicitly or implicitly required by policies adopted over the last couple of years. In November 2022, California adopted the Advanced Clean Cars II (ACC II) program, which will require EVs to account for 35% of new passenger car, truck, and sport-utility vehicle sales starting with model year 2026, ramping up to 100% by model year 2035. A number of other states have adopted all or part of California's vehicle regulations under Section 177 of the Clean Air Act, and as a result ACC II is expected to apply to approximately one-third of U.S. light-duty vehicle (LDV) sales starting in 2027.

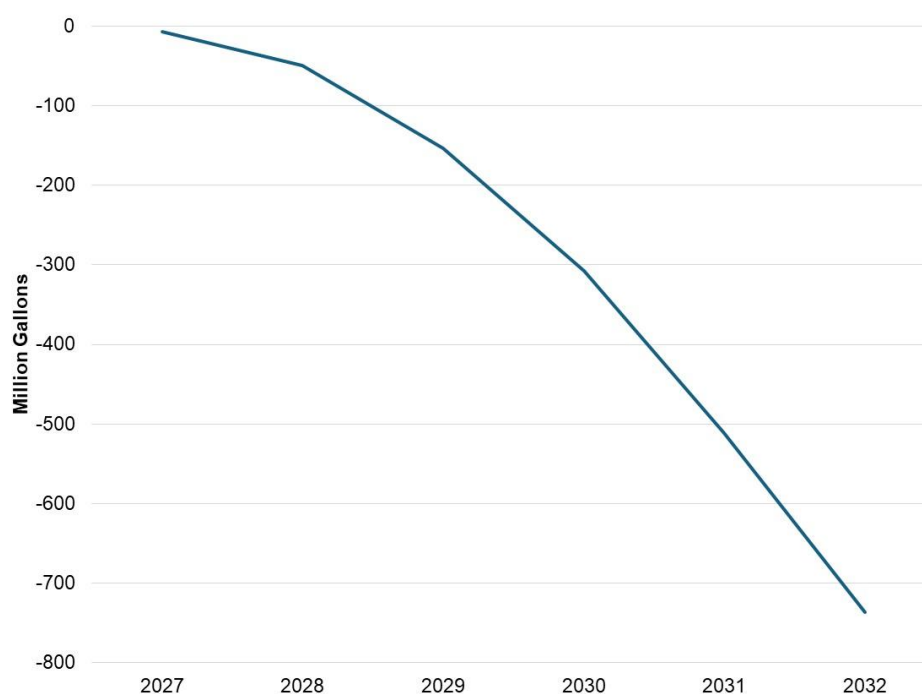
Moreover, in March 2024, EPA released its final Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles, more commonly referred to as the "tailpipe emissions standards." In conjunction with the release, the Agency stated, "EPA projects that from MYs 2030-2032 manufacturers may choose to produce battery electric vehicles (BEVs) for about 30 percent to 56 percent of new light-duty vehicle sales."² Plug-in hybrid electric vehicles (PHEVs) would account for part of

² <https://www.epa.gov/system/files/documents/2024-03/420f24016.pdf>

the remaining sales. Under EPA’s “central case” technology pathway, the share of U.S. LDV sales represented by plug-in EVs would exceed the share that would result only from adoption of ACC II by California and Section 177 states.

In a Regulatory Impact Analysis, EPA estimated the impact that the standards would have on liquid-fuel consumption. Based largely on that analysis, RFA estimates that if the average ethanol content of finished gasoline were to remain at the 2023 level of 10.39%, the annual impact on U.S. ethanol consumption would be 300 million gallons (mg) in 2030 and more than 700 mg in 2032 (Figure 3). Given that adoption of E15 is expected to continue expanding in the interim, the impact is likely to be even greater. If all finished gasoline sold in the U.S. were E15 in 2032, 1 billion fewer gallons of ethanol will be consumed than would be the case without the rule.

Figure 3: Annual Reduction in Ethanol Consumption Under EPA 2027-2032 Tailpipe Standards



Source: RFA analysis of EPA Final Regulatory Impact Analysis (Table 4-13)

Note: Assumes 98% of liquid fuel for light- and medium-duty vehicles is gasoline, based on Department of Transportation data

For land use change to actually occur, production of a certain biofuel, and the associated consumption of feedstock, must increase more rapidly than gains in feedstock production efficiency (i.e., crop yield). Models used to estimate emissions resulting from land use change typically assume that demand for a particular biofuel outpaces the agriculture sector’s capacity to provide the requisite feedstock on existing cropland. This has not occurred in the real world, and projections looking forward show this will not occur in the future.

As noted in a recent paper written by leading researchers involved in the lifecycle analysis of biofuels, “Unfortunately, land-use changes are not directly observable or measurable. Economic models have been used to estimate land-use changes.”³

Models are typically run separately for a certain biofuel volume trajectory and for a counterfactual scenario (e.g., without a policy change), and then the results are compared. Alternatively, models can be run to show the impact of a biofuel volume “shock” of a specific size. For example, in the Model Comparison Exercise that EPA conducted in conjunction with issuing the 2023-2025 volume obligations under the Renewable Fuel Standard (RFS), it introduced a corn ethanol shock and a soybean oil biodiesel shock, each of which involved an additional billion gallons of domestic consumption per year.⁴ However, as discussed above, U.S. ethanol volumes are not expected to grow materially in the near term, and usage as a road transportation fuel is expected to decrease in the medium term. That is, there is no upward “shock” to be modeled to estimate expected land use change.

In introducing its proposed sustainability requirements, CARB stated, “Crop-based and forestry-based feedstocks must not be sourced on land that was forested after January 1, 2008.”⁵

Importantly, the entire increase in U.S. corn production since 2007 has come as a result of rising yields (and switching with other crops), not expanding acreage. The U.S. harvested a record corn crop in 2023; however, if yields had stayed the same as in 2007, corn production would not have increased at all (Figure 4).

U.S. corn yields have exhibited a strong upward trend during recent decades. Yields have increased by nearly 1.9 bushels per acre annually since the mid-1990s (Figure 5). This has been the result of substantial investments in seed technology, combined with the adoption of improved agronomic practices.

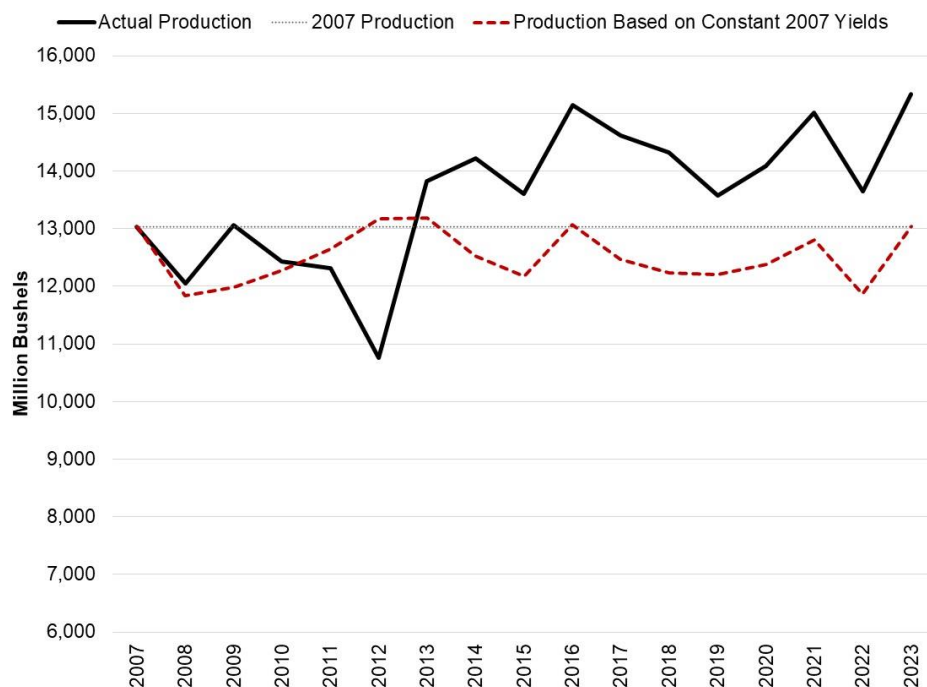
In the future, if ethanol production is steady or declines, fewer acres will be needed to grow corn to be used as feedstock for ethanol because more corn is being produced per acre. Additionally, approximately 15 pounds of distillers dried grains, a high-quality animal feed ingredient, is produced from each bushel processed for ethanol, along with nearly one pound of distillers corn oil, which is used as a low-carbon-intensity feedstock for biomass-based diesel or as a feed ingredient. Together, nearly one-third of the corn that is used by ethanol biorefineries is returned to the market in the form of coproducts.

³ <https://doi.org/10.3390/su16072729>

⁴ <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockkey=P1017P9B.pdf>

⁵ https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/lcfs_appa1.pdf

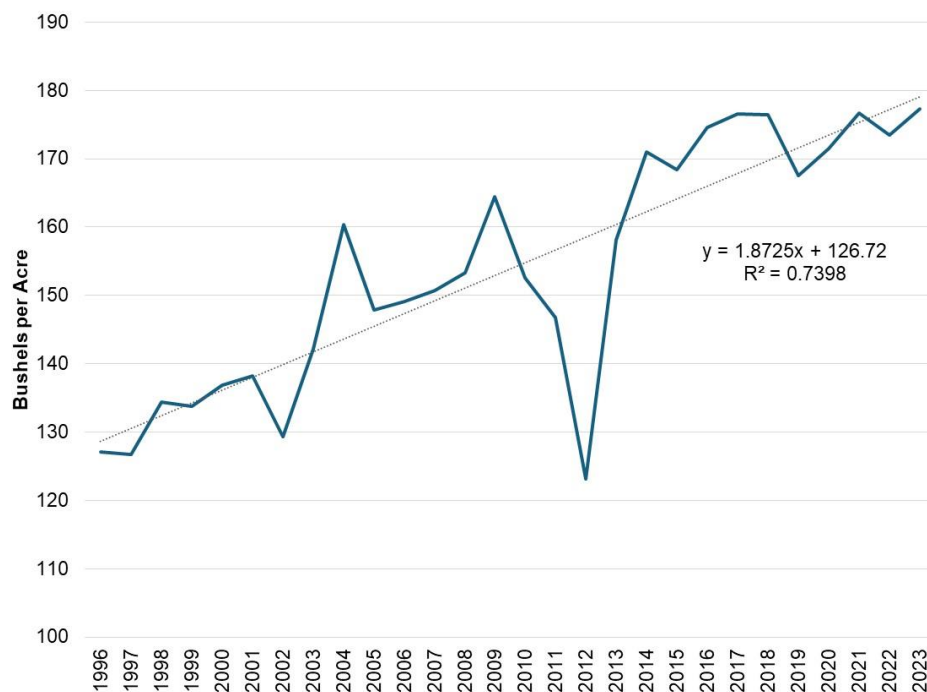
Figure 4: Actual U.S. Corn Production vs. Level if Yields Had Not Changed Since 2007



Source: USDA-NASS (historical production), RFA (analysis)

Note: Dashed line represents actual harvested acreage multiplied by 2007 yield

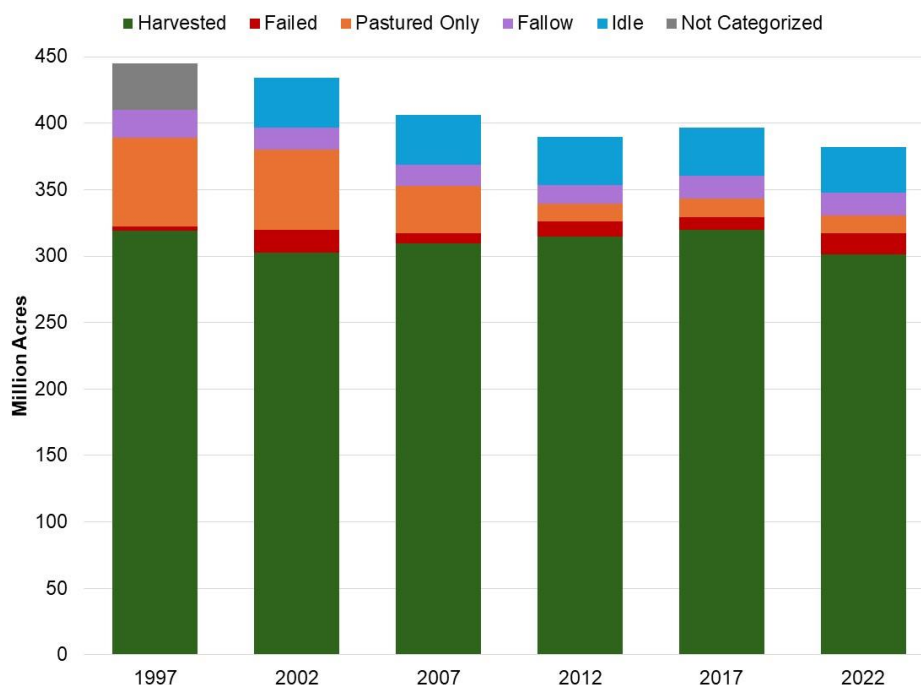
Figure 5: U.S. Average Corn Yield



Source: USDA-NASS (historical production), RFA (analysis)

Putting corn acreage dynamics into a broader context, total U.S. cropland has fallen steadily for decades, as has been documented in previous RFA comments.⁶ More specifically, cropland has declined since the beginning of 2008, the date after which CARB’s proposed sustainability criteria are intended to ensure that previously forested land is not used to grow feedstocks for the LCFS program. This decline in cropland was confirmed by the 2022 Census of Agriculture released in February, which showed that the amount of cropland in the U.S. fell by an additional 14 million acres, or 4%, since the prior Census in 2017 (Figure 6).

Figure 6: Composition of U.S. Cropland



Source: USDA Census of Agriculture

The Energy Independence and Security Act of 2007 (EISA), in which the RFS was expanded and allocated among several categories of biofuels, specified that the “renewable biomass” used to produce those biofuels must be “harvested from agricultural land cleared or cultivated at any time prior to the [December 19, 2007] enactment of this sentence that is either actively managed or fallow, and nonforested.”⁷ Thus, the RFS already accomplishes at a national level the objective that CARB has elaborated for its proposed sustainability criteria.

To implement this provision of EISA, EPA adopted an aggregate compliance approach. In its final rule for the revised RFS, EPA stated:

⁶ See particularly RFA comments dated August 8, 2022 and February 20, 2024

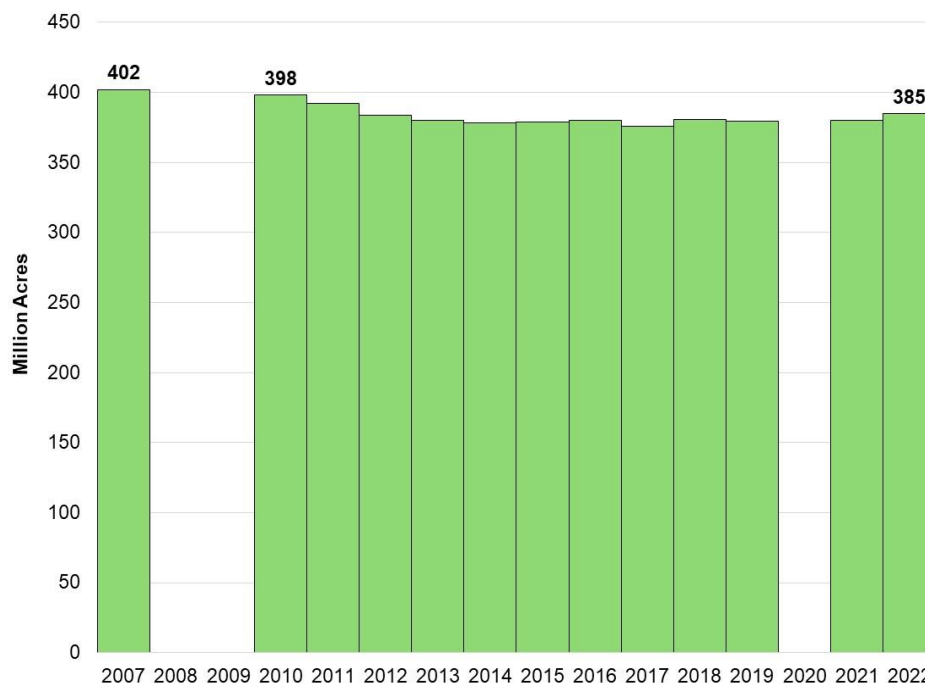
⁷ <https://www.congress.gov/110/plaws/publ140/PLAW-110publ140.pdf>

EPA has determined that an aggregate compliance approach is appropriate for certain types of renewable biomass, namely planted crops and crop residue from the United States.

Under the aggregate compliance approach, EPA is determining for this rule the total amount of “existing agricultural land” in the U.S. ... at the enactment date of EISA, which is 402 million acres. EPA will monitor total agricultural land annually to determine if national agricultural land acreage increases above this 2007 national aggregate baseline. Feedstocks derived from planted crops and crop residues will be considered to be consistent with the definition of renewable biomass and renewable fuel producers using these feedstocks will not be required to maintain specific renewable biomass records ... unless and until EPA determines that the 2007 national aggregate baseline is exceeded.⁸

To ensure compliance, EPA tracks U.S. agricultural land area annually using USDA data.⁹ Its estimate of the number of acres of agricultural land is consistent with the Census of Agriculture’s estimate of total cropland, and the two series have exhibited similar downward trends since 2007. EPA estimates that there has been a 17-million-acre reduction in U.S. agricultural land area between 2007 and 2022 (Figure 7).

Figure 7: EPA Assessment of U.S. Agricultural Land Area



Source: EPA

Note: No estimates were issued for 2008, 2009, or 2020

⁸ <https://www.govinfo.gov/content/pkg/FR-2010-03-26/pdf/2010-3851.pdf>

⁹ Note that EPA’s definition of agricultural land includes Conservation Reserve Program acreage

A similar compliance approach was recently adopted by Environment and Climate Change Canada (ECCC) for ethanol produced from U.S.-grown feedstock. As noted by USDA, “On November 9, 2023, ECCC publicly announced that it approved the U.S. application for legislative recognition which demonstrates that U.S. feedstock is in compliance with the land use and biodiversity (LUB) criteria under the Clean Fuel Regulation (CFR). ... Without legislative recognition, individual farmers or states would have had to prove their own compliance, as of January 1, 2024.”¹⁰

If California moves ahead with any feedstock certification program, there should be a provision comparable to those in the RFS and CFR to designate all U.S.-produced ethanol as in compliance with the program, so long as aggregate cropland acreage does not expand beyond a 2007 baseline.¹¹ This is justified by both the steady decline in U.S. cropland and the lack of growth reflected in federal government forecasts/analyses of future ethanol volumes, as detailed above.

It is recognized that two developments have the potential to result in growth in domestic ethanol consumption beyond these levels: the adoption of E15 and the emergence of sustainable aviation fuels (SAF). However, E15 currently accounts for a small share of U.S. finished gasoline consumption, and growth will take time, although a combination of compelling economics (including the value of LCFS credits) and compatible infrastructure would be expected to result in somewhat more rapid adoption in California if the fuel blend is approved for sale there.¹² Still, the adoption of E15 in the U.S. and specifically in California is not expected to result in significant growth in overall ethanol consumption and is more likely to result in keeping long-term ethanol consumption at or near current levels.

Regarding SAF, current production of alcohol-to-jet fuel is very small, and it will take years and large capital expenditures for the industry to be built out.¹³ Additionally, tax credits available for SAF under the Inflation Reduction Act of 2022 are scheduled to expire at end of 2027. As a result, forecasts of future SAF volumes are highly speculative.

In summary, the proposed LCFS sustainability criteria are not currently justified for ethanol. If future growth of the industry is stronger than reflected in current federal government forecasts, CARB would have sufficient time to revisit the potential introduction of requirements designed to achieve the purpose of the criteria.

¹⁰

https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Canada%20acknowledges%20that%20US%20feedstocks%20are%20in%20compliance%20with%20Land%20Use%20and%20Biodiversity%20Criteria%20under%20the%20Clean%20Fuel%20Regulation_Ottawa_Canada_CA_2023-0053.pdf

¹¹ AB32 was enacted in late 2006, and the Low Carbon Fuel Standard was identified as a “discrete early action” for greenhouse gas emissions reduction in 2007.

¹² <https://ethanolrfa.org/media-and-news/category/blog/article/2024/04/e15-sales-set-another-record-in-2023-but-are-at-risk-again-this-summer>

¹³ <https://www.energy.gov/eere/bioenergy/articles/first-ethanol-alcohol-jet-sustainable-aviation-fuel-production-facility>

Thank you again for the opportunity to submit these comments. RFA looks forward to working with CARB staff and other stakeholders to strengthen and extend the successful LCFS program.

Sincerely,

A handwritten signature in dark ink, appearing to read "Scott Richman", with a long horizontal flourish extending to the right.

Scott Richman

Chief Economist



August 27, 2024

Matthew Botill
California Air Resources Board
1001 I Street
Sacramento, CA 95814
Via Online Submission: <https://ww2.arb.ca.gov/applications/public-comments>

Comments on Proposed Low Carbon Fuel Standard Amendments—15-day changes

Dear Mr. Botill:

Thank you for the opportunity to provide comments in response to the Low Carbon Fuel Standard (LCFS) proposed 15-day changes. We appreciate CARB engaging stakeholders' input on a variety of forward-looking concepts for the future of the LCFS. Taking decisive action to bolster the LCFS market will help ensure the long-term viability of the program and the accomplishment of the state's carbon reduction objectives. SkyNRG Americas ("SkyNRG") is pleased to be able to provide comments on several areas of the 15-day change proposal.

SkyNRG has been engaged in enabling sustainable aviation fuel (SAF) as a solution to decarbonize aviation since 2010. Starting in 2019 we initiated the construction of new dedicated SAF production facilities to support the aviation industry's 2050 net-zero commitments with new SAF capacity globally. Critically, SAF is one of the few cost-effective and scalable tools for decarbonizing aviation in the near-to medium-term. As such, SAF is one of few viable solutions for California to mitigate aviation emissions in the foreseeable future.

For our SAF project development efforts in the US, SkyNRG will be among the first producers of SAF and renewable diesel (RD) at-scale sourced from cellulosic feedstocks such as biomethane or renewable natural gas (RNG). SkyNRG's SAF production process is anticipated to use RNG sourced from a variety of sources and secured from common carrier pipelines on a mass balance accounting basis similar to producers of other clean fuels such as compressed natural gas (CNG), or liquid natural gas (LNG) do currently in California. Importantly, SAF produced from RNG also doesn't compete with food-based crops or create indirect land use challenges.

As other industries and transportation sectors decarbonize utilizing electrons and other low carbon fuel sources, aviation as a proportion of California's total greenhouse gas footprint will continue to increase through 2035 and beyond. The aviation sector is one of the most difficult industries to decarbonize (or electrify) due to unique operational and safety requirements that necessitate liquid energy-dense fuels, highlighting the critical role of low-carbon liquid fuels such as SAF for the future of the sector.

SAF is an essential contributor to achieving Governor Newsom's goal of 20% clean fuels for the aviation sector by 2030.¹ However, delaying supportive low carbon policies that enable SAF in the LCFS now will jeopardize the industry's ability to scale SAF production in the timeframe needed to meet the Governor's goal in the future. SAF production facilities can take five to seven years to move from

¹ [Governor Newsom Calls for Bold Actions to Move Faster Toward Climate Goals | Governor of California](#) calling for 20% SAF target.

development to operation; consequently, construction of new projects (or expansions of existing facilities) must begin now to enable these solutions to be available by 2030.

SkyNRG submits the following comments related to the fossil jet fuel exemption, support for increased program ambition for 2025 and beyond, caution against changes to the avoided methane emissions crediting, flexibility around the mass balance accounting and deliverability of RNG for the production of SAF and the cap on biomass-based biodiesel from virgin soy and canola.

Support for maintaining the removal of “Fossil Jet Fuel” from LCFS exemption for intrastate use

SkyNRG sees sustainable aviation fuel as one of the few near-term, readily available solutions to addressing both carbon dioxide (CO₂) and non-CO₂ emissions from aviation. For this reason, we were disappointed by the most recent proposal to maintain the LCFS fossil jet fuel exemption.

Achieving California’s ambitious goals for the aviation sector will require addressing the structural disincentives for SAF embedded in the status quo. While SAF is eligible to receive credits under the LCFS,² the lack of deficits on the fossil jet fuel side decreases the value of SAF as a replacement relative to renewable diesel, which replaces an obligated and therefore more costly fossil fuel. This structural disparity, illustrated by multiple third-party analyses, strongly and systematically incentivizes clean fuel producers to make renewable diesel rather than SAF.³ The result: in 2023, 2 billion gallons of renewable diesel were registered by the program but only 23 million gallons of SAF.⁴ It remains unclear what differences exist between aviation and on-road fuels that justify continuation of uneven supportive policies.

For most low-carbon alternative fuels, production remains more expensive than the incumbent fossil alternative. Fundamentally, not obligating traditional fossil fuels ensures that they remain inexpensive relative to low carbon alternatives. Rational fuel users will choose the less expensive option, and even fuel users who want to advance low carbon options will be undercut. This puts a strong chilling effect on the rate of adoption of opt-in fuels.

To ensure that CARB’s current proposal does not exacerbate structural disincentives to SAF under the LCFS program, we suggest a modest step that would remove the applicability of the Auto Acceleration Mechanism (AAM) to the table of annual jet fuel benchmarks. The AAM applied to the gasoline and diesel benchmarks can act to control the credit supply by both reducing credit generation for alternative fuels and increasing deficits for fossil fuels. However, without any obligations on fossil jet fuel, the AAM would only undercut support for SAF without creating any corresponding demand.

In conjunction, we propose that CARB set the jet fuel benchmarks at a level and on a schedule that recognizes that SAF is an emerging, less mature market that has not benefited from higher fossil

² We applaud CARB’s harmonization of the annual CI standards for diesel and jet fuel following the 2018 Rulemaking. This preserves credit generation opportunities for SAF and reduces some of the structural differences that would otherwise disincentivize SAF production compared to diesel, though significant disincentives remain.

³ See Bay Area Air Quality Management District (BAAQMD), Sustainable Aviation Fuel: Greenhouse Gas Reductions from Bay Area Commercial Aircraft. October 2020. Page 56 available at <https://www.baaqmd.gov/news-and-events/page-resources/2020-news/121120-saf-report>. See also <https://stillwaterassociates.com/saf-in-the-ira-era-how-do-the-incentives-stack-up/>.

⁴ CARB Data Dashboard available at <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>

benchmarks and years of credit generation since program inception in 2010. In the early years of the LCFS program, CARB set small CI reduction targets for gasoline and diesel and modest annual increases to allow the industry (both fossil and alternative) time to complete their investments and ramp up production. CARB can evaluate the jet fuel benchmarks and set them in such a way that supports SAF as an emerging fuel and addresses airline industry concerns about the transition towards increasing low-carbon fuel use. This could include freezing the jet fuel benchmarks, resetting the 2030 jet fuel benchmark targets to their pre-amendment level of 20%, or decoupling the annual increases of the jet fuel benchmarks from those of gasoline or diesel. Notably, British Columbia has adopted a similar approach under their recent LCFS amendments, providing both a higher benchmark and a less aggressive compliance curve for aviation fuels, preserving credit generation opportunities for the emerging SAF industry.

- 111.3 Further study of the local air quality conditions surrounding California's major airports and the benefit of SAF use to these communities is also recommended. This presents an opportunity for collaboration with the aviation sector and airport workers to support the accelerated uptake of currently available solutions like SAF to help mitigate both health and climate impacts in the near- and long-term.

After virtually attending the April workshop, we were moved by the testimony and diverse perspectives of airport workers, as represented by the Service Employees International Union (SEIU) and their support for clean fuels such as SAF. While air travel remains crucial in our society, we encourage CARB staff to develop policy that drives uptake of SAF that contributes to protecting the health and safety of these workers and airport communities. Fully addressing aviation's impacts requires a committed approach to reducing CO₂ and non-CO₂ emissions from aviation and there is a growing body of data that SAF offers this in both cases.⁵

Support for increased program ambition for 2025 and beyond

- 111.3 We strongly support CARB's proposal to change the carbon intensity reduction target for 2025 to 9%. Since its implementation over a decade ago, the LCFS has proven highly successful in both encouraging market investment in low carbon fuels and lowering emissions in the transportation fuel sector. To help ensure a healthy LCFS credit market that can keep pace with these investments, we strongly support CARB's plans to strengthen the existing emission targets for 2030 and beyond. Therefore, we encourage CARB to adopt the 9% near-term stepdown presented during the April workshop, thereby recognizing the carbon intensity (CI) reduction successes of the program over the previous years. This better aligns with the findings of the consulting firm ICF, which suggests an optimal stepdown range of 10.5% to 11.5% for 2025 and targeting a credit bank size equivalent to two quarters worth of deficits. By making appropriate adjustments, CARB can reflect the strong market supply scenario, thereby fostering the development of additional solutions to further drive down the state's emissions with SAF.

- 111.4 Additionally, we believe a 2030 target of 30% can be achieved as noted in the ICF analysis and that the Auto Acceleration Mechanism should be able to trigger earlier. As a member of the Coalition for

⁵ <https://www.dlr.de/en/vt/research-transfer/fag/fag-sustainable-aviation-fuels>
<https://www.manchester.ac.uk/discover/news/using-sustainable-aviation-fuels-could-reduce-emissions-by-up-to-80-scientists-find/>
<https://open.overheid.nl/documenten/ronl-af341f669119e9edbbd2a6ed78f68a7eaa7c9fae/pdf>
https://www.who.int/health-topics/cardiovascular-diseases#tab=tab_1

Renewable Natural Gas (RNG Coalition), we support their positions on these two topics in their comments on the 15-day amendments.

Further Study on Changes to Avoided Methane Emissions Credits is Necessary

We are very disappointed to see the 15-Day Package treatment of avoided methane crediting continues to lack connection to any long-run strategy that would ensure continued methane abatement. It is unwise and risky to impose an arbitrary phase-out of avoided methane crediting without a detailed plan for developing a supporting replacement policy. The treatment of avoided methane continues to create significant project uncertainty and increases the potential for stranded assets—an issue correctly cited by CARB during prior workshops as a key outcome to be avoided.⁶

CARB should continue to encourage the capture and productive repurposing of methane emissions from organic waste streams processed through anaerobic digestion, regardless of the source of the waste stream or when this waste is produced. To this end, and as noted in previous comments, SkyNRG encourages CARB to avoid making changes that limit opportunities to include avoided emissions in CI calculations.

If CARB truly wants methane abatement from sources such as agricultural wastes to continue, and for new sources of RNG activity such as organic waste diversion from the municipal waste stream to develop, they must reconvince the clean fuel investment community that RNG will remain a viable and important contributor to the LCFS framework. Therefore, we believe that this warrants further study from CARB to avoid any unnecessary consequences as currently proposed since methane sources will continue to increase in the future.

As SkyNRG continues to build out SAF production capacity in the US, the company will continue to explore a wide range of RNG feedstock opportunities from organic waste streams, including food waste, yard and landscaping waste, industrial and wastewater sludge, and a variety of animal wastes in the coming decades. Many untapped waste streams are novel as it relates to LCFS pathways, but nonetheless can readily be converted to transportation fuels through technologies that are commercially proven and readily suitable for producing low carbon fuels from RNG pathways.

The GHG emission reductions resulting from CNG fleets being the default for many medium- and heavy-duty applications are attributed, in part, to the incentives of the LCFS and has resulted in improved air quality for constituents. SAF is at a similar crossroads. By allowing for avoided methane crediting for RNG as a feedstock, CARB has the potential to see SAF become the default fuel for aviation, much like the transition in the CNG fleet space. RNG has continued potential to reduce GHG emissions in California, and recognizing its potential as a feedstock is essential to the continued success of the program.

We encourage CARB to study the success of Europe's Renewable Energy Directive (RED), which has long recognized the avoided methane benefits when assessing the lifecycle CI of various RNG pathways. The RNG to SAF pathway presents a unique opportunity to scale-up low carbon fuels in the aviation sector to align with the Governor's recently stated goal for SAF by 2030.

⁶ See CARB's Presentation at the February 22, 2023, LCFS Workshop, slide 31.

https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/lcfs_meetings/LCFSpresentation_02222023.pdf

111.6 Expanding Not Limiting Mass Balance Accounting of RNG including to SAF and RD

As stated in previous comments to CARB, expanding opportunities for RNG to be used as an input for additional transportation fuels such as SAF and RD will be critical to achieving more stringent targets. Existing LCFS regulations incentivize the use of RNG in renewable CNG and LNG applications by offering the flexibility of mass balance accounting of RNG injected into pipeline systems connected, sometimes at great distance, to downstream production or dispensing locations (sometimes referred to as “book-and-claim”). This is a highly effective way to rapidly decarbonize transportation fuels, and we encourage this to be expanded to SAF and RD as it has been applied to other transportation fuel end uses like CNG, and LNG. Under the current LCFS regulations, SkyNRG (and others) would be unable to participate in the expansion of the program because there are no provisions allowing mass balance accounting for offsite RNG utilized as feedstock to produce SAF and RD.

The U.S. RNG industry has evolved with existing regulatory programs at both the federal and state levels that reasonably recognize that most sources of RNG do not justify co-location of fuel production facilities. To accommodate this challenge, mass balance accounting is an indispensable ingredient to incentivizing the development of RNG resources and unlocking their emission reduction potential to materially reduce emissions.

The U.S. Environmental Protection Agency (EPA) has recognized the potential for RNG as a feedstock in the production of renewable fuels. In its 2023 rulemaking, the EPA established a regulatory framework allowing the use of RNG as a “biointermediate,” paving the way for producers like SkyNRG to make renewable, low carbon fuels like SAF and RD from products derived from RNG under mass balance accounting (once finalized). Critically, the EPA’s regime leverages indirect accounting of pipeline injection and offtake at separate points consistent with LCFS mass balance accounting procedures. In CARB’s ISOR for the proposed rule change, the need to align with federal support for SAF proliferation is specifically highlighted as a guiding principle of the rule change.

The LCFS program has long been compatible with federal incentives, including the Renewable Fuel Standard (RFS) and numerous tax credits. The creation of additional federal incentives through the Inflation Reduction Act (IRA) and Infrastructure Investment and Jobs Act (IIJA) only increases the opportunity for the LCFS program to align with and leverage federal investments to accelerate decarbonization. While the SAF market is growing, these incentives are greatly needed and have outsized impacts in supporting the industry’s maturation. CARB should ensure that the LCFS program aligns with the treatment of SAF feedstocks under the RFS to avoid creating a bifurcated RNG market. Further, given the intention to align and coordinate LCFS programs in California, Oregon and Washington and further accelerate the uptake of SAF, we also encourage CARB to consider Washington state’s approach to enabling book and claim/mass balance accounting for RNG to SAF.

We implore CARB to expand eligibility for mass balance accounting of all sources of RNG as feedstock to produce transportation fuels like SAF and RD. Doing so will create new opportunities to utilize RNG to make low, or even negative, CI transportation fuels that are suitable for sectors that are hard to decarbonize in California, directly contributing to Governor Newsom’s ambitious goals for expanded production and use of low carbon, renewable aviation fuels. With appropriate oversight (including the verification and validation procedures CARB already requires), we believe that any compliance risks can be effectively managed as they are today for CNG, LNG, and hydrogen production. By recognizing the potential of RNG as an SAF and RD feedstock, CARB acknowledges its material value to a maturing

industry and instills confidence in investment communities to continue to invest in the energy transition of this sector. Limiting mass balance accounting eligibility for RNG feedstocks is a critical issue that may significantly negate California's ability to benefit from the next generation of low carbon fuels.

111.7

Deliverability language creates a barrier to imports and should not be adopted in the LCFS

CARB's 15-Day package proposed changes to RNG deliverability requirements which remain problematic for RNG development. This fundamentally reduces investment certainty and delays investment in RNG projects and thus slows critical near-term methane reductions.

We are discouraged that CARB introduced deliverability requirements for RNG that restrict the ability to utilize this low carbon feedstock, rather than expanding its applicability. Geographic and deliverability limitations would almost certainly stifle investment in RNG resources and reduce opportunities for the state to achieve its LCFS-specific climate goals.

It is unclear how directional flow data from 2020 to 2023 should hold any relevance to long-run delivery patterns for RNG. Assuming California (and hopefully other states) are serious about cutting fossil demand and increasing renewable gas supply at the rate called for in the Scoping Plan, the gas system would fundamentally change, from a system that is driven heavily by fossil gas flows to one driven by renewable gas flows.

Given that California clearly benefits from broad North American and global energy markets for other types of energy—and the recent trend toward significant increases of the in-state supply of RNG,⁷ with in-state production increasing from 6.74 in 2021 to 18.23% of LCFS supply in 2023—we question why CARB would propose eliminating any imported RNG eligibility from any portion of the North American gas system.

111.8

Support for the cap on credit generation for biomass-based diesel produced from virgin soybean oil and canola oil

SkyNRG supports CARB's proposal to limit the credit generation potential of biomass-based diesel produced from virgin soybean oil and canola oil to 20 percent of annual biomass-based diesel reported on a company-wide basis. We agree that this proposal will help avoid sending a long-term signal for virgin soy or canola oil to serve California demand. Furthermore, we believe that CARB should continue to focus on shifting demand to advanced feedstocks that can bypass the issues that first generation biofuel feedstocks face. Given that science-based research has shown that food-based biofuels are linked to emissions from deforestation and other indirect land-use change (ILUC), this shift is particularly important.⁸ We are however concerned about the addition of alcohol to hydrocarbons to the list as a potential Tier 2 eligible drop-in fuel. This could potentially open up a loophole enabling corn ethanol-

⁷ <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>

⁸ Tyler J. Lark, Nathan P. Hendricks, Aaron Smith, Nicholas Pates, Seth A. Spawn-Lee, Matthew Bougie, Eric G. Booth, Christopher J. Kucharik, and Holly K. Gibbs, "Environmental Outcomes of the US Renewable Fuel Standard," Proceedings of the National Academy of Sciences 119, no. 9 (March 1, 2022). <https://doi.org/10.1073/pnas.2101084119>

based SAF which could skirt the cap on biomass-based diesel. For this reason, we would urge careful consideration of this addition.

Thank you for the opportunity to comment on the proposed changes to the LCFS. SkyNRG applauds California's leadership and CARB staff for taking action to drive innovation and growth of low carbon fuel technologies. Through careful consideration of the impact of these rule change to a developing industry, we believe SAF can help take the LCFS to new heights.

Sincerely,

A handwritten signature in blue ink, appearing to read 'John Plaza'.

John Plaza
President & CEO
SkyNRG Americas, Inc.

August 27, 2024

Honorable Chair Liane Randolph and Honorable Board Members
Low Carbon Fuel Standard Program
California Air Resources Board
1001 I St., Sacramento, CA 95814

Sent via email to LCFSworkshop@arb.ca.gov

Re: 15-Day Changes to Proposed Low Carbon Fuel Standard Amendments

Chair Randolph and Members of the Board:

EVgo appreciates the opportunity to comment on the California Air Resources Board's 15-Day Changes to the proposed Low Carbon Fuel Standard (LCFS) amendments. The LCFS remains a cornerstone of California's transportation electrification efforts and EVgo commends CARB's efforts to update the regulation to better reflect the state's zero-emission vehicle (ZEV) and climate policy goals.

In particular, the proposal to modify the 2025 carbon intensity (CI) target from a 5% stepdown to a 9% stepdown is one of the most essential measures CARB can take to address sustained overcompliance in the program and send a near-term signal for further low carbon fuels investment in support of CARB's foundational ZEV regulations – including Advanced Clean Cars II.¹ EVgo also appreciates the proposed modifications to the light-duty fast charging infrastructure (FCI) provisions of the regulation, including the proposal to preserve the existing pool of available FCI credits at 2.5% of prior quarter deficits and other modifications that streamline FCI credit generation opportunities. Direct current fast charging remains an essential component of the state's strategy to support widespread EV adoption – particularly in communities without access to home charging – and the continuity of FCI provisions in the LCFS will support critical operations and maintenance activities that bolster the reliability and accessibility of California's public charging network.

¹ EVgo notes that a more stringent 2025 CI target would further magnify the benefits associated with a 9% CI stepdown.

To further support goals of the LCFS and CARB's broader ZEV adoption goals, EVgo respectfully requests that CARB consider the following minor amendments:

112.1

1. Clarify that electricity dispensed for EV charging should be verified by desktop review and remove requirements for site visits to EV charging stations in §95501(b)(3) to recognize that EV charging networks' fuel transaction data is housed on electronic charging management platforms and not individual EV charging stations; and
2. Enable the Automatic Acceleration Mechanism (AAM) to trigger in 2026 based on 2025 data.

1. **Clarify that electricity dispensed for EV charging should be verified by desktop review and remove requirements for site visits to EV charging stations in §95501(b)(3) to recognize that EV charging networks' fuel transaction data is housed on electronic charging management platforms and not individual EV charging stations**

EVgo recognizes the importance of ensuring alignment between the quantity of electricity dispensed by EV charging stations and the quantity of electricity reported to CARB by entities generating LCFS credits from EV charging. To this end, EVgo maintains that the best way to verify the accuracy of reported fuel from EV charging stations is through data checks and reviews of electronic records as identified in §95501(b)(5). Site visits may be appropriate for verification of large liquid fuel production facilities, but they are not suited to EV charging networks for several reasons:

112.2

- **EV charging networks' fuel transaction data is housed on electronic charging management platforms, not at individual EV charging stations.** Third-party verifiers cannot readily obtain cumulative fuel transaction data from visiting individual EV charging stations because EV chargers, unlike liquid fuel production facilities, are unmanned and do not feature data management systems on-site. Instead, third-party verifiers can complete electronic reviews of data management systems that collect fuel transaction data from across EV charging networks that are then used to generate fuel transaction reports that are submitted to CARB. This approach can provide material time and cost savings while providing third-party verifiers with the information needed to carry out a comprehensive assessment of an entity's compliance with LCFS reporting requirements.
- **EV charger metrological accuracy is already regulated by California Department of Food and Agriculture Division of Measurement Standards (DMS).**

112.2 Cont.

Many stakeholders have noted throughout the rulemaking process that DMS has already established a regulatory framework (the California Type Evaluation Program) that governs the testing and approval of EV chargers in California with EV charger accuracy requirements that are at least as stringent as those in § 95491.2 of the LCFS regulation.² Given the comprehensive lab and field-testing requirements that EV chargers are already subject to per DMS regulations, it is redundant for CARB to require additional site visits to assess the metrological accuracy of thousands of individual EV chargers participating in the LCFS.

- **EV charging networks are large and widespread.** Whereas third-party verifiers may feasibly carry out annual site visits to a limited number of large liquid fuel production facilities, it is costly and time-intensive for verifiers to conduct annual site visits for thousands of EV charging facilities located in diverse areas across the state.

112.3

Instead of taking a one-size-fits-all approach to a diverse suite of low carbon fuels, EVgo strongly recommends that CARB remove the requirement for site visits to EV charging stations participating in the LCFS and modify the regulations in a manner that allows third-party verifiers to complete verification services remotely, as fuel transaction data is housed on electronic charging management platforms – not at individual EV charging stations. This approach is better situated to provide third-party verifiers with the data needed to conduct in-depth verification.

2. Enable the Automatic Acceleration Mechanism (AAM) to trigger in 2026 based on 2025 data.

112.4

EVgo strongly supports the inclusion of the AAM in the LCFS and maintains that CARB can further support the ambition of California's decarbonization goals by allowing the AAM to be triggered in 2026 with a potential earliest effective date in 2027 (as opposed to the currently proposed 2027 trigger year and effective date in 2028). While CARB's proposed 9% CI stepdown in 2025 could potentially forestall the need for the AAM in 2026, the AAM acts as an important near-term hedge against sustained overcompliance at a time when the credit bank has reached unprecedented levels. Allowing the AAM to trigger in 2026 would ensure that the AAM can effectively achieve its express purpose of accelerating the stringency of the LCFS if certain market conditions are met.

² [View Document - California Code of Regulations \(westlaw.com\)](#)

To conclude, EVgo appreciates CARB's efforts to update the LCFS in line with California's transportation decarbonization goals and respectfully requests that CARB adopt the minor modifications described in these comments to ensure that the LCFS continues to support continued EV charging deployment in California. With these amendments, EVgo looks forward to supporting the passage and implementation of the proposed LCFS regulation.

Respectfully submitted this 27th day of August,

Noah Garcia
Manager, Market Development and Public Policy
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Los Angeles, CA 90064
Tel: 310.954.2900
E-mail: noah.garcia@evgo.com

August 27, 2024

California Air Resources Board
1001 I Street Sacramento, CA 95814

RE: Proposed 15-Day Modifications to Proposed Regulation Order

Dear California Air Resources Board,

Advanced Biofuels Canada is the Canadian national trade association for advanced biofuels and renewable synthetic fuels. ABFC members produce a portfolio of liquid low-carbon fuels (including alternative jet fuels), sustainable feedstocks, and intermediary products. Our members operate over 10 billion gallons of low carbon fuel production capacity globally and are significant suppliers to renewable and low carbon fuel regulations in Canada, the US, and worldwide. Many of our members have operations in both the United States and Canada.

Regarding the Proposed Low Carbon Fuel Standard Amendments:

- 113.1 **Additional consultation requested** - The concepts included Modifications to Section 95482. *Fuels Subject to Regulation* item #4 (specifically the 20% limit of annual biomass-based diesel from virgin soybean and canola oil) have not been publicly presented or reviewed in any detail during CARB public workshops. The LCFS policy structure pioneered in California is regarded as a science-based and technology-neutral regulation; establishing feedstock limitations, without due consultation, goes against this science-based approach. Proposals of this magnitude and impact merit additional consultation and stakeholder engagement prior to finalization and enactment.
- 113.2 **As written, the 20% limit will result in stranded assets and introduces significant regulatory risk to project developers** - The proposed approach of limiting pathway holders to supply only 20% of annual biomass-based diesel reported on a company-wide basis with crop-based biofuels (soy & canola) will directly impair businesses that have invested in production facilities to supply low carbon biofuels to the California LCFS market. There are significant questions on application and implementation (e.g., will the limitation apply to rapeseed, winter canola, spring canola [?]; what is the process by which a feedstock would be considered for being subject to this 20% limit [?]; will the application and amount of the limit be reviewed with any established frequency [?], etc.).

113.1 cont

The specific identification of virgin canola and soybean oil pathways as being subject to the 20% limit should be further substantiated by Staff - Analysis of the compliance data from Q1 2021 – Q1 2024 indicates that canola and soybean-based BD and RD have provided 8.2% of liquid biofuel credits and 10.7% of BD and RD credits. Other feedstock pathways for BD and RD (corn oil, tallow, UCO) provide 64% of all liquid fuel credits and 84% of BD and RD credits. It merits further explanation and supporting rationale for why virgin vegetable oils (soybean, canola) should be limited when other feedstock are not considered for limitation. Proceeding with feedstock limitations without sufficient consultation will hinder the advancement of alternative agricultural feedstocks for biofuel production lest they be similarly proposed for limitation without sufficient consultation. Additionally, the proposed limit will impair investments in agricultural innovation via Climate Smart Agriculture practices (e.g., yield enhancement, reduced inputs – fertilizer, pesticide, water use, etc., use of cover crops, use of low till/no till practices).

113.3

Potential for increased petroleum diesel usage under the 20% limit: California's LCFS demonstrates the extent to which low carbon fuels can achieve significant diesel emissions reductions in a relatively short time frame. If enacted, the proposed 20% limits would lead to backsliding in low carbon fuel use in diesel and impair the ability of the LCFS to achieve near-term GHG reductions. This is especially critical given the uncertainty around ZEV penetration in the MHDV fleet. Limiting the available amount of verified low carbon distillate fuels useable by the MHDV fleet will jeopardize the significant progress achieved in this 'hard to decarbonize' sector.

113.4

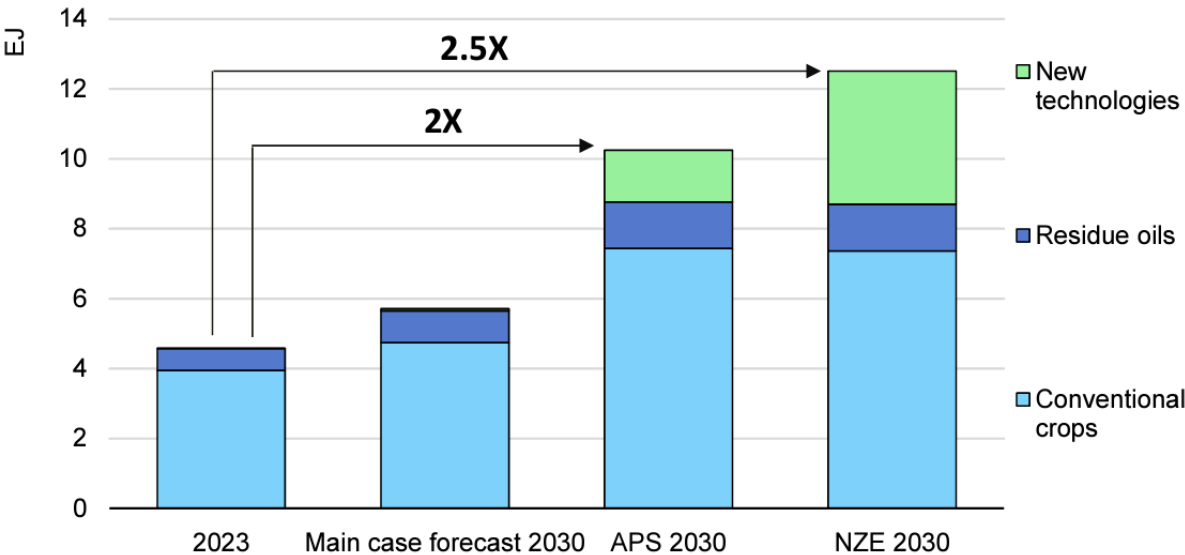
Support of compliance targets and curve smoothing - Re: *Modifications to Section 95484. Annual Carbon Intensity Benchmarks*. ABFC supports the increased stringency of the LCFS (from 5% to 9%) in the 2025 compliance year and a smoothed trajectory towards the 2030 target of 30% reduction.

113.5

Staff should consider an adjustment of the LCFS to re-focus the regulation on reducing the CI of liquid fuels supplied in California and remove ZEV from credit creation once an established penetration threshold is achieved. As ZEV use expands, the credits available in the compliance market will remove the signal for ongoing and increasing decarbonization in gasoline and diesel fuels. Staff should consider whether the LCFS is best utilized to ensure that remaining Internal Combustion Engines have the highest use of low carbon liquid fuels possible.

113.6 **The inclusion of sustainability criteria in the California LCFS make it among the most appropriate jurisdictions in which agriculture-derived biofuels can be responsibly increased to achieve strengthened GHG reduction targets** - Analysis by the International Energy Agency (IEA) in their recent study (July 2024) ‘Carbon Accounting for Sustainable Biofuels’ firmly states that biofuels from agricultural crops defined as ‘corn, sugarcane, canola/rapeseed, palm oil and other crops’ need to expand to achieve Net Zero Emissions by 2050 scenario:

Figure 1.3 Biofuel production by feedstock: Current, main case, Announced Pledges Scenario and Net Zero Emissions by 2050 Scenario, 2023-2030



IEA. CC BY 4.0.

Notes: APS = Announced Pledges Scenario. NZE = Net Zero Emissions by 2050 Scenario. “Conventional crops” refers to corn, sugarcane, soybeans, canola/rapeseed, palm oil and other crops. “Residue oils” refers to used cooking oil, animal fats, palm oil mill effluent and other residue oils. “New technologies and practices” refers to biofuel production from (lignocellulosic) agricultural and forestry residues, municipal solid waste and oil seeds grown on marginal land through intercropping, double-cropping and other approaches that do not otherwise compete with food and feed production.

Sources: IEA (2024), [Oil 2024: Analysis and Forecast to 2030](#); IEA (2023), [World Energy Outlook 2023](#).

(Source: <https://www.iea.org/reports/carbon-accounting-for-sustainable-biofuels>, page 14)

The LCFS’s inclusion of sustainability criteria, along with the Renewable Biomass provisions in the US RFS, ensure that irresponsible feedstocks are not utilized for credit creation.

113.7 **US and Canadian trade should be maintained and enhanced through regulatory cross compliance for sustainability certification between the LCFS and Canada’s Clean Fuel Regulations (CFR) - ABFC**

recommends that CARB maintain open markets between Canada and the US on crops, fuels, and biofuels by aligning regulations and recognition of existing compliance and administrative measures. Specifically, CARB can recognize the verified adherence to the Canadian Clean Fuel Regulations' Land Use and Biodiversity Criteria¹ as achieving the requirements of the LCFS section 95488.9 (g).

113.8 A revised approach to jet fuel is warranted - The demonstrated effectiveness of the LCFS in reducing gasoline and diesel emissions should be harnessed to reduce aviation emissions. ABFC suggests that CARB re-consider its exemption for intrastate jet fuel and consult on a revised approach (whether within the current LCFS or via a new regulation) where all jet fuel sold in California is subject to both a minimum volume blend requirement of alternative jet fuel as well as a carbon intensity reduction requirement. This revised approach would address the issue identified that '*aviation fuel suppliers who would generate deficits under the initial proposal could simply acquire credits to meet that compliance obligation*'.² We note that this approach has been implemented in the British Columbia Low Carbon Fuel Standard as of January 2024.³

CARB's actions to address jet fuel emissions will be impactful on other subnational jurisdictions: ABFC suggests that California expand its ambition towards jet fuel and align with the approach enacted in British Columbia that (1) obligates all jet fuel sold under the regulation, (2) prescribes minimum volumetric AJF use requirements, and (3) prescribes carbon intensity (CI) reduction requirements for jet fuel.

British Columbia's updated LCFS statute:

- Was approved on December 11, 2023, and enacted on January 1, 2024.
- Requires 1% AJF by volume in 2028, 2% in 2029, 3% in 2030.
- Requires a 2% CI reduction from a fossil jet baseline of 88.83 gCO₂e/MJ in 2026, 4% in 2027, 6% in 2028, 8% in 2029, and 10% in 2030.

BC's CI reduction requirements for jet fuel are lower than that of gasoline and diesel fuels. Gasoline has a 5% renewable content requirement and a 30% CI reduction requirement by 2030 (below 2010 levels);

¹Land use and biodiversity guidance: <https://www.canada.ca/en/environment-climate-change/services/managing-pollution/energy-production/fuel-regulations/clean-fuel-regulations/compliance/guidance-land-use-biodiversity.html>

² As stated in the Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information.

³ British Columbia LCFS: https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/282_2023

diesel has a 4% renewable content requirement and is subject to the same 30% CI reduction requirement by 2030. (We note that the CI reduction requirements for any fuel can be met by overcompliance in other fuel types though there must be a volumetric minimum supply of alternative jet fuel.

Thank you for this opportunity to provide comments.

Yours truly,

Advanced Biofuels Canada

REMORA

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ADDRESS ECHENEIDAE INC. DBA REMORA
13685 OTTERSON CT
LIVONIA, MI 48150

August 27, 2024

California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812
[submitted electronically]

RE: Comments On 15-Day Changes to the Low Carbon Fuel Standard Proposed Regulation Order

Remora values the chance to share input on the 15-day changes to the Low Carbon Fuel Standard (LCFS) Proposed Regulation Order. We are eager to collaborate with CARB, its State agency partners, and all stakeholders to contribute innovative climate solutions with broad-reaching benefits in California and beyond. We submit these comments in support of a more stringent LCFS program and the swift inclusion of Mobile Carbon Capture Technologies within that program.

About Remora & Mobile Carbon Capture Technology

[Remora](#) designs and manufactures an **innovative engine exhaust technology that captures carbon dioxide (CO₂) directly from hard-to-decarbonize mobile sources**, including Class 8 heavy-duty trucks (semi-trucks), line-haul locomotives, and cargo ships. Using Remora's mobile carbon capture and storage (MCCS) technology, exhaust is diverted to a carbon capture unit, which captures CO₂ emissions, before the exhaust is released into the atmosphere. The captured CO₂ is compressed, stored onboard, and then offloaded at designated sites that are co-located at refueling or cargo-loading infrastructure sites. All captured CO₂ can be safely and permanently disposed of via underground sequestration or utilized within other products and industries.

Mobile carbon capture technologies are uniquely poised to provide major decarbonization benefits while also supporting critical air quality benefits, particularly in heavily impacted communities.

Remora Supports a Strong LCFS

California's transportation sector is the State's largest source of both greenhouse gas emissions (GHG) and air pollution, accounting for more than half of statewide GHG emissions.¹ Rapidly driving down these emissions is a critical element of California's strategy to achieve carbon neutrality. As described in the 2022 Scoping Plan Update, the transition to zero-emission technology will take time as internal combustion vehicles will remain on the roads and in service in California for decades to come. The modeling for the Scoping Plan indicates that even in 2045, significant volumes of liquid fuels, including fossil fuels, are likely to remain in California's transportation fuel mix.² Solutions that can significantly reduce—and even fully eliminate—greenhouse gas emissions from California's transportation sector will be key.

Remora supports CARB's near-term increase in carbon intensity (CI) stringency to a 9% CI reduction in 2025, which is included in the 15-day changes. CARB should also consider that the increased step down should be advanced through the stringency curve to guarantee stronger reduction targets year after year through 2030. Both of these changes will support the program's efforts to maximize emission reductions and drive California towards its climate goals.

The LCFS Can Be More Effective By Positioning it To Incorporate Mobile Carbon Capture Technologies

Given the scale and scope of the challenge to meet California's GHG reduction targets, the State cannot afford to limit any approaches that can contribute to this effort. As CARB works to refine LCFS, Remora urges CARB to ensure that it optimally positions California to reap the benefits that innovative and proven technologies like MCCS can provide.

Swiftly incorporating additional technologies into the existing CCS Protocol within the LCFS Regulation will recognize the role CCS can play in decarbonizing the production of transportation fuels and will be key in meeting California's climate goals.

By incorporating MCCS into the LCFS, California can work towards even more ambitious transportation decarbonization targets, which will provide climate, air quality, and public health benefits to Californians.

¹ See Draft 2022 Scoping Plan Update, pg. 147.

² See Draft 2022 Scoping Plan Update, pg. 153.

Remora appreciates the opportunity to submit comments, and we look forward to continuing to work with you and all stakeholders in California on this critically important effort.

Sincerely,

DocuSigned by:

85A7EE329E6444C...
Paul Gross
CEO

August 27, 2024

Chair Liane Randolph & Members of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Via electronic submission

Re: Proposed 15-Day Changes to the Proposed Regulation Order

Dear Chair Randolph and Members of the California Air Resources Board,

On behalf of the Iowa Biodiesel Board, thank you for the opportunity to comment on the proposed 15-day changes (15-Day Changes) to the Low Carbon Fuel Standard (LCFS) program. The Iowa Biodiesel Board represents the biodiesel industry in Iowa, from the farmers who grow the feedstock, to production, through distribution to end users. Founded by the Iowa Soybean Association, IBB operates an independent organization and board, working to promote the commercial and economic success of biodiesel in Iowa.

115.1

Our position is that the proposed amendments introduced by CARB to significantly limit vegetable oil feedstocks and set onerous requirements for soybean oil are short-sighted and counterproductive to CARB's goal of decarbonizing the fuel supply. Rather than further embracing biodiesel – a solution that is here today and already contributing greatly to cleaning up the California fuel supply – it appears to us that CARB will penalize biodiesel while waiting for future technology to take hold.

Without scientific justification, these proposed vegetable oil caps and additional sustainability requirements threaten to reverse the progress California has made in emissions reductions and destabilize the economics of renewable fuels nationwide. This is harmful to Iowa and other states with strong biodiesel production and a thriving farm economy. Unlike petroleum, this proposal would penalize the many producers and farmers who have dedicated their livelihoods to a cleaner, more sustainable energy supply. This is likely to have many unintended consequences, such as a halting investment in renewable fuels and other innovations.

It is important to remember that soybeans are grown primarily for their meal, which goes into the animal feed supply. Curbing demand for the lower-value soybean oil has an unintended effect of raising the price of protein for the food supply.

This proposal calls into question the integrity of the LCFS, and whether it is something the renewable fuels industry can count on, or if it is capricious and can be easily blown off course by unpredictable winds.

CARB's 15-Day Changes to revise the LCFS was quite surprising, as the final package diverged significantly from what was included in the Initial Statement of Reasons (ISOR) and the April 10 public workshop. Of top concern for biodiesel producers and farmers across our state and the rest of the nation is a proposal that would in effect cap the use of soybean oil and canola oil as feedstocks for biofuels at 20 percent by company.

Placing an artificial limit on the market, combined with the inclusion of sustainability guardrails, as proposed will fail to reduce emissions and will only increase costs. Iowa biodiesel producers and farmers remain frustrated that CARB insists on using data and methods that are over two decades old to set carbon intensity (CI) scores for soy, while refusing to consider new economic data and failing to consider the potential indirect emission impacts their expanding preference for waste is having.

115.2 IBB opposes the proposed discretionary authority provided to the Executive Officer to stop accepting new pathways for biomass-based diesel. In addition to discriminating against the lipid-based fuel platform, we are concerned this could have unintended impacts for non-lipid pathways which could produce biomass-based diesel as a co-product. We are 115.3 also concerned that the aggressive step-down of CI benchmarks, which partially result from the removal the proposed regulation of fossil jet fuel, combined with other changes, will reward importers of waste feedstocks while penalizing farmers across Iowa and the broader United States.

As CARB seeks to finalize updates to the LCFS program in the coming months, we strongly encourage the agency to ensure these updates are based on science as required by AB-32. The determination to make such drastic changes to previous CARB proposals so late in the game was shocking to the soybean and biofuels industries. For CARB to move from arguing that, based on the modeling, a vegetable oil feedstock cap was detrimental to the goals of the LCFS at the April public workshop, to now recommending a wildly stringent cap on those feedstocks without data or science, is quite difficult to comprehend. CARB's own April 10th analysis showed that a feedstock cap would increase greenhouse gas (GHG) emissions in California, which is contrary to requirements in AB-32.

The Impact of a Vegetable Oil Feedstock Cap

Iowa is the nation's leading biodiesel producer. The state's operating biodiesel plants produce about 350 million gallons of fuel per year. According to a [study](#) by ABF Economics, the biodiesel industry:

- Accounts for more than \$850 million of Iowa GDP
- Supports nearly 5,700 fulltime-equivalent jobs in all sectors of the Iowa economy
- Accounts for about \$410 million of household income for Iowans

In 2023, the Iowa biodiesel industry spent \$1.8 billion on raw materials, other inputs, goods, and services. The largest share of this spending is for fats and oils used as the raw

material to make biodiesel. The 2 billion pounds of soybean oil used to produce biodiesel in Iowa were the equivalent of the oil from nearly 178 million bushels of soybeans, more than 30 percent of Iowa's soybean crop. Iowa's biodiesel industry used an additional 600 million pounds of other feedstocks including distiller's corn oil (a co-product of corn dry mill ethanol production), canola oil, animal fats, and domestic used cooking oil (UCO).

115.1 cont

The inclusion of a virgin vegetable oil feedstock cap in the 15-Day Changes was alarming to producers, farmers and the entire biofuels value chain, as reflected in market activity. You may understand our surprise based on the April 10 workshop in which CARB noted that liquid fuels would continue to be needed in the transportation sector in California for at least the next decade. In that same workshop, CARB also argued that the imposition of a virgin vegetable oil feedstock cap would increase the utilization of petroleum diesel in the transportation sector. In the staff's own presentation on April 10, staff noted that nearly eighty percent of vehicles on the road in California to still use combustion engines by 2030. Further, they noted that such a stringent cap on virgin vegetable oils may result in 2.8 billion gallons of fossil diesel utilization in 2030, versus 1.9 billion gallons using a scenario that does not impose the cap proposed by the Environmental Justice Advisory Committee.

In a full reversal of staff's prior analysis, which is only four months ago, staff is now essentially recommending to the board that more fossil diesel be sold into the market in 2030. This recommendation appears to not only go against the goals of AB-32, but also science. This recommendation seems to flatly disagree with the Intergovernmental Panel on Climate Change, which notes in its sixth assessment report that using existing low carbon technologies is a crucial component to avoiding catastrophic temperature increases, stating that "biodiesel and renewable diesel fuels...could offer important near-term reductions" for several technologies, including buses, rail, and long-haul trucking.¹

In our current interpretation, the cap may lock out of the market producers of the lowest cost, lowest carbon intensity soybean oil-based biofuel (soy methyl esters). Most soy methyl esters are produced at biodiesel plants adjacent to soybean processing plants. Often, the companies which own operate these soybean processing are not involved in the procurement and processing of non-crop-based oils, such as UCO and tallow. They exclusively make biofuels out of soy oil or canola oil. The current language limits crediting of soy and canola to 20 percent of reported gallons. This leaves integrated agriprocessing/biofuel producers two choices: 1) exit the market entirely, or 2) be denied a government benefit on 80 percent of their fuel. If this is the current interpretation of the proposed provision, it would significantly and arbitrarily disadvantage the sustainable oilseed biodiesel community.

¹ Jaramillo, P., S. Kahn Ribeiro, P. Newman, S. Dhar, O.E. Diemuodeke, T. Kajino, D.S. Lee, S.B. Nugroho, X. Ou, A. Hammer Strømman, J. Whitehead, 2022: Transport. In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_Chapter10.pdf

We echo the concern of the American Soybean Association and Clean Fuels Alliance America that new requirement appears to contradict the statutory guidance laid out in AB-32 to minimize costs.

Sustainability Guardrails

115.4

The IBB was surprised to find that not only was a feedstock cap in the 15-Day Changes, but the sustainability guardrails were also retained. The cap, sustainability guardrails and Indirect Land Use Change score all additively, and redundantly, address land use change. This has the equivalent effect of giving soy and canola a much higher CI score increasing the compliance cost associated with delivering the product, despite the lack of direct evidence.

Broadly we are concerned that the requirement proposed by CARB is unneeded given the longstanding, excessively high ILUC figure (relative to more recent modeling efforts). Furthermore, we are extremely disheartened that CARB has not followed the example of governments across North America, where farmers who submit data for compliance are also given the opportunity to be incentivized for conservation efforts. This additional cost without benefit contradicts language authorizing the LCFS. Section 38562 (b)(7) of AB-32 directs CARB to, “Minimize the administrative burden of implementing and complying with these regulations.” Adding supply chain traceability to a bulk delivery system adds significant administrative burden without changing the GHG emissions of the pathway.

115.5

CARB’s efforts could be improved and enhanced by outreach to U.S. Department of Agriculture (USDA) personnel who have engaged in activity regarding climate-smart farming practices. USDA recently closed a comment period on its Request for Information on Procedures for Quantification, Reporting, and Verification of Greenhouse Gas Emissions Associated with the Production of Domestic Agricultural Commodities Used as Biofuel Feedstocks. With the information received, USDA seeks to quantify and qualify the benefits of climate smart agriculture practices for biofuel programs at the state, national, and international level. Communication between CARB and USDA could be enlightening regarding ongoing agricultural sustainability practices.

Through the current sustainable aviation fuel (SAF) federal tax credit (40B), the CI of soy-based biofuels can improve through no-till and cover cropping on the field that the soybeans were produced. Other farming practices like low-till, nutrient management, enhanced efficiency fertilizers, buffers, wetland and grassland management, tree planting on working lands, planting for higher carbon sequestration, and soil amendments all can and should be accounted to assign a lower CI score to an agricultural feedstock. USDA already tracks all these practices through several of their managed conservation programs. In addition, there are a variety of other practices that scientifically lower the CI score of soybean feedstocks for biofuels, and USDA is actively working to develop mechanisms to account for those.

Given the work being undertaken by USDA and EPA as part of the implementation of the Inflation Reduction Act, IBB urges CARB to reconsider its proposed sustainability requirements to allow soybean growers the opportunity to participate in the California biofuels market through innovative and climate smart agriculture practices.

Outdated Scoring

For the last several years, state soybean associations, national associations, and biofuel producers have urged CARB to consider updating its scoring methodology for crop-based biofuels. CARB has refused to even consider the request.

We remain deeply concerned that without a comprehensive update to the Global Trade Analysis Project model for biofuels (GTAP-BIO) that CARB utilizes, soy-based feedstocks will be phased out of the LCFS even without the additional limitations being proposed in the 15-Day Changes. Current data indicates a much lower CI score for soybeans, as growers continue to improve soil practices, limit water use, lower on-farm emissions and more. On the one hand, CARB is recommending stringent sustainability guardrails for U.S. soy, but on the other hand is still on track to likely phase-out soy-based biofuels from credit generation by approximately 2035 or sooner.

CARB has indicated plans to update all major models for lifecycle emissions calculations except for GTAP-BIO in the updated LCFS rulemaking. The soy industry has made vast improvements in sustainability and efficiency over the past two decades, with even greater improvement goals ahead. At the same time, CARB continues to rely on a 2014 model that uses data from 2004. The ILUC score accounts for half or more of the CI score for soy-based biofuels. CARB's current modeling assigns soy biomass-based diesel with an ILUC impact of 29.1g CO₂e/MJ whereas updated results from the model used to calculate ILUC scores indicate a value of between 9 and 10 gCO₂e/MJ for soybeans². The recently released 40BSAF-GREET 2024 model has an ILUC score of 12.2 for soy-based sustainable aviation fuel in federal programs.

The benefits of the LCFS can only be achieved if CI values are accurately captured. If land use change concerns are large enough to justify sustainability guardrails and capping virgin vegetable oil feedstocks, then the modeling should also be updated to reflect current land use change data.

115.2 cont **Entities Eligible to Apply for Fuel Pathways**

We are concerned about CARB's 15-Day Changes to give the Executive Officer discretion to stop accepting new pathways for biomass-based diesel starting in 2031. We do not understand what provision of AB-32 statute is served, or justifies, this arbitrary and highly

² Taheripour, F., Karmai, O., and Sajedinia, E. (2023). *Biodiesel Induced Land Use Changes: An Assessment Using GTAP-BIO 2014 Data Base*. Purdue University

selective change. CARB must under statute minimize costs and maximize GHG reductions. It is unclear how this is served by rejecting new pathways. In fact, the requirements of current law are met by allowing the most available pathways. If these pathways cannot achieve cost-effective GHG savings, they will not be utilized by the market in the LCFS. In essence, an increase in pathways can only serve to improve GHG benefits in California. Singling out a single fuel for prejudicial treatment is baffling given the goals of the LCFS and the authority that establishes it. Executive Order S-01-07 establishing the LCFS specifically cites diversity of fuels as a motivation for the program, and this proposal contradicts one of the stated purposes of the program. In addition, this provision if implemented could also significantly disadvantage other biofuel production processes which may produce biomass-based diesel as a co-product, for example in system where SAF is a main product.

Conclusion

The IBB is encouraged by the continued successes of programs that support the development of cleaner, low-carbon fuels. However, it is critical that CARB finalizes updates in a way that does not arbitrarily exclude agricultural feedstocks through policies that are not science-based and run afoul of CARB's mandate, including capping vegetable oil feedstocks and applying onerous sustainability guardrails that add cost without rewarding farming practices that lower CI.

CARB's 15-Day Changes, released in August 2024, is deeply concerning. CARB has singled out soybean and canola oil for adverse, prejudicial treatment. No scientific evidence is ever given for this treatment. In fact, CARB has refused to update the science as required by law for these feedstocks. This alone calls into question the integrity of a performance-based LCFS. On top of this, CARB is now proposing feedstock caps, traceability requirements and authority to reject applications for these fuels produced from them. Again, CARB has not shown any scientific justification. In fact, the LCFS is already over penalizing soy for any land use change requirements.

Biodiesel producers and farmers across Iowa remain eager to continue working with CARB to support the role of agriculture in diversifying the fuel supply while reducing GHGs and increasing clean air in California and beyond. We appreciate the opportunity to comment and look forward to collaborating with CARB and other relevant stakeholders on implementation of policies that expand the use of soy-based biofuels and market opportunities for soybean farmers.

Sincerely,

Grant Kimberley
Executive Director
Iowa Biodiesel Board



27 August 2024

Chair Randolph and Members of the Board
California Air Resources Board (CARB)
1001 I Street
Sacramento, CA 95814

Subject: Mercedes-Benz High Power Charging (MB HPC) response to the August 12, 2024 Notice of Public Availability of Modified Text and 15-day changes as stated in the Summary of Proposed Modifications

Dear Chair Randolph and Members of the Board,

Mercedes-Benz High-Power Charging (MB HPC) supports the California Air Resources Board's (CARB) ongoing efforts to update the Low Carbon Fuel Standard (LCFS) regulations. The LCFS program is a key policy in attracting private investment in the state, particularly when it comes to high-power direct current fast charging (DCFC) stations. Our vision to invest hundreds of millions of dollars in California and to build out the I-5 corridor in the coming years factored in California's flexible and innovative policies, particularly the LCFS.

The LCFS is a key policy driving investment in the state, and we support CARB's efforts to refresh and utilize this program to reach the goals of the state's Scoping Plan. CARB's steady hand administering this policy over the years has maintained the policy's efficacy.

We are largely supportive of CARB's Proposed Modifications. However, we have concerns about the new definition for Public Light- and Medium-Duty (LMD) Charging Site under the Fast Charging Infrastructure (FCI) pathway contained in the 15-day package. The proposed LMD-FCI program, as currently defined, could hamper innovation and station deployment. With minor edits, the definition can be modified to incentivize more DCFC across the state while encouraging continued innovation.

Overview of MB HPC

MB HPC, a joint venture between subsidiaries of Mercedes-Benz Group AG (Mercedes-Benz) and MN8 Energy LLC (MN8), has made an initial investment of \$1 billion for the first phase of building a public DCFC charging network to elevate the electric vehicle (EV) charging experience across North America. Leveraging Mercedes-Benz' over 130-years of engineering excellence and leadership in delivering exceptional customer experiences, and MN8's extensive expertise as a renewable energy infrastructure developer and owner-operator, MB HPC will set a new standard for quality, safety, and innovation in the charging industry. To do so, we are extending the Mercedes-Benz brand promise to all EV drivers, regardless of vehicle brand. Our convenient, fast, and reliable network is designed to fit seamlessly into drivers' everyday lives. Powered by 100% clean energy, our goal is to promote the shift to sustainable, emission-free mobility.

Comments

- 116.1 CARB's proposal to increase the annual carbon intensity (CI) reduction benchmark in 2025 from 5% to 9% will drive further investment into the state as California continues to exceed its clean fuel goals. We
- 116.2 conceptually support CARB's proposal to develop a new FCI pathway for LMD charging sites. The proposed LMD-FCI program, if designed with innovation in mind, will expand the deployment of DCFC infrastructure in California, which is necessary for California to meet its transportation carbon emission reduction goals.

What do we mean by Innovation?

MB HPC was founded with the goal of developing products and solutions that address the pain points drivers have experienced using the first generation of EV chargers. MB HPC takes a measured approach to product innovations, testing new solutions within the ecosystem of Mercedes-Benz drivers. Once proven these innovations are released across the network to all drivers with the aim of setting a new standard for public charging. Simply put, this standard will be defined by charging infrastructure that reliably works and is complemented by delightful experiences that allow the act of charging to fade into the background, as exemplified by our recent announcement to electrify the I-5 by building at Starbucks sites throughout the corridor.

One of the first products developed within the Mercedes-Benz ecosystem to optimize the charging experience is an intelligent queuing feature that allows drivers to reserve a charger fifteen minutes prior to the vehicle's expected arrival at the charger, helping to address the prevalent concern EV drivers have with congestion at public charging stations. According to a recent survey of current and prospective EV owners, "80 percent of survey respondents who are considering an EV as their next car believe that the current availability is insufficient; another 15 percent are satisfied with it but worry that the future network will not be robust enough to meet surging demand."¹

By routing vehicles to stations with available chargers and away from those without availability, intelligent queuing is a critical measure to deliver the reliable driver experience necessary so that EV adoption is not hindered. Other Charge Point Operators (CPOs) are implementing congestion management methods that seek to address this concern, such as idle fees, dynamic pricing, and vehicle state of charge (SOC) limits. The intelligent queueing feature offers an alternative way of reducing congestion, without raising prices or limiting the length of charging sessions for drivers. We expect this feature to not only result in a better charging experience for drivers, but also, to increase utilization by routing demand to available supply. We believe that product innovation is critical in these still nascent years in the charging industry, and caution CARB against implementing a policy that would discourage it.

¹ [Exploring consumer sentiment on electric-vehicle charging](#)

116.2 cont **Recommended Changes to the Public LMD-FCI Charging Site Definition Proposed in the 15-day package:**

We respectfully request that CARB amend the 15-day package to incorporate changes to the Section 94581 Definitions and Acronyms. Our proposed changes are as follow:

“Public LMD-FCI Charging Site” means an EV fast charging site that can be restricted to light- and medium-duty EVs and that is available to the public for at least 12 continuous hours each day, including the time interval between 9 a.m. and 5 p.m.
~~Chargers at the site must not be reservable during public hours.~~

~~Chargers at the site may be reserved during public hours and still qualify as public if no more than 75% of EVSE at a charging station are reservable, rounding down to the nearest integer [2].“~~

This definition will avoid discouraging experimentation with innovative features such as intelligent queueing, which we believe will improve the charging experience and increase utilization of equipment and would otherwise be penalized under CARB’s Proposed Modifications. If not adopted, the current proposal would lead to a situation where stations deploying innovative queueing systems receive only half of the FCI funding of other, “public” stations – this would discourage this type of innovation and result in less deployment of DCFC infrastructure in California.

California’s continued leadership in clean transportation is important to ensure that operators of EVSE are able to innovate around features and products, and best serve both the current and next generation of EV drivers. Limiting opportunities to participate in the LCFS program for DCFC projects because a portion of the chargers are not first come, first served hurts the economics of these projects and discourages what we believe could be a valuable innovation for the industry and future drivers.

Summary

The LCFS is a critical tool in CARB’s toolkit to meet the timelines laid out in the Scoping Plan. While we urge CARB to adopt our changes to the 15-day package, we support CARB’s strengthening of the LCFS by increasing the short-term CI reduction benchmark and establishing the LMD-FCI pathway.

Through this suite of changes, we believe that the LCFS program will continue to meaningfully incentivize CPOs to invest in California, helping the state to meet its infrastructure goals, while also encouraging continued innovation in the charging space, which will support the much-needed levelling-up of the charging experience.

We commend CARB for putting in the time and effort to develop this proposal and its continued steady hand with the highly impactful LCFS program, and we appreciate the opportunity to provide meaningful feedback on the program.

Sincerely,


Andrew Cornelia

President & CEO, Mercedes-Benz High-Power Charging



Brian Kee

Manager, EV Charging Policy, MN8 Energy LLC



[2] Proposed EVSE Reservation Limits

EVSE per Site	1	2	3	4	5	6	7	8	9	10
Reservable EVSE	0	1	2	3	3	4	5	6	6	7
Non-Reservable EVSE	1	1	1	1	2	2	2	2	3	3



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August 27, 2024

Rajinder Sahota

Deputy Executive Officer for Climate Change & Research

California Air Resources Board

1001 I Street

Sacramento, CA 95814

RE: World Energy's Comments on the 15-Day Proposed Amendments to the Low Carbon Fuel Standard

Dear Ms. Sahota and CARB Staff,

World Energy appreciates the opportunity to provide comments on the 15-Day Proposed Amendments to the Low Carbon Fuel Standard (LCFS). We would like to thank CARB staff for their continued efforts throughout this extensive process to consider stakeholder feedback. Of the utmost importance, World Energy urges the finalization of this rulemaking at the November 8th Board meeting to ensure the proposed amendments will have the greatest impact in driving additional decarbonization in California's transportation sector. It is also important for CARB to provide meaningful modifications to the 15-Day Proposed Amendments in order for our company to realize the low carbon opportunities that are envisioned by CARB.

World Energy is one of the largest and longest-serving advanced clean energy suppliers in North America. We were the world's first producer of sustainable aviation fuel (SAF) and remain leaders in the field of renewable fuels. Our facility in Paramount, CA is in the final stages of conversion from a petroleum refinery to a 100% renewable fuels bio-refinery. When completed, World Energy's Paramount facility is projected to increase production capacity to approximately 350 million gallons of low carbon fuels per year.

We have made significant investments in continuously reducing the carbon intensity (CI) of our fuels and producing very-low carbon fuels for the California market and will continue to do so as lower carbon reduction technologies are created and implemented over next 20 to 30 years. Already, we have fuel pathways providing up to an 85% reduction in CI, which are near the lowest commercial scale CI fuels in the marketplace. Our fuels have helped the LCFS program meet and exceed its targets, and our Paramount plant is a premiere example of the clean energy future. World Energy continues our commitment to reduce transportation emissions including investing \$4 billion in scaled manufacturing and new technologies to achieve our goal of supplying 1 billion gallons of sustainable aviation fuel annually by 2030.

World Energy would like to share the following comments and concerns for consideration in response to the 15-Day Proposed Amendments shared on August 12:

2025 CI Benchmark

We are encouraged by the proposed nine percent change in stringency for the 2025 CI benchmark as proposed in §95484(d) through (f). Given the accumulation of credits in the credit bank, this is a necessary threshold to begin to better balance the market and send a stronger investment signal in 2025 and beyond. Together with the auto acceleration mechanism, these updates to the LCFS will help maximize transportation decarbonization. We encourage these proposed amendments to be advanced to the CARB Board.

Proposed Addition of §95482(i): Biomass-Based Diesel from Virgin Soybean and Canola Oil

118.1

World Energy has significant concerns with the proposed addition of §95482(i) pertaining to the phase out of biomass-based diesel from virgin soybean and canola oil. Both the principle and the details of the proposal give us pause. Although World Energy prides itself on primarily sourcing waste oils, this restriction will cause significant indirect impacts on us and feedstock supply constraints across the industry.

On principle, we remain unconvinced that these feedstock limits are necessary, and are concerned that CARB is for the first time disqualifying credit generation from a feedstock with a certified low carbon intensity score. The evidence from the marketplace demonstrates that CI scores already act as a restriction to the use of virgin seed oils. While soybean and canola oil comprised over 50%¹ of feedstock for biofuels across the country in 2023, in California these feedstocks represented only 19.5% of the market.² The market driver and reason for the regional difference is the CI score, indicating that the

¹ Energy Information Administration Monthly Biofuels Capacity and Feedstocks Update Report, Tables 2b and 2c for calendar year 2023

² CARB LCFS Data Dashboard, Figure 6.

118.1
Cont. LCFS framework is functioning as intended to incentivize the lowest carbon approaches to transportation decarbonization, and crowd out higher carbon alternatives.

It is particularly concerning to us that this significant change to our industry is proposed in a 15-day comment package so close to the regulatory update being completed. The unprecedented suggestion to disqualify credit generation from a category of fuels that currently qualify for credits is likely to send chilling signals to other investors in the marketplace writ large. The investment community will view the last-minute, sudden change in the program as an indication of regulatory instability, which could increase risk calculation and discourage investment in other feedstocks, fuels, or technologies within the LCFS.

Therefore, our **top recommendation is to remove the draft feedstock limitation from the staff proposal**. As originally intended, the CI scores are working as a natural limitation, while still providing some market flexibility during unforeseen events.

118.2 If CARB is determined to pursue this concerning provision, we urge CARB to utilize a universal start date in 2030 paired with a phased approach. The necessary components of this revision include:

1. **A universal start date** that does not pick winners and losers, allowing some in the industry to utilize virgin oil feedstocks for several years beyond the rest of the industry.

We are very concerned with the 2028 start date for only certain entities. In separating which entities are subject to the regulation immediately versus in 2028, CARB arbitrarily chooses winners and losers by allowing some entities to have additional time to adjust to the change. This breaks with precedent in the LCFS and gives a marketplace advantage to some fuel producers based on a very finite snapshot of the past – in this case, the 2023 feedstock selections.

2. **A 2030 start** to the limit that will still send a strong signal to the market that alternative feedstocks are of upmost value but provides time for the industry to adjust and for companies like World Energy to avoid significant feedstock price spikes. This would also ease concerns from the investment community across the LCFS. Moreover, a later start date will be more consistent with the slow and steady approach typically taken in regulatory implementation.

The respective 2025 and 2028 start dates across the industry do not provide sufficient time for the feedstock market to react. Consider that in order to

118.2 Cont. plant new, alternative sustainable non-food crops (e.g., camelina and covercrops such as carinata or pennycress) and have yields of any meaningful volumes, farmers will require at least 4-5 growing cycles. The regulatory implementation must reflect this timeline, at a minimum. The planning cycle for farmers, together with the years it takes for seed and farm practice development to supply an updated feedstock offering to the market cannot meet the proposed short timeline. This has the potential to unleash significant feedstock shortages and price spikes.

Already, CARB has recognized that existing credit generation opportunities should have ample advanced notice, as reflected in the staff proposal to cease crediting avoided methane emissions after 2040. Both the marketplace and investors need this lead time for investment confidence and regulatory stability. As users of the lowest carbon feedstocks, World Energy has signed letters of intent with most (if not all) low carbon feedstock developers, trying to spur their development into the commercial marketplace. The simple truth is that these new crops take a long time to develop. Five years of advanced notice is the absolute minimum the industry requires to adjust and develop alternatives.

118.3 3. A **phased approach** that starts higher than 20 percent and ratchets down until 2035 or 2040. This would provide the market flexibility to weather unforeseen economic events, while CARB's CI values continue to function as intended.

The existing flexibility in feedstocks has proven crucial recently, when supply chains were severely impacted during COVID. California needs a long-term decarbonization strategy that can weather black swan events like COVID. Completely eliminating fossil fuel from our transportation cannot be accomplished if we are creating plans that only work during strong, predictable economic years.

118.4 Furthermore, when it comes to soybean and canola oil and agriculture across the United States, one size does not fit all. Already, farmers are creating more options and greater flexibility to use practices that reduce feedstock and CI. Moreover, the biofuels market remains constantly evolving. Innovation is advancing at an unprecedented rate on feedstock diversification, crop development, and farming practices to reduce GHGs. This is why we encourage CARB to enable as much adaptability and flexibility in its framework as is practicable and embrace a performance-based approach in its analysis, focusing on outcomes rather than prescriptive and exclusionary lists of acceptable feedstocks.

Proposed Addition of §95488(d): No New Fuel Pathways if ZEVs or NZEVs Exceed 132,000

118.5

We are also concerned with the proposal in §95488(d) regarding the Executive Officer's ability to deny new fuel pathway applications for biomass-based diesel if the number of Class 3 to 8 zero-emission vehicles (ZEV) or near-zero emission vehicles (NZEV) reported in California exceeds 132,000 vehicles. While World Energy agrees this may make sense for ZEVs, we ask CARB to reconsider this provision for NZEVs. Particularly, NZEVs will still use combustion fuels and eliminating the option for new fuel pathways may reduce the opportunities to include new biomass-based diesel fuel pathways with lower CI. As such, the restriction could inadvertently prolong the use of petroleum over switching to lower carbon fuels. As long as NZEVs are in use, the LCFS should incentivize new fuel pathways to ensure the lowest possible CI fuels are available to fuel NZEVs.

Sustainability Related Considerations

The current proposed language for biomass-based feedstock requires environmental management practices that are not relevant to waste based oils. World Energy suggests adding a stipulation that the requirements pertain to cultivated rather than waste diversion/repurposing end uses.

118.6

Regarding Approved Certification Systems, it is possible that several of the requirements may not be included in the operating procedures for the standards bodies (e.g., certification system requiring auditing bodies to maintain professional liability insurance). We recommend that CARB consider including formal consultation with the candidate "certification system" operators that includes both analysis and the potential for adoption of new CARB provisions. It is unclear whether CARB is envisioning a California based certification (e.g., ISCC-CARB, RSB-CARB fuel certification), or whether the assessment will determine if recognizing an external regulatory system as sufficient (e.g., CARB recognizes ISCC-Plus or RSB-Global as complying). Clarification on these points would be helpful.

Unresolved Issues for Imminent Consideration

World Energy is glad to see CARB is reaching the final stages of this LCFS rulemaking. However, we want to highlight some important topics that we have mentioned in our previous comments that have not been addressed in this rulemaking. We would like to encourage staff to turn their attention to these topics as soon as possible at the conclusion of this rulemaking.

- 118.7
1. Low Carbon Power Crediting: CARB should update its low carbon power sourcing provisions – already afforded to the ZEV market – for renewable fuel production. Utilization of lower carbon power, both as an industrial power source and to create hydrogen, should be rewarded in the California marketplace. To adequately encourage SAF production, CARB should align its accounting for and crediting of electricity emissions with that of the federal government’s 40B guidance.
 2. Book and Claim for Hydrogen: Furthering the issue above, to spur the growth of lower carbon hydrogen in California, industrial use of low carbon hydrogen should be credited, so long as the eventual product is used in the transportation market. CARB is narrowly dictating end uses of low carbon energy sources when cleaner hydrogen should be credited within the transportation market, whether used to produce SAF or sent directly into a FCEV.
- 118.8
3. Farm Side Crediting and Soil Organic Carbon: We also recommend CARB evaluate the potential benefits of adding farm side crediting to the LCFS during the next rulemaking. As farmers consider opportunities to implement agricultural climate solutions, such as soil organic carbon sequestration, including farm side crediting in the LCFS can incentivize and reward improved agricultural practices. Reducing emissions associated with feedstock production at the farm level will result in overall lower carbon intensities of the LCFS fuel pool.
- 118.9
4. Marine Fuels: We encourage CARB to consider adding ocean-going and marine vessels to the LCFS. Ocean-going and marine vessels are hard-to-decarbonize and incentivizing lower CI fuels will be a crucial near-term solution to move the vessels towards lower carbon emissions. Adding ocean-going and marine vessels to the LCFS can motivate investments and open the market to lower CI fuels which can support the decarbonization of these vessels.

World Energy values CARB staff’s work to finalize this LCFS rulemaking. We hope our concerns will be considered and incorporated before the rulemaking package is finalized and approved by the CARB Board. We are hopeful that the final package will be adopted on November 8th and implemented on schedule in January 2025 to send the appropriate market signals and ensure the continued success of the LCFS.

Sincerely,

World Energy Net Zero Services,



Scott Lewis, President



August 27, 2024

California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812
[submitted electronically]

RE: Charm Comments on the On 15-Day Changes to the Low Carbon Fuel Standard Proposed Regulation Order

Charm Industrial (Charm) appreciates the opportunity to submit comments to the California Air Resources Board (CARB) on the 15-day changes to the Low Carbon Fuel Standard (LCFS) Proposed Regulation Order. Charm is a California-based company working in support of state efforts to rapidly drive down greenhouse gas emissions (GHGs) on the path to carbon neutrality. Our innovative negative emissions technology can play a key role in these efforts. We look forward to continuing to work with CARB, its state agency partners, and all stakeholders to deliver innovative climate solutions that will provide benefits in California and beyond.

About Our Technology

Charm has developed a proven carbon dioxide removal technology that has already removed thousands of tons of carbon from the atmosphere. Our innovative approach converts biomass residues into a carbon-rich liquid that is safely and permanently stored underground. Agricultural waste and highly combustible forest residues that would otherwise burn or be left to rot, emitting GHGs into the atmosphere, are instead transformed into a carbon benefit. In addition to the vital climate benefits that negative emissions technologies like bio-oil sequestration provide, our approach delivers critically needed air quality, wildfire resilience, and economic benefits in parts of California that most need them, like the Sierras and the Central Valley.

Charm Supports The CARB's Near-term Increase In Carbon Intensity (CI) Stringency

California must build on and accelerate actions to rapidly cut GHGs. These actions must include a robust policy and regulatory framework that will take advantage of the significant benefits that innovative carbon removal and sequestration technologies can deliver while still prioritizing direct emissions reductions.

Charm supports CARB's near-term increase in carbon intensity (CI) stringency to a 9% CI reduction in 2025 in its 15-Day Changes. However, to ensure that the program is moving towards maximizing emission reductions to help achieve California's GHG reduction goals, the increased step down should be advanced through the stringency curve to guarantee stronger reduction targets year after year through 2030.

CARB Can Strengthen The LCFS by Ensuring That Additional Technologies Are Quickly Incorporated Into The Existing Regulatory Framework for Carbon Removal.

119.1

Stronger benefits from the LCFS program could be realized if CARB swiftly establishes pathways within the current regulatory framework for additional carbon removal technologies. Charm can help support the success of an ambitious LCFS program through its proven carbon dioxide removal technology as one part of a suite of innovative technologies that California will need to meet its climate goals. The kinds of solutions that Charm has developed can also play a key role in supporting California's biomass and forest waste management goals, wildfire and forest resilience actions, and air quality goals. As a California-based company, we are invested in helping the state continue to be a climate leader by putting in place policies that pave the way for innovative technologies and solutions to support climate action. Policies that support emerging carbon-negative technologies will ensure continued investment, job creation, and economic growth for California.

Consistent with the necessary and ambitious goals for carbon removal technology detailed in the 2022 Scoping Plan, CARB can strengthen the LCFS by, as expeditiously as possible, ensuring that as new carbon dioxide removal and sequestration technologies emerge, they can be quickly incorporated into the existing regulatory framework.

Conclusion

Charm is fully committed to helping California meet its climate goals. California needs a host of strategies to decarbonize virtually every economic sector in the state to achieve carbon neutrality. While we support ongoing efforts to secure direct emission reductions wherever possible, it is clear that innovative carbon removal and sequestration technologies are also going to be needed for California to reach its climate goals, including carbon neutrality by 2045.

Our company was founded to develop and bring technological solutions to the collective effort needed to turn the tide against climate change rapidly. We look forward to continuing to work with CARB on this challenge.

Sincerely,



Nora Cohen Brown

Head of Market Development and Policy



VIA ELECTRONIC FILING

August 27, 2024

Matthew Botill
California Air Resources Board
1001 I Street
Sacramento, California 95814
Re: DVO, Inc. Comments on Low Carbon Fuel Standard 15-Day Amendments

Dear Mr. Botill:

DVO, Inc is a U.S.-based provider of anaerobic digesters designed to effectively and efficiently digest a variety of organic materials to produce either biomethane or renewable electric power. With over 150 digester vessels installed worldwide (majority in North America), DVO is the largest single provider of anaerobic digesters in this industry.

Our industry position is most often that of a vendor to developers and/or project owners. As such, we have a broad and direct overview of the anaerobic digester industry throughout North America. Projects involving DVO's digesters on methane capture projects most often require significant long term investment – either from private individuals, developers, lending institutions or investors.

In recent years, we have seen and experienced what we would describe as an erosion of the effectiveness of the LCFS program. This has resulted in a meaningful drop off in project development and investment. We look forward to CARB instituting improvements that will result in increased methane capture and diversion into beneficial uses as renewable energy.

Toward the goal of increasing methane capture and program effectiveness, we thank CARB and CARB staff for the opportunity to provide the following comments on the LCFS 15-day amendments:

- 120.1a • **Near Term CI Ambition:** We support an increased near-term ambition from the proposed 9% to something greater, such as 11% proposed by other stakeholders. This course-correction should help boil off the current credit bank surplus and the resulting economic consequences.
- 120.1 • **Credit True Up:** DVO supports the proposed language to include a full credit true-up including the temporary period once verification is complete.

- 120.2
- **Step Down in Avoided Methane Crediting from Three Periods to Two:** We do not support the proposed step down in the total number of crediting periods for avoided methane emissions for some subset of projects breaking ground before January 1, 2030, from three to two. This would be an extremely problematic change as it would reduce project lifetimes and create significant headwinds for investment decisions. In addition, lacking further economic incentive support, at the end of only a second avoided methane crediting period, many projects run the risk of abandonment as it may no longer be cost-effective to continue operations. We believe the avoided methane crediting periods should be at least three.
- 120.3
- **Deliverability Language:** We find very troubling the proposed language limiting delivery of out-of-state RNG to pipelines with >50% directional flow into California. The direction of pipeline flows are not controlled or controllable by RNG project owners. Pipeline operators make their own decisions about directionality of products they carry. The current book and claim approach has helped incentivize RNG projects in the U.S. We strongly believe the proposed directional deliverability language by CARB in the 15-day proposed language will further disincentivize investment in these critical RNG projects.
 - **Accessibility to Non-Colocated Renewable Power:** To help further incentivize development in the renewable power industry, we urge CARB to remove the co-located power generation requirement and allow greater and more diverse sources of green power to help produce RNG.

We appreciate CARB's consideration of our views and concerns and look forward to a more robust and reliable LCFS program to support the interests of all stakeholders

Sincerely,



Stephen Dvorak, PE
President & Co-Founder
DVO, Inc.



Cynthia Williams
Global Director
Sustainability, Homologation and Compliance

Ford Motor Company
One American Road
Dearborn, MI 48126-2701

August 27, 2024

Clerk of the Board, California Air Resources Board
1001 I Street
Sacramento, CA 95814
via <https://ww2.arb.ca.gov/lispub/comm/bclist.php>

Subject: Ford Comments on the Proposed Low Carbon Fuel Standard Amendments

Dear Chair Randolph and Members of the Board,

Ford Motor Company (“Ford”) hereby submits our comments on the California Air Resources Board’s (“CARB”) Proposed 15-Day Changes to the Proposed Amendments to the Low Carbon Fuel Standard (“LCFS”). We appreciate the opportunity to comment as well as CARB’s time and consideration.

Ford supports the proposed changes to direct up to 45 percent of the base credits generated by light-duty electric vehicle residential charging to the automakers producing those vehicles, which is outlined in the comments submitted by the Alliance for Automotive Innovation as well. Automakers are uniquely positioned and motivated to effectively invest revenue from the LCFS program to advance the electrification of transportation. In California, automakers face the strictest emissions requirements in the world, and a primary limiting factor on the adoption of electric vehicles is consumer concerns about costs and availability of charging infrastructure. With additional revenue from LCFS, automakers can help relieve these concerns, and doing so improves the financial performance of automakers’ electric vehicles.

With additional revenue, Ford could provide strategic support for residential charging—where most people charge most of the time—and for efforts to integrate electric vehicles into the grid and help ensure these vehicles reduce the grid’s carbon intensity while also reducing the cost of electricity for Californians. On this point, Ford supports the comments submitted by the Vehicle-Grid Integration Council (“VGIC”) and encourages CARB to include vehicle-grid integration (“VGI”) programs as an approved usage for both Base Credit revenue and Electric Distribution Utilities (“EDU”) holdback funds. Ford is currently participating in a small-scale pilot program with Sacramento Municipal Utility District to test VGI. With additional revenue, Ford would like to bring these types of VGI programs to additional customers in California in partnership with the California utilities, thus, helping further electric vehicle adoption by creating new value streams for electric vehicle customers and, at the same time, helping to

support the electric grid by administering VGI programs in coordination with utilities in order to meet the utility goals of increased resilience, infrastructure upgrade deferral, and increased renewable energy utilization.

121.1

To date, Ford has only reported residential charging for a small number of Ford drivers in California which has limited the ability to fully utilize the LCFS program's potential to invest and support the customer's EV transition. CARB's proposed amendments would improve Ford's ability to invest in electrification to support EV affordability for customers. Further, Ford requests that CARB consider the fact that Ford does not include a customer's vehicle in the LCFS Incremental Credit program unless and until that customer opts into the program. Ford participates in the Zero-Carbon Intensity pathway in order to offer our customers' the value of carbon free charging at home through the pathway with Renewable Energy Credit purchases, but this adds additional cost into the business case for Ford's participation in the LCFS. We take this approach to help ensure compliance with California privacy laws, and beat customer expectations, given that Ford may need to share with CARB the customer's vehicle identification number and location. As a result, Ford's participation has been limited to generating about 1,200 credits since it began participating in December 2021. This contributed to 3,457 MWh of renewable electricity from solar and wind energy projects via renewable energy credits. However, if all Ford vehicles were eligible to participate as part of the proposed Base Credit generation, we anticipate that Ford would generate almost six times that number of credits for calendar year 2025, equating to approximately 15-16 times the amount of carbon reduction for residential charging. Ford is eager to find ways to participate in the LCFS in a more substantial way while maintaining our high standards for customer privacy.

121.1
Cont.

If you have any questions, please contact Steve Henderson, Vehicle Regulatory Strategy & Planning (shenders@ford.com), or Evan Belser, Policy Strategist and Managing Counsel (ebelser1@ford.com). Thank you for your attention to these comments.

Sincerely,



Cynthia Williams

August 27, 2024

Ms. Laine Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Submitted Electronically: <https://ww2.arb.ca.gov/lispub/comm/bclist.php>

RE: Hyundai's Comments to the California Air Resources Board's Low Carbon Fuel Standard 15-Day Changes

Dear Chair Randolph:

Hyundai Motor North America ("Hyundai") appreciates the opportunity to comment on the California Air Resources Board's ("CARB") Low Carbon Fuel Standard's ("LCFS") 15-day changes that were published on August 12, 2024.

Hyundai offers a diverse line up of quality and affordable electric vehicles ("EV") which include battery, plug-in hybrid, hybrid, and fuel-cell electric (both light- and heavy-duty) vehicles. We are committed to innovative initiatives that propel forward the EV transition. For example, we are a proud member of IONNA¹, the joint venture of eight automakers to build out more than 30,000 chargers across the nation. As a key partner in the NorCAL ZERO demonstration project², we deployed 30 heavy-duty XCIENT fuel-cell trucks to support the world's most capable hydrogen refueling station in Oakland. Additionally, we seek to convert drivers to EVs by offering a hands-on experience with EVs through a low-commitment, "try-before-you-buy" subscription program, Evolve+³. We will continue to doggedly pursue innovative solutions to spur EV adoption among early majority buyers.

Hyundai recognizes CARB's hard work and dedication in revamping the LCFS regulation. We greatly appreciate the proposal for automakers to earn Base Credits for plug-in electric vehicles ("PEVs"). Automakers are best positioned to efficiently utilize proceeds to further advance the EV transition as automakers have the most at stake. Additionally, we support the 9% stringency increase in carbon intensity ("CI"), as well as the proposed automatic acceleration mechanism, in hopes these together will increase the LCFS credit prices.

¹ See ionna.com.

² See Press Release, Hyundai Newsroom, Hyundai Motor Spearheads U.S. Zero-Emission Freight Transportation with NorCAL ZERO Project Launch (March 5, 2024), <https://www.hyundai.news/eu/articles/press-releases/norcal-zero-project-launch.html>.

³ See Press Release, Hyundai Newsroom, [Hyundai Announces Evolve+ EV Subscription Program at the Chicago Auto Show](https://www.hyundai.news/eu/articles/press-releases/hyundai-announces-evolve-ev-subscription-program-at-the-chicago-auto-show) (February 9, 2023), <https://www.hyundai.news/eu/articles/press-releases/hyundai-announces-evolve-ev-subscription-program-at-the-chicago-auto-show>.

However, significant investments are still needed for CARB to meet its environmental goals. California is behind in charging infrastructure to support the quantity of PEVs (aka ZEVs) required by CARB's Advanced Clean Car II (ACC II) regulation⁴ and woefully behind in hydrogen infrastructure for both light-duty and heavy-duty applications⁵. For example, in Southern California, there are no performant heavy-duty stations publicly available. The existing three stations are not a viable option due to limited fuel and station reliability issues. Additionally, PEVs are facing headwinds in the market, resulting in a much slower adoption rate than anticipated. Therefore, significant incentives are needed to rebuild the momentum.

Below are specific requests that we kindly ask you to consider.

- 122.1 1. The existing monies that the utilities collected but did not allocate through the Clean Fuel Reward ("CFR") program should be divided among automakers who sold PEVs from the time the program expired, September 1, 2022 until the next iteration of LCFS is implemented next year. Unfortunately, the automakers experienced a lost opportunity during this timeframe that would have otherwise supported EV expansion investments.
- 122.2 2. The CFR program has been changed to be used only for medium- and heavy-duty vehicles. We request that proceeds from credits generated from light-duty vehicles be utilized for light-duty vehicles.
3. The proposal states that the light-duty fast charging infrastructure ("FCI") program sunsets at the end of 2030. We request that this program be extended to 2035 to align with CARB's ACC II requirement of 100% ZEV sales by 2035 model year.
- 122.3 4. We request that the final amendments allow hydrogen-powered fuel-cell electric vehicles ("FCEVs") to receive Base Credits or, at a minimum, Incremental Credits subject to the applicable requirements for PEVs. Like PEVs, these vehicles produce no tailpipe emissions and should receive the same benefits as PEVs.
- 122.4 5. We have strong concerns that hydrogen produced using fossil gas feedstock can no longer generate credits starting in 2031. The hydrogen industry is still in its infancy. By removing fossil gas as an allowed feedstock at such an early stage, it may undercut the market's development. While we understand that water electrolysis is the goal, without abundant

⁴ See [CA AB 2127](https://www.energy.ca.gov/publications/2024/assembly-bill-2127-second-electric-vehicle-charging-infrastructure-assessment) Second Electric Vehicle Charging Infrastructure Assessment (updated March 6, 2024), located at <https://www.energy.ca.gov/publications/2024/assembly-bill-2127-second-electric-vehicle-charging-infrastructure-assessment>. The assessment states that 1.01 million chargers are needed to support 7.1 million light-duty vehicles by 2030, and 2.11 million chargers to support 15.2 million light-duty vehicles in 2035 to meet California's zero-emission vehicle targets. As of August 26, 2024, the California Energy Commission website shows 105,012 total public and shared private chargers (<https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics-collection/electric>).

⁵ See [CARB Hydrogen Station Network Self-Sufficiency Analysis per Assembly Bill 8](https://www2.arb.ca.gov/sites/default/files/2021-10/hydrogen_self_sufficiency_report.pdf) (October 2021), located at https://www2.arb.ca.gov/sites/default/files/2021-10/hydrogen_self_sufficiency_report.pdf, p. 14 ("With respect to hydrogen, the EO tasks all State agencies to work with other organizations in the private and public sectors to support the development of 200 hydrogen stations by 2025."). Additionally, according to the Hydrogen Fuel Cell Partnership, there are a total of 55 hydrogen stations 18,729 FCEVs in California as of July 3, 2024. See Hydrogen Fuel Cell Partnership, [FCEV Sales, FCEB, & Hydrogen Station Data](https://h2fcp.org/by_the_numbers) (Numbers as of July 3, 2024), https://h2fcp.org/by_the_numbers.

122.4
Cont.

access to deionized water and more affordable green electricity – which will take considerable time to build out – hydrogen will not be cost-competitive. Meeting diesel Total Cost of Ownership is key to driving fleet adoption. We request that blended feedstock of bio and fossil gas be allowed in 2031 and beyond to generate credits until alternative technologies reach market readiness.

6. Though we are hopeful that the proposed CI standards will appropriately increase credit prices, we strongly encourage CARB to continue its dialogue with hydrogen refueling station operators. The current decline in LCFS credit values caused tremendous hardships on the operators, and this unfortunately resulted in a significant price increase at the pump. Appropriate LCFS credit values are imperative to maintain the affordability of hydrogen and ultimately drive FCEV adoption of all vehicle classes.

In closing, Hyundai appreciates CARB staff's efforts on these amendments. We also support the environmental goals that California's LCFS program strives to achieve. Hyundai is aligned with the comments submitted by the Alliance for Automotive Innovation. We are more than happy to discuss our comments further; please feel free to reach out to Gil Castillo at gcastillo@hmausa.com with any questions. Thank you.

Sincerely,



Olabisi Boyle
Senior Vice President, Product Planning & Mobility Strategy
Hyundai Motor North America

August 27, 2024

Via Electronic Submittal

Clerk of the Board
California Air Resources Board
1001 I. Street
Sacramento, CA 95814

Re: Comments on the Additional Modifications to the Proposed
Amendments to the Low Carbon Fuel Standard

Dear Honorable Members of the California Air Resources Board:

This firm represents Leadership Counsel for Justice and Accountability (“Leadership Counsel”) in matters relating to the California Air Resources Board’s (“CARB”) Proposed Amendments to the Low Carbon Fuel Standard Regulation (“LCFS”). Central Valley Defenders of Clean Water & Air, Animal Legal Defense Fund, and Food & Water Watch have informed us that they also join in this letter. On February 20, 2024, we submitted comments demonstrating that CARB’s proposed amendments to the LCFS would greatly incentivize concentrated animal feeding operations (“factory farms”) to expand their herds and install anaerobic digesters, which will have devastating environmental impacts. These impacts were not adequately evaluated, or even acknowledged, in the Draft Environmental Impact Analysis (“DEIA”). The additional modifications to the proposed amendments published on August 12, 2024 do not eliminate, and would likely increase, the incentive for factory farms to expand their herds and install anaerobic digesters.

Leadership Counsel intends to provide more comprehensive comments on the inadequate Recirculated Draft Environmental Impact Analysis ahead of the September 30, 2024 public comment deadline. However, as discussed below, Leadership Counsel notes that the modifications do not address its concerns regarding the incentives for factory farms created by the LCFS.

Key Modifications to the Proposed Amendments

Strengthening the Carbon Intensity Benchmark

123.1 Currently, the LCFS includes a carbon intensity benchmark requiring a 20% reduction from the 2010 baseline by 2030. The proposed amendments, released in December 2023, strengthened the carbon intensity benchmark to a 30% reduction from the 2010 baseline by 2030, and established a new 90% carbon intensity reduction benchmark by 2045.¹ In our February 2024 comments, we pointed out that strengthening the carbon intensity would increase demand for LCFS credits, and thus increase the money eligible fuel producers, including factory farms, receive for LCFS credits. The additional modifications to the proposed amendments would further increase the required carbon intensity reduction in the first five years following adoption (2025, 2026, 2027, 2028, and 2029). Notably, the initial increase in stringency will be a 9% reduction from the 2010 baseline benchmark² in 2025 as compared to the 5% reduction included in the amendments published in December. Put differently, the recent amendments update the 2025 benchmark schedule to achieve a 22.75% CI reduction compared to the 13.75% CI reduction specified in the 2018 adopted regulation, and the 18.75% reduction specified in the December 2023 amendments. CARB explained this change is intended to increase the stringency to bring deficits and credits into balance.³ If adopted, this modification would provide even more financial benefits for eligible fuel producers, and thus increase the incentive factory farms have to expand their herds and install anaerobic digesters.

Avoided Methane Crediting

123.2 The proposed amendments published in December 2023 drew a bright line between factory farm fuel pathways certified before, and after, January 1, 2030, with respect to avoided methane crediting.⁴ Factory farm fuel pathways certified before January 1, 2030 would be eligible to be renewed for up to three consecutive 10-year crediting periods, whereas fuel pathways certified after January 1, 2030 would only be eligible to generate LCFS credits until 2045 at the latest. Leadership Counsel argued in our February 2024 comments that this proposed amendment would provide a significant

¹ CARB Staff Report: Initial Statement of Reasons, at 22-26 (December 19, 2023) (“ISOR”).

² CARB, Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information, at 5 (August 12, 2024) (Notice of Additional Modifications).

³ *Id.*

⁴ ISOR, at 31.

incentive for factory farms to expand their herds and/or install anaerobic digesters before December 31, 2029, to take advantage of maximum LCFS crediting. The additional modifications to the proposed amendments would limit the number of crediting periods for fuel pathways that are certified before January 1, 2030 to two, rather than three.⁵ However, even with this modification, factory farms would still be greatly incentivized to expand their herds and install digesters before December 31, 2029.

Biomethane Deliverability Requirements

123.3

Under the current LCFS Regulation, all factory farms across the nation can generally qualify for LCFS credits on the same basis as factory farms in California. The proposed amendments included new deliverability requirements that would limit the biomethane eligible for LCFS crediting to biomethane “carried through common carrier pipelines that physically flow within California or toward end use in California.”⁶ Leadership Counsel argued that these deliverability requirements would limit the supply of LCFS credits, thereby increasing the amount of money eligible fuel products would receive per credit, providing a substantial incentive for factory farm herd expansion and digester installation in California. Moreover, it would limit eligible fuel producers to those in California or providing fuel for California, thus providing a greater market share for California livestock operations. The additional modifications would add a condition that would move up the starting point for deliverability requirements under specified circumstances.⁷ Leadership Counsel anticipates this additional modification will only further incentivize the expansion of herds and installation of digesters in California.

Limitations on Fossil Hydrogen Favor Livestock Methane

123.4

The Notice of Additional Modifications states that “staff proposes to remove LCFS credit generation eligibility for hydrogen produced using fossil gas as a feedstock, effective January 1, 2031.”⁸ The text of the proposed amendment, however, provides that hydrogen produced using fossil gas as a feedstock will still be eligible after January 1, 2031, if “biomethane attributes are matched to the hydrogen production.”⁹ This change will require that fossil hydrogen producers that wish to generate credits through the LCFS to purchase the environmental attributes of biomethane. This methane laundering will

⁵ Notice of Additional Modifications, at 12.

⁶ ISOR, at 30-31.

⁷ Notice of Additional Modifications, at 12.

⁸ Notice of Additional Modifications, at 3.

⁹ CARB, Notice of Additional Modifications, Attachment A-1, at 37 (August 12, 2024), https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_atta-1.pdf.

Clerk of the Board
August 27, 2024
Page 4

both expand the market and demand for livestock biomethane and send a signal to the market that the demand for livestock biomethane will increase. This change, too, will increase the value of livestock methane and will encourage the production of biomethane and with it the production and concentration of livestock manure.

Very truly yours,

SHUTE, MIHALY & WEINBERGER LLP



Orran G. Balagopalan, Attorney

August 27, 2024

Attention:
Matthew Botill
Division Chief, Industrial Strategies Division
California Air Resources Board
1001 I Street
Sacramento, California 95814

Submitted electronically.

RE: Proposed Low Carbon Fuel Standard Amendments – August 12, 2024

Dear Mr. Botill,

On behalf of the Canola Council of Canada (CCC) and Canadian Oilseed Processors Association (COPA) we welcome the opportunity to provide feedback on the *Proposed Low Carbon Fuel Standard Amendments (Proposed Amendments)* released August 12, 2024.

The CCC and COPA are non-profit industry associations that work collaboratively to help address issues impacting the canola value chain and oilseed processing sector in Canada.

124.1 The canola industry in Canada is extremely concerned with the California Air Resources Board's (CARB) proposal to cap canola and soybean oil's participation in the Low Carbon Fuel Standard (LCFS) program. The proposal appears to be arbitrary, discriminatory, and lacks scientific justification. As CARB's own data and analysis show¹², clean fuels derived from these vegetable oil feedstocks are making positive contributions to California's GHG emission goals and will play a critical role in supporting cost effective emission reductions from the transportation sector in the future.

Proceeding with a cap, coupled with proposals to phaseout biomass-based diesel pathways, and rigid certification requirements on already sustainable feedstocks like canola and soybeans from Canada and U.S., can be expected to stifle clean fuel investments, lead to more combustion of fossil diesel fuel, drive up fuel prices at the pump and lead to poorer air quality.

124.2 To avoid these unintended consequences, we strongly recommend CARB consider the following actions before finalizing amendments to the LCFS.

1. Reject any imposition of a cap on canola and soybean oil's participation in California's clean fuel market, consistent with CARB's own analysis that a cap on virgin vegetable oils is unwarranted.
2. Remove the proposal to give the Executive Officer discretion to stop accepting applications for new fuel pathways for biomass-based diesel, starting January 1, 2031. This provision is discriminatory and contradicts the overarching principle that LCFS programs be technology neutral.

¹ <https://ww2.arb.ca.gov/sites/default/files/2024-04/LCFS%20April%20Workshop%20Slides.pdf>

² <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>

- 124.3 3. Provide options and flexibility for sustainability certification. We agree that sustainability criteria are important to protect the integrity of any clean fuel program, but demonstrating compliance can be achieved on aggregate (in lieu of certification) if a jurisdiction can provide the necessary evidence to demonstrate there is no detrimental impact on land use change, including deforestation. This approach is consistent with existing biofuel programs, including the U.S. Renewable Fuel Standard and Canada's Clean Fuel Regulation, and has proven to address sustainability concerns while limiting regulatory burden on market participants.
- 124.4 4. Hold an additional public process, after the conclusion of this rulemaking, on these topics. Given the nature and magnitude of the unexpected changes that have been proposed, one can only conclude that there is a clear misunderstanding in the stakeholder community about the sustainability of canola and soy to fuel, therefore, it is vital for CARB to hold further consultations with stakeholders on these topics. This should be done outside of this rulemaking period to allow time for input from stakeholders, including leading academics and experts, on this topic area. Insufficient public process has occurred to-date to support such significant changes at this late date, but this can and should be remedied by appropriate public dialogue on a go-forward basis, in which we would willingly participate.

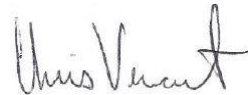
Our detailed feedback on *the Proposed Amendments* can be found in the attached Appendix

The CCC and COPA appreciate this opportunity to comment and look forward to an ongoing dialogue with CARB and other relevant stakeholders to enact changes to the LCFS that will address climate change while creating economic opportunities for those in the clean fuels value chain.

Sincerely,



Chris Davison
President and CEO
CCC



Chris Vervae
Executive Director
COPA

Appendix

I. Cap on Canola and Soybean Oil

While the intention behind CARB's Scoping Plan, and historical LCFS work appears to be to displace up to 100% of the State's current fossil diesel demand, the proposal to cap canola and soybean oils as feedstocks will likely have the opposite effect. Capping the use of these feedstocks will eliminate opportunities to displace fossil diesel and can be expected to increase fuel costs. Canola and soybean oils produced in Canada and U.S. are the most efficient, cost-effective and sustainably produced feedstocks on the market. Limiting their use will constrain the supply of renewable diesel. Renewable diesel and biodiesel are crucial components of California's efforts to reduce greenhouse gas emissions and transition to cleaner energy sources. Any arbitrary limitation on the use of these feedstocks will create a supply-demand imbalance, driving up the costs of renewable diesel production and, consequently, the price at the pump for consumers.

Furthermore, reaching CARB's goal to displace 100% of fossil diesel demand with the proposed feedstock constraints in place is unrealistic and impractical. The clean fuels industry is still developing, meaning access to all sustainably produced feedstock will be critical to meet the state's ambitious targets. By capping the use of canola and soybean oil, the proposal risks both existing and future investments made by clean fuel producers and feedstock providers alike. In turn, this will stall progress made to reduce carbon emissions by creating a bottleneck in clean fuel production. CARB's own analysis supports this assessment.

The CCC and COPA strongly support CARB's findings presented at the April 2024 workshop that renewable diesel and biodiesel have a positive impact on both consumers and the environment. CARB's "Staff Report: Initial Statement of Reasons" (ISOR) specifically modeled an alternative (Alternative 1) which "includes several policy mechanisms that have the effect of limiting the number of credits created from existing low-CI pathways" including "a limit on total credits from diesel fuels or sustainable aviation fuel produced from virgin oil feedstocks." The report's impacts are glaring – and each of them point to more fossil diesel use due to a cap on vegetable oil feedstocks:

- **Increased Fuel Costs:** Total costs of \$162 billion. "The main reason is that diesel fuel is a larger part of the fuel mixture and continues generating large amounts of in-state deficits through 2046. This is because renewable diesel produced from virgin oil feedstock is phased out...and more fossil diesel is needed to fuel the remaining vehicles with internal combustion engines."
- **18% more Greenhouse Gas Emissions, Increased Particulate Matter (PM2.5) and Nitrous Oxide Emissions (NOx) Emissions:** The baseline scenario reduces GHG emissions by 18 percent more than Alternative 1. "Alternative 1 increases NOx emissions by an additional 10,981 tons and increases PM2.5 emissions by 2,773 tons. Alternative 1 has more NOx and PM2.5 emissions than the proposed amendments because this scenario uses less renewable diesel than the proposed amendments."
- **Fewer Health Benefits:** "Alternative 1 has a valuation of health benefits at \$1.58 billion compared to the proposed amendments with a valuation of \$4.98 billion, a difference of \$3.4 billion less in health benefits. The lower avoided health impacts of Alternative 1 are primarily associated with increases in PM2.5 over the baseline due to lower utilization of renewable diesel." (emphasis added)

At the April Workshop, CARB Staff justifiably rejected Alternative 1, citing the fact that it "relies more heavily on fossil fuels...than the proposed amendments. As a result, [Alternative 1] does not achieve the same level of NOx and PM2.5 emissions reductions as the proposed amendments and potentially exacerbates existing air quality challenges in the State."

Additionally, the ISOR included an analysis, and the rejection of, another proposal which included a cap on vegetable oils set at 2020 levels. CARB found that “due to limitations on lipid biofuels and dairy biogas, the Comprehensive Environmental Justice Scenario results in higher volumes of fossil diesel being used than any of the other scenarios evaluated.” (emphasis added)

The proposal to cap canola and soybean oils as a means to achieve 100 % displacement of fossil diesel runs counter to all the evidence presented by CARB to-date that demonstrates a cap on virgin vegetable oil feedstocks will lead to greater fossil diesel demand, higher GHG emissions and higher costs.

Lastly, capping the use of canola and soybean oils will require California to rely on imported feedstocks originating from outside Canada or U.S., such as used cooking oil (UCO) from China. While free and open trade is an important market principle to uphold, it is harder to guarantee or be certain of the origin of UCO or other imported feedstocks, compared to those derived in North America. For example, there is some concern that some of the flood of UCO imports in the past year could include palm oil from southeast Asia, which is the subject of significant concerns due to the environmental profile of its production and concerns over deforestation. There is no deforestation in North America from canola and soybean production and any “indirect” impacts are already accounted for in the overly conservative life-cycle analysis and carbon intensity scores that have been developed for clean fuels from canola and soybeans.

II. Authority to phase out new Biomass-Based Diesel pathways

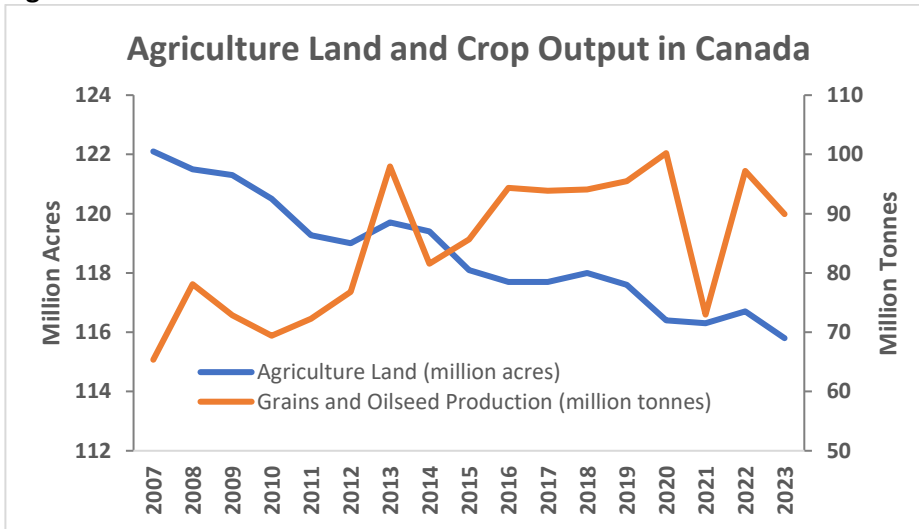
The proposed authority to phase out new BBD pathways in 2031 is also concerning and unwarranted. CARB has a stated goal to achieve 100 percent renewable diesel, and phasing out new pathways would be unnecessary – either because the market has already become saturated and new pathways would no longer be needed, or because the market has not yet achieved 100 percent saturation and additional fuel and feedstocks are required. The inclusion of this provision only serves to send a market signal that will limit both near and long-term supplies of feedstocks and fuel necessary to achieve the climate goals of the LCFS.

III. Sustainability Certification

Data that the canola industry and other stakeholders have shared with CARB over the past 12-24 months, clearly demonstrate that agriculture land in Canada and the U.S. is shrinking, yet crop output continues to grow. Figure 1 is an example of this trend, clearly indicating that crops grown and harvested in Canada do not contribute to deforestation or associated adverse land use impacts. Furthermore, growing more crops with less available land is a testament to the innovation of crop production, with farmers deploying enhanced plant genetics and applying sustainable growing practices.

We reiterate our position that CARB adopt an approach in the updated rule that would allow biofuels produced from crop-based feedstocks to comply with sustainability requirements on aggregate in lieu of certification. While we respect the importance of sustainability criteria in the development of low carbon fuel markets, the certification requirements proposed appear to be a ‘one size fits all’ approach, placing unnecessary obligations and burden on the supply chain from jurisdictions like the U.S. and Canada that have already demonstrated crop production has no adverse impact on land use, deforestation, or biodiversity. Indeed, both the U.S. Renewable Fuel Standard and Canada’s Clean Fuel Regulations already recognize crop production in U.S. and Canada as meeting sustainability requirements.

Figure 1.



Source: Statistics Canada

An aggregate approach to demonstrate compliance with sustainability requirements carries clear advantages for both CARB and market participants including:

1. It opens the door to a wider compliance option for CARB and allows for recognition of similar anti-deforestation efforts taken in partner jurisdictions (i.e. encourages efforts similar to U.S. and Canadian governments).
2. It encourages jurisdictions (not just individual entities) to demonstrate that their supply chains can and do meet sustainability criteria on key issues such as land clearance and deforestation.
3. Where sustainability equivalency can be demonstrated on aggregate across a jurisdiction, it will reduce the administrative burden and cost of feedstock supplies from those jurisdictions that are already fully meeting sustainability requirements under the rule.

August 27, 2024

Ms. Liane Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Comments to Proposed Low Carbon Fuel Standard Amendments (Amendments)

Dear Ms. Randolph:

Proteum Energy® (“Proteum”) thanks you for the opportunity to provide comments on the proposed modifications to the text of the Low Carbon Fuel Standard (LCFS) amendment issued August 12, 2024 (the “15-day Changes”). We commend the board and CARB staff (Staff) on their efforts to update the LCFS to support California’s greenhouse gas (GHG) emission reduction goals toward achieving carbon neutrality.

CARB’s 2022 Scoping Plan emphasizes the necessity of increasing the production of low carbon intensity (CI) hydrogen so that California can hit its decarbonization targets leading to carbon neutrality by 2045. To do so, it expressly “calls for accelerating the transition from combustion of fossil fuels to hydrogen.”

But the Scoping Plan also acknowledges the challenge of producing green hydrogen when it talks about the uncertainty surrounding “the availability of solar to support both electrification of existing sectors and the production of hydrogen through electrolysis” and the vast amount of additional solar capacity that electrolysis would require. As described below, Proteum’s technology can help California surmount this challenge by producing renewable low-CI hydrogen without reliance on electrolysis and the additional solar capacity required for such green hydrogen.

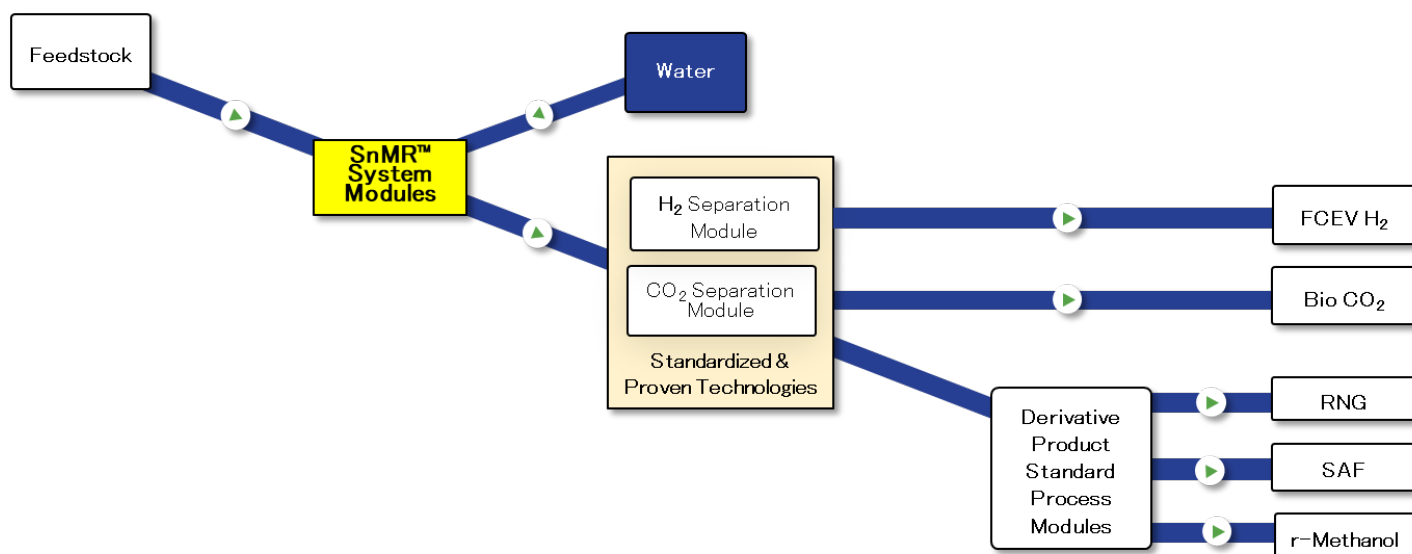
Indeed Proteum is a company that can help California accelerate GHG reductions by producing CI-negative transportation fuels. It is the producer of clean hydrogen and other ultralow-CI fuels for sale into the California transportation market using highly innovative proprietary technology, as described more fully below. As CARB has often made clear the transition to the electrification of heavy-duty trucking will be difficult and take many years due to the weight and range of batteries, as well as the long charging times. Hydrogen solves both of those problems, and we encourage the Amendments to do even more to encourage its production and use.

Proteum plans to produce low/negative carbon intensity fuels from renewable ethanol feedstock in California. Our technology, called Steam Non-Methane Reforming (SnMR™), reforms ethanol feedstock into clean hydrogen, renewable natural gas (RNG) and biogenic CO₂ for use to produce bio-methanol and sustainable aviation fuel (SAF). Our first two California projects will use California corn ethanol as their feedstocks, and both will employ CCS with CO₂ sequestered in California.

We have been developing our technology since 2014 and have been awarded 11 patents in the US and internationally, with an additional 21 patents pending. Proteum has successfully deployed our technology with Diamondback Energy and has a demonstration facility in Bryan Texas. Our production process does not require methane feedstock unlike steam methane reforming (SMR), nor does it utilize electrolysis. Our process uses less water and power than competing technologies, providing an ideal production process for California markets where water and power are constrained.

Utilizing available CCS, our SnMR™ technology platform can produce fuel cell grade hydrogen and bio-methanol with a negative carbon intensity (CI). Our Northern California project will be designed to produce 34 MT/day of carbon-negative fuel cell grade hydrogen, which will be liquified and delivered to FCEV refueling facilities in California, 450 MT/day of carbon-negative renewable methanol for marine bunkering fuel, and 3,100 MMBtu/day of renewable natural gas.

Below is a simple process flow diagram that illustrates the steps in Proteum's production process.



However, the viability of our California projects depends on the availability of LCFS credits.

Proteum believes that the spirit of the proposed Amendments furthers the State's GHG objectives, while certain terms could be enhanced to better support carbon abatement technologies to accelerate GHG reduction. We offer the following comments, which we believe will materially enhance the effectiveness of the Amendments.

Proteum supports many of the modifications proposed in the 15-Day Changes.

We support the 9% step-down in 2025 and the inclusion of AAM. However, we are disappointed that the first potential triggering of the AAM remains as in the 45-day package so that 2028 remains the first year for which the AAM can amend CI reduction targets. Instead we recommend that 2025's performance should be able to trigger the AAM. A 2025 data-year triggering would be able to impact CI targets in 2027. In short, the AAM should be allowed to trigger as early as needed to guard against the case where the step down is not sufficient to address the current oversupply,

126.1

particularly since CARB did not include a more aggressive step-down in 2025, as recommended by ICF and advocated for by many stakeholders in comments on the 45-day package.

We also applaud the adding of the term “captured CO₂” to the type of feedstocks that can be used to produce Alternative Jet Fuel. Proteum’s captured CO₂ can be used to produce AJF as well as negative-CI methanol marine fuel.

In addition to the foregoing, we request the following modifications to the 15-day Changes.

- 126.2 **The Amendments should encourage ethanol as a renewable feedstock to produce ultralow-CI transportation fuels.** An important benefit of using ethanol as a feedstock is that atmospheric CO₂ can be captured and permanently removed through Proteum’s SnMR™ process combined with CCS. Crops and the cellulosic resources used to produce ethanol capture CO₂ directly from the air which is liberated in Proteum’s SnMR™ process with production of renewable transportation fuels; when sequestered, this CO₂ is permanently removed from the atmosphere. This process is not only renewable but exceeds the carbon abatement benefits of other production processes like electrolytic hydrogen using renewable power. With the support of LCFS credits, it does so in a more economically feasible way than other abatement methods like direct air capture. Accordingly, the use of sustainable ethanol as a feedstock for hydrogen production for transportation fuels should be encouraged. In particular: (i) The definition of “Renewable Hydrogen” should *include hydrogen produced from ethanol feedstock*; (ii) The definition of “Biomethane” should *provide for biomethane produced from reformation of ethanol feedstock*; (iii) The definition of “Biomass” should *include all plant-based materials, including ethanol* to encourage Biomass reformation innovation; and (iv) *Reforming of ethanol* should be added to the list of suggested hydrogen production methods for drop-in fuels at § 95488.1(d)(4) and innovative production techniques at § 95488.1(d)(6).

To support innovation in the production of low-CI transportation fuel production, the term “renewable hydrocarbon” should be defined and *include renewable oxygenated hydrocarbons, including ethanol and other biomass sources, that meet the requirements of § 95488.9(g).*

- 126.3 **Sustainable farming practices should be acknowledged and encouraged.** Proteum endorses Staff’s proposal to assure that Biomass used to produce transportation fuels be sustainable. This concept can be developed further—and to a greater benefit—by allowing Biomass producers to *demonstrate and certify their sustainable farming practices* utilized to materially reduce CI using the Tier 2 fuel pathway certification process. Lumping leading edge sustainable Biomass producers into a pre-set CI disincentivizes them from making further investment and innovation to reduce GHG.

- 126.4 **Support for CCS.** Proteum encourages Staff to provide clear support for CCS in the production of renewable transportation fuels. The process of reforming ethanol and other Biomass feedstocks benefit greatly from the use of CCS, which enables Proteum to produce carbon-negative transportation fuels. Due to the expense and required economies of scale, the Amendments should not restrict CCS to facilities co-located with fuel production. The Amendments can incentivize CCS in renewable transportation fuel production separate and apart from questions about utilizing CCS solely when producing fossil-based fuels.

126.5

Addition to the definition of Alternative Jet Fuel.

Please add clarifying words to the definition of Alternative Jet Fuel as follows:

“Alternative Jet Fuel” means a drop-in fuel, made from non-petroleum sources, **including without limitation ethanol**, or captured CO₂, which can be blended into conventional jet fuel without the need to modify aircraft engines and existing fuel distribution infrastructure.

126.6

Additions to the Tier 1 Hydrogen Calculator and Instruction Manual.

In Section 2.1, Pathway Type, in Section 2, Pathway Inputs, on the Site-Specific Inputs tab of the proposed CA-GREET 4.0 Tier 1 Hydrogen Calculator, please add Steam Non-Methane Reforming as described above as a Pathway Input. In Section 2.3 of the same tab, please change the title to “SMR and Steam Non-Methane Reforming Feedstock” and add ethanol to the list of feedstocks.

Please make the corresponding changes in the accompanying Instruction Manual.

Despite CARBs diligent efforts, we fear that the Amendments, as proposed, will stifle the renewable and clean transportation industry in California. We urge CARB to revise and issue an additional 15-day proposal that will more fully encourage investments in clean hydrogen and other ultralow-CI renewable fuels to support its zero-emissions end use goals. We appreciate Staff’s work to develop the proposed rule and their commitment to improving the LCFS. We thank you for considering Proteum’s comments which we believe will advance the State’s GHG reduction goals.

Very truly yours,

PROTEUM ENERGY, LLC



Laurence B. Tree, II

President / Chief Executive Officer

cc: Matt Botill, Chief – Industrial Strategies Division
Rajinder Sahota, Deputy Executive Officer – Climate Change & Research
Jordan Ramalingam, Manager



August 27, 2024
California Air Resources Board
1001 I Street
Sacramento, CA 95814

SUBJECT: Low Carbon Fuel Standard 15-Day Changes

Dear CARB staff and Honorable Board Members,

Clean Transportation
Technologies and Solutions

www.calstart.org

CALSTART appreciates this latest iteration of the Low Carbon Fuel Standard (LCFS) amendments and applauds staff for their hard work and dedication to improve the LCFS program. The LCFS program is critical to the State's overall air quality, climate, and electrification strategy, as reflected by CARB's 2022 Scoping Plan, which lays out the path for attaining the State's carbon neutrality goals, and explicitly relies on the LCFS program to support electrification.

CALSTART and our Origins

CALSTART, headquartered in California, is a globally renowned 501(c)3 nonprofit organization dedicated to the advancement of zero-emission vehicle and infrastructure technology. With a global member consortium of almost 300 technology, government, industry, and community partners, CALSTART has worked for 30+ years to accelerate the commercialization and deployment of advanced technologies and solutions. Through policy development, incentive program administration, and first-of-its-kind deployment partnerships, CALSTART has designed and managed programs that drive the market for clean transportation technologies needed to achieve critical greenhouse gas and criteria pollutant emission reduction goals.

Comments on Proposed 15-Day Changes to the LCFS

CALSTART strongly supports the LCFS program and believes that the 15-day amendments are a huge step in the right direction in terms of improving programmatic elements to best support the transformation of the transportation sector, particularly for medium- and heavy-duty vehicles.

Capacity Credits and the HD-FCI Provisions

CALSTART appreciates staff's modifications to the HD-FCI and HD-HRI programs, which address many of the concerns that were raised by industry and advocates during the 45-day comment period and April 10 workshop. Specifically, we are thankful for the changes to the geographic limitations and the removal of FSE caps in favor of a limit on total power. These changes will help address grid constraints and support infrastructure buildout consistent with the State's overarching climate strategy and the Joint Office of Energy and Transportation's National Zero-Emission Freight Corridor Strategy.

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While these revisions on the whole seem to greatly improve the HD-FCI program in order to support the State's ZEV deployment goals, there are some areas where clarification within CARB's Final Statement of Reasons are still needed:

OFFICES IN :

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2600 Tenth Street, Suite 407, BERKELEY, CA 94710 | 200 E. Big Beaver TROY, MI 48063 | 168 Smolian Circle, SANTA ROSA BEACH, FL 32459



127.1 Cont.

- Regarding the prohibition that a shared HD-FCI site cannot be reserved for one HDV fleet for more than 12 hours each day, we seek clarification on whether this restriction applies site-wide or on an individual FSE basis. It is our understanding that the 12-hour limitation is intended to be site-wide. If the restriction were to apply on a per-FSE basis, it could significantly impact the viability of the charging-as-a-service business model, which often relies on 24-hour reservation periods to support fleet operations effectively.
- It is our understanding that the distance requirement for shared HD-FCI sites, which has been extended to five miles from any ready or pending FHWA Alternative Fuel Corridor, is intended to mean as-the-crow-flies rather than as-the-truck-drives, but clarification would be greatly appreciated.

Increased Stringency

127.2

CALSTART appreciates staff's proposal to increase the Carbon Intensity (CI) stepdown from the initially proposed 5% to 9%. Increasing the stringency of the program translates into millions of additional tons of greenhouse gas emission reductions and strengthen the market in the process. While we are tremendously grateful to see this stepdown, we'd like to reiterate comments from our 45-day comment letter to encourage CARB to pull forward the effective date for triggering the Auto Acceleration Mechanism (AAM). The AAM should be based on 2025 data with the trigger assessment occurring in May 2026, and the AAM being applied in 2027 providing the applicable conditions are met, thus increasing the program stringency for 2027.

We are also pleased to see the introduction of a limit on credits for biomass-based diesel produced from virgin soybean oil and canola oil of up to 20 percent of annual biomass-based diesel reported on a company-wide basis— this is a step in the right direction. As California continues its progress toward carbon neutrality, it will continue to be important that the State's climate programs work synergistically together in order to achieve our ambitious goals and mandates. We commend staff for sending this important market signal and encourage staff and the Board to continue to think about how the LCFS program can best support the State's electrification objectives as the program continues into the future.

Conclusion

The LCFS program continues to be one of the best drivers to incentivize and promote investments in zero-emission infrastructure. It is a necessary program to ensure the reduction of carbon intensity in the transportation sector while accelerating the adoption of ZEVs. We appreciate all of CARB staff's work on this regulation to date, and the consideration of stakeholder feedback in this latest round of amendments.

Thank you for your time and consideration. Please feel free to reach out if there are any comments or questions.

Trisha Dello Iacono
Head of Policy
CALSTART



August 27, 2024

California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Comments of Kaluza on the Proposed 15-Day Changes to the Proposed Amendments to the Low Carbon Fuel Standard

Dear Chair Randolph, Honorable Board Members, and California Air Resources Board Staff,

Kaluza appreciates the opportunity to provide comments on the California Air Resources Board's ("CARB") Proposed 15-Day Changes to the Proposed Amendments to the Low Carbon Fuel Standard ("LCFS"). We support the modifications being proposed by staff in these amendments, recognizing the vital role they play in strengthening the LCFS program and driving California towards the use of cleaner fuels and decarbonized transportation electrification.

Introduction

Kaluza is a fully cloud-native SaaS company that enables energy utilities to engage their customers in the clean energy transition. From revolutionizing billing to smart electric vehicle charging, Kaluza's technology is empowering some of the biggest energy suppliers to better serve millions of customers. Powered by Kaluza's meter-to-cash platform that automates the customer lifecycle from onboarding to billing and customer care, utilities can invest in innovating for tomorrow's customers and drive decarbonization with smart, low carbon technologies that not only reduce energy bills, but also lay the foundations for a more flexible energy system.

Kaluza's Flex software platform powers a range of market-leading managed charging programs, including the world's largest residential V2X pilot and a scaled managed charging program on behalf of the UK's third largest energy retailer that has grown from 200 EVs to 15,000 in less than a year.

Scaling its load management and smart charging solutions globally, Kaluza is working with a number of leading automotive companies. These collaborations are focused on developing cutting-edge direct-to-vehicle solutions able to intelligently manage the storage of green and affordable electricity across millions of EVs and reward customers,

without the need for separate smart charging hardware. Kaluza is proud to be a B Corp-certified business with US employees in California, Texas, New Jersey, and Washington DC in addition to global offices in London, Bristol, Edinburgh, Lisbon, and Melbourne.

Comments

Kaluza strongly supports utilizing utility holdback funding for all Vehicle-Grid Integration (VGI) projects and load management software outlined in section 95483(c)(1)(A)5b. Specifically, the inclusion of funding for investments in grid-side distribution infrastructure, support for vehicle-grid integration projects, and incentives to encourage driver participation in managed charging and vehicle-to-grid applications aligns with our mission to optimize energy systems for a sustainable future. These initiatives are critical to enhancing grid resilience, reducing costs for electricity ratepayers, and supporting the widespread adoption of electric vehicles (EVs) across California as well as moving towards a more customer centric energy system.

128.1 While Kaluza acknowledges the importance of focusing on medium- and heavy-duty vehicles as part of the broader decarbonization strategy, we believe that funding light-duty vehicle projects should remain a priority as well. To this end, we support the allocation of base credits to Original Equipment Manufacturers (OEMs) as a means to provide additional funding for the Zero-Emission Vehicle (ZEV) transition. By enabling OEMs to use these credits for projects such as installing EV charging infrastructure, subsidizing EV charging plans, and promoting VGI initiatives, California can ensure a comprehensive and balanced approach to transportation electrification.

128.2 As a certified B-Corp, Kaluza actively collaborates on projects that prioritize equity, frequently partnering with community-based organizations. We are seeing this equity-focused approach become increasingly common in utility programs and pilots across the U.S. These initiatives are crafted to ensure substantial participation from disadvantaged and low-income communities, proving that VGI and equity objectives can effectively align. We believe that residents in DAC areas are the ones who would benefit from VGI and clean air the most.

However, the current separation of equity projects from VGI initiatives in Sections 95483(c)(1)(A)5.a. and 95483(c)(1)(A)5.b. could unintentionally hinder the development of equity-focused VGI projects. We urge CARB to revise the language to combine the lists of required and pre-approved uses of holdback credits, clearly stating that VGI projects benefiting disadvantaged communities qualify for funding. Furthermore, the criteria for equity projects under the LCFS are currently too restrictive, limiting what



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Electric Distribution Utilities (EDUs) can accomplish. By broadening these criteria, a wider range of transportation electrification efforts that serve underserved communities could receive support, helping EDUs to design programs that better align with CPUC guidelines.

Conclusion

In summary, Kaluza endorses the proposed changes and urges the adoption of these amendments to enhance the effectiveness of the LCFS program. We believe that these adjustments will provide the necessary support to advance managed charging technologies, promote VGI projects, and ultimately contribute to California's ambitious clean energy and transportation objectives.

Thank you for considering our comments.

Respectfully submitted August 27, 2024

Samuel Goda
Regulatory & Government Affairs
Manager
Kaluza US LLC
1701 Rhode Island Ave NW,
Washington, DC 20036
samuel.goda@kaluza.com

Re: SEIU-USWW Public Comments on Proposed Low Carbon Fuel Standard Amendments

Our Union & Member Communities

SEIU United Service Workers West (USWW) represents nearly 45,000 janitors, security officers, entertainment & stadium workers across California, including thousands of workers at LAX, SFO and other airports throughout the state. Our membership primarily consists of workers within low-wage industries, including aviation. Many of our members reside in communities near major airports and within their flight paths. For decades, these communities - largely Black and Brown - have endured exposure from an array of toxic pollutants produced by airport operations, adding on to the decades of environmental racism these cities and neighborhoods have faced from other sources.

SEIU USWW recognizes the detrimental health impacts on our membership and communities produced by commercial aviation's dependency on fossil fuel consumption. For years, we've fought to raise industry standards at the bargaining table, but more recently have been expanding our commitment to confronting the environmental racism and inequity that our members and their communities face as a result of this industry's continued and ever-expanding operations.

Worker & Communities Taking Action on Commercial Aviation in the LCFS

For all of these reasons, airport workers from across the state have stepped up and become involved in CARB's rulemaking for the Low Carbon Fuel Standard. In a space typically populated by industry lobbyists and business interests seeking to ensure that the program continues to work for them, hundreds of airport workers have made the trip from all over California to attend CARB meetings and workshops related to the LCFS. These members have been sharing their stories of the lived impact that the industry's emissions has had on them, their families and their communities. Our members have also been proud to stand in coalition with other frontline communities and environmental justice organizations voicing their longstanding concerns about the program.

Up to this point, CARB has appeared willing to finally take significant action to address commercial aviation's outsized and growing share of pollution, proposing an end to the exemption that conventional fossil jet fuel enjoys within the LCFS. That exemption saves the airlines an estimated \$110 to \$360 million each year on the cost of their fossil fuels¹ - a benefit in addition to the nearly \$300 million each year they save via a state sales & use tax carveout², as well as the \$23 million a year they save on jet fuel's exemption from excise taxes.³

CARB staff indicated in September of last year⁴ that their jet fuel proposal at the time was intended to cover fuel combusted in California airspace, regardless of whether or not it is from an intrastate flight or from California's portion of an interstate or international flight. Just a few months later, the proposal was scaled back significantly, limited to just fossil jet fuel used in intrastate flights.⁵

This was itself a disappointing and substantial change, as intrastate flights represent less than 6% of the overall emissions activity from aviation in California. In 2018, for instance, California's aviation sector

¹ State fuel use estimated using DoT T-100 data on available seat miles originating in state & DoT data on national airline fuel consumption for 2019

² CA Dept. of Tax and Fee Administration, Aircraft Jet Fuel - Frequently Asked Questions

³ CA Dept. of Finance, Tax Expenditure Reports, 2021-22

⁴ CA Air Resources Board, September 28, 2023 Board Meeting

⁵ Staff Report: Initial Statement of Reasons, CARB, 12/19/23

accounted for about 34 million metric tonnes of CO₂ emissions, just 2 million of which were the result of intrastate flights.

Airlines & CARB Falling Short on Even Short-Term Solutions in Sustainable Aviation

Despite the significant reduction in the scope of the proposal, we still viewed this as a great first step toward the necessary goal of finally reckoning with aviation's climate impact and the many harmful effects for workers and communities. This kind of movement was necessary and encouraging. It was also long overdue, as CARB's current approach to the industry - exemptions for the fossil fuels and LCFS credits for use of Sustainable Aviation Fuel (SAF) - has clearly not been working well enough to push aviation toward zero-emission technology or even toward significant uptake of SAF, which accounted for less than a quarter of one percent of global jet fuel use in 2023.⁶ As you know, SAF is intended to be a bridge fuel - a stopgap solution as zero emission technology develops to commercial scale in aviation. The short-term fix in aviation is itself decades away from significant adoption. This kind of outcome should surprise none of us when the industry's fossil fuels are allowed to remain exempt from the programs our state is using to achieve its climate goals. It is even less surprising when the airlines continue to enjoy hundreds of millions of dollars worth of tax breaks on those fossil fuels from our state. Returning to complete exemption in the LCFS for conventional fossil jet fuels is just more of the same approach that got us to this point.

Current Proposal Broadens CARB's Generously Hands Off Approach to Aviation

129.1 Restoring the conventional jet fuel exemption isn't the only break the industry is receiving in CARB's latest rulemaking updates. Limits on LCFS credits for biofuels derived from soybean and canola oil are added in the most recent proposal⁷, a restriction that does not appear to apply to Sustainable Aviation Fuel, which has been a credit-generating fuel in the LCFS for years. These guardrails are critical for SAF too, otherwise we risk trading one sustainability problem for another and subsidizing the industry for the privilege. Understand - this aspect of the proposal is already being described by at least one expert as having "nearly zero near-term impact."⁸ CARB is letting the airlines off the hook even for measures as modest and ineffectual as the 20% blend limit for those crop-based fuels, which speaks volumes about how much work there still is to be done.

Aviation's Growth & Missed Opportunities in California

129.2 Aviation is already a massive source of emissions in California, the full impact is just being excluded from the state's Greenhouse Gas Emissions Inventory.⁹ If all of the industry's exempted emissions were included in that inventory, commercial aviation would be the second largest emissions subcategory in the entire state, behind only the combined emissions from all on-road transportation in California.¹⁰ Based on 2019 data, this total would exceed California's entire inventory for all possible residential categories, all agriculture and forestry uses, and even exceed the sum of emissions caused by all electricity generation in the state. Not only is aviation being cut out of the meager solutions CARB is offering in this LCFS rulemaking, most of the industry's impact isn't even being acknowledged in any meaningful way in the state's own metrics.

⁶ IATA, Net Zero 2050: Sustainable Aviation Fuels Fact Sheet

⁷ Proposed Low Carbon Fuel Standard Amendments, CA Air Resources Board, 8/12/24

⁸ Murphy, Colin [@scianalysis], "The limitations on crop-based fuels (20% blend limit and no new pathways after 2030 if we meet HD ZEV targets) are useful long-term signals, but have nearly zero near-term impact." X, 8/16/24, <https://x.com/scianalysis/status/1824580188979794307>

⁹ GHG Inventory by Sector, California Air Resources Board, 2023

¹⁰ CARB, CA GHG Inventory for 2000-2020 - by Sector and Activity, 10/26/22

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The FAA forecasts that aviation activity in California will increase by at least two-thirds by 2044.¹¹ NO_x emissions from aircraft are expected to increase by 30% in that time in California - with aviation being the only transportation sector whose emissions are projected to increase in that time. (On-road is projected to decline by 88% in that same span.) This is a fossil fuel industry that is already a huge problem and yet also growing very quickly. We can't afford to continue taking such a hands-off approach with aviation.

Next Steps & Opportunities for Leadership

California is now on course to forfeit a significant opportunity to demonstrate leadership on one of the most impactful industries when it comes to climate change and air quality. As a state, we are very well positioned to take a leading role in the clean energy transition of commercial aviation. We can start to reverse some of the alarming impacts this industry's operations have had on airport workers and frontline airport communities - communities that are often Black & Brown and dealing with the consequences of decades of environmental racism. The status quo will not be enough. More subsidies to an already highly subsidized industry will not be enough.

CARB must do the following:

129.3

- Reinstatement of the proposal to end the LCFS exemption for conventional jet fuel - at a minimum for intrastate California flights.
 - CARB should also continue to plan for the eventual inclusion of California's share of interstate and international flights in the LCFS as a deficit generator as well.
- Include Sustainable Aviation Fuel in any LCFS proposals concerning the sustainability of feedstock used in biofuels, such as the limitations on LCFS credits for biomass-based diesel produced from soybean and canola oils.
- Continue to find ways to set strong sustainability criteria for SAF feedstock.

Intrastate fossil jet fuel being brought into the LCFS as a deficit generator was already an extraordinarily modest proposal - scaled back significantly from earlier versions of this proposal. That CARB has backslid even further in the face of industry lobbying and threats is a profound disappointment that we still have the time to undo. Now is the time for California to step into its role as a climate leader and put workers and communities ahead of polluters in the LCFS.

Sincerely,



David Huerta
President - SEIU United Service Workers West & SEIU California

¹¹ FY2024-2044 FAA Aerospace Forecast, Federal Aviation Administration



August 27, 2024

Chair Liane Randolph
California Air Resources board
1001 I Street
Sacramento, CA 95814

Re: Comments on the August 12th 15-day Package

Submitted electronically: <https://ww2.arb.ca.gov//lispub/comm/bclist.php>

Dear Chair Randolph and members of the California Air Resources Board:

The Clean Fuels Alliance America (Clean Fuels)¹ and California Advanced Biofuels Alliance (CABA)² appreciate the opportunity to provide comments on the 15-day package (Package) that was published on August 12th, 2024. Clean Fuels and CABA have been longtime supporters of the state's overall climate and air quality improvement goals and have collaborated frequently with CARB staff toward achieving those goals. We have been strong partners with California in its long-term efforts to decarbonize its transportation sector, with its vast portfolio of policies, regulations and incentives that target high priority zero emission technologies and the hugely successful Low Carbon Fuel Standards – the hallmark policy that champions a market-based approach to decarbonizing transportation fuels by being science-driven, fuel-neutral, technology-agnostic, and performance-based. CARB set out a lofty goal to reduce GHG emissions and the members of Clean Fuels and CABA responded swiftly and overwhelmingly to that call...with innovation and investment throughout the supply chain.

¹ Clean Fuels Alliance America (Clean Fuels) is the U.S. trade association representing the entire biodiesel, renewable diesel, and sustainable aviation fuel supply chains including producers, feedstock suppliers, and fuel distributors serving the on- and off-road applications, rail, marine, and heating oil markets. Made from an increasingly diverse mix of resources such as recycled cooking oil, soybean oil, and animal fats, the clean fuels industry is a proven, integral part of America's clean energy future.

² California Advanced Biofuels Alliance is a not-for-profit trade association promoting the increased use and production of advanced biofuels in California. CABA represents biomass-based diesel (BMBD) feedstock suppliers, producers, distributors, retailers, and fleets on state and federal legislative and regulatory issues.

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Overview

As of the Q1 2024 quarterly data summary, biodiesel and renewable diesel or biomass-based diesel (BMBD) make up an astonishing 73% of California's diesel pool. BMBD is the most successful fuel in meeting the LCFS reduction targets – representing 45% of the carbon reductions – more than electric vehicles, hydrogen, and RNG combined. Emissions of fine particulates and toxic air pollution have been reduced and local air quality has improved, especially in the Environmental Justice communities that are located closest to the transportation corridors where these vehicles are active. But now, after California has enjoyed 13 years of successful carbon reductions largely due to the use of BMBD, Clean Fuels and CABA are deeply disappointed that CARB is shifting away from what has made the policy successful in the past and towards a future that punishes selective fuels without cause.

On August 12, 2024, CARB released new proposed amendments to the LCFS following earlier changes released in December 2023 and an April workshop where staff explored additional options. Among the most important of the proposals to the BMBD industry are: 1) significantly increasing the program's carbon intensity (CI) targets between 2025 and 2030, 2) requiring that biomass used in fuel pathways must only be sourced on land that has not been cleared since 2008, 3) requiring that biomass must be produced according to best environmental management practices, and 4) restricting credit generation from biodiesel and renewable diesel made from soybean and canola oil.

In the Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information for the Proposed Low Carbon Fuel Standard Amendments (Notice), CARB claims that these modifications aim to promote zero-emission technologies and ensure that only waste oils are used to replace fossil diesel, but they provide no technical basis for their assertions. What the Notice fails to do is identify a critical problem or problems that exist in the current LCFS or the ISOR and then subsequently fails to identify why the proposals in the package can solve the problem(s).

CARB claims that these modifications are appropriate, given the state's transition to zero-emission technologies, but it is counter to the basic tenets of the LCFS as a technology-neutral, market-based program. Restricting access to specific fuels and/or feedstocks through an arbitrary cap will only decrease the options to meet the carbon intensity targets if the transition to ZEV does not live up to expectations. Furthermore, it leaves open the possibility that high-carbon fossil fuels will fulfill California's diesel needs. BMBD has played a leading role in reducing emissions to date and it should be allowed to continue to reduce emissions from the hard-to-electrify heavy-duty and off-road sectors. There is still work to be done and just two weeks ago, US Department of Agriculture Secretary Vilsack announced \$32 million in Higher Blends Infrastructure grants: <https://www.usda.gov/media/press-releases/2024/08/16/biden-harris-administration-invests-domestic-biofuels-and-clean> to California companies, demonstrating that they are still committed to provide even more biodiesel to consumers.

130.1

Previous Comments

Clean Fuels and CABA are keenly aware of how significant this rulemaking is to its members and the clean fuels industry. We have actively participated throughout the workshops in the pre-rulemaking process to provide information and perspective on how staff's proposal may impact the industry. In addition to this comment letter, please refer to our previous comments submitted for the [May 31/June 2 virtual meeting](#), the [May 23 workshop on Auto-Acceleration Mechanisms](#), the [February 22 workshop to discuss potential changes to the LCFS](#), and the [April 10 workshop](#). The gist of our prior and current comments is this: CARB has utterly failed to prove with any reputable evidence or modeling its ostensible concerns about the use of vegetable oils inducing meaningful land use change, specifically deforestation, which were raised (again without solid evidence) by stakeholders with an all-electrification objective at the expense of other alternative fuels like BMBD that are actually achieving significant environmental and public health benefits now. These unfounded concerns continue to drive CARB's proposals that unfairly target the most successful carbon-reducing fuels in the LCFS.

Comments on the 15-day Package

Regarding the 15-Day Package released on August 12, 2024, Clean Fuels and CABA offer the following comments:

130.2

1. **Support for Increased Stringency**

We strongly support the proposed near-term increase in stringency to a 9% CI reduction, rather than the 5% year-over-year increase outlined in the Initial Statement of Reasons (ISOR) proposal. The 9% reduction offers the greatest certainty for rebalancing the LCFS credit bank in the short term and is the chief reason this rulemaking should be finalized on November 8th.

130.3

2. **Concerns About the Proposed Sustainability Provisions**

We are deeply disappointed with the inclusion of sustainability provisions in the 15-day Package as a guardrail against negative unintended consequences that have still not been justified. We raised concern over the inclusion of these vague and unfounded provisions in our comments to the ISOR and offered our assistance to help CARB staff craft reasonable provisions that could be amenable to the industry. While the Package contains some additional details about how these provisions will be implemented, beyond what was proposed in the ISOR, several critical questions remain, including but not limited to:

- How is land designated under the USDA Conservation Reserve Program (CRP) treated under 95488.9(g)(1)(A)?
- What is the criteria for the best environmental management practices under 95488.9(g)(1)(B)?
- What certifications will be aligned with EU RED 2018/2001?

Because of the need for additional details, we recommend that CARB convene a working group that includes agricultural feedstock providers, feedstock processors, and biofuels producers, to assist in the development of workable sustainability guardrail provisions that answer the questions posed above. The timing of this working group is critical to facilitate decision-making that is appropriate for the targeted planting cycle. For example, planting decisions and investments for the 2025 crop are happening as soon as the 2024 crop is harvested. The crops planted in 2025 will become fuels in 2026 which means that farmers will need to start complying with proposed, not adopted rules – gathering field boundary GPS coordinates and existing farmland attestations – which is not reasonable.

Therefore, we strongly recommend that:

- The working group be convened in the second quarter of 2025;
- Phase One begin in 2027;
- Phase Two begin in 2029; and
- Phase Three begin in 2031.

3. Concerns About New ILUC Values

CARB's proposal includes potential revisions to the Table 6 ILUC values to increase ILUC values for feedstocks from regions with a high risk of land use conversion based on empirical evidence; however, CARB neglects to consider ILUC value revisions for feedstocks from regions with a *low risk* of land use conversion based on empirical evidence (e.g., North American agricultural production lands, including the U.S. and Canada, which are already subject to sustainability requirements).

- a. Over the course of the existence of both the U.S. Renewable Fuel Standard and the LCFS, domestic soybean oil production has grown to satisfy the demand for BMBD without compromising the supply of soybean oil for other uses or instigating land use change, as evidenced by Tables 1 – 3 below.

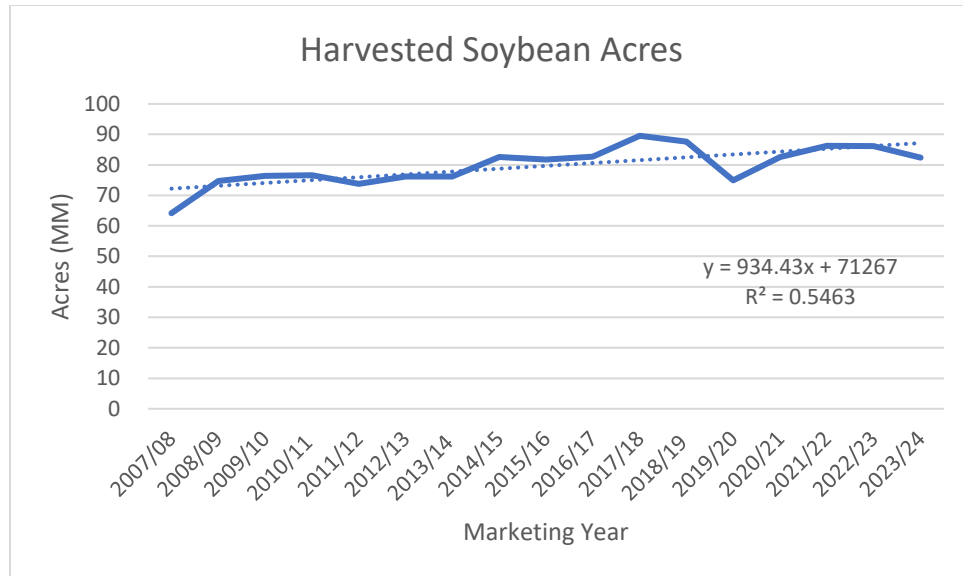


Table 1. Total U.S. Soybean Acres Harvested³

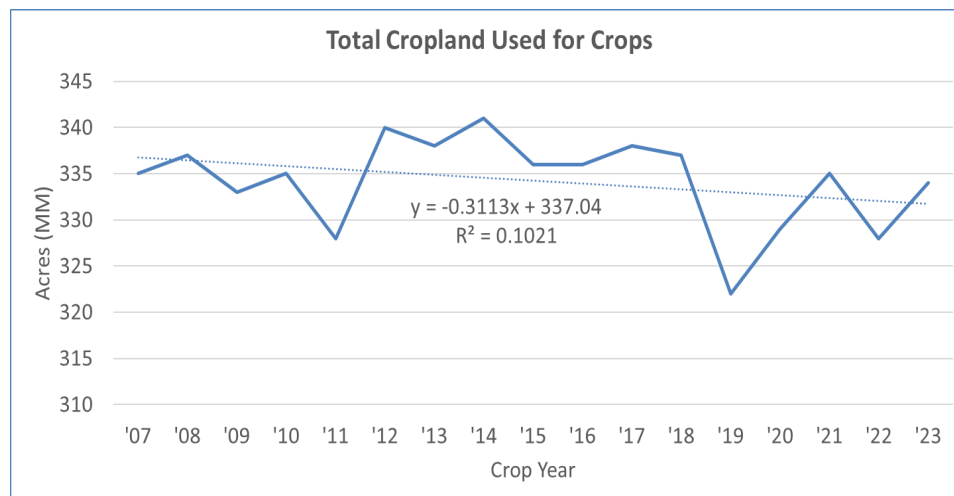


Table 2. Total U.S. Cropland Acres⁴

³ <https://www.ers.usda.gov/data-products/oil-crops-yearbook>

⁴ <https://www.ers.usda.gov/data-products/major-land-uses/>

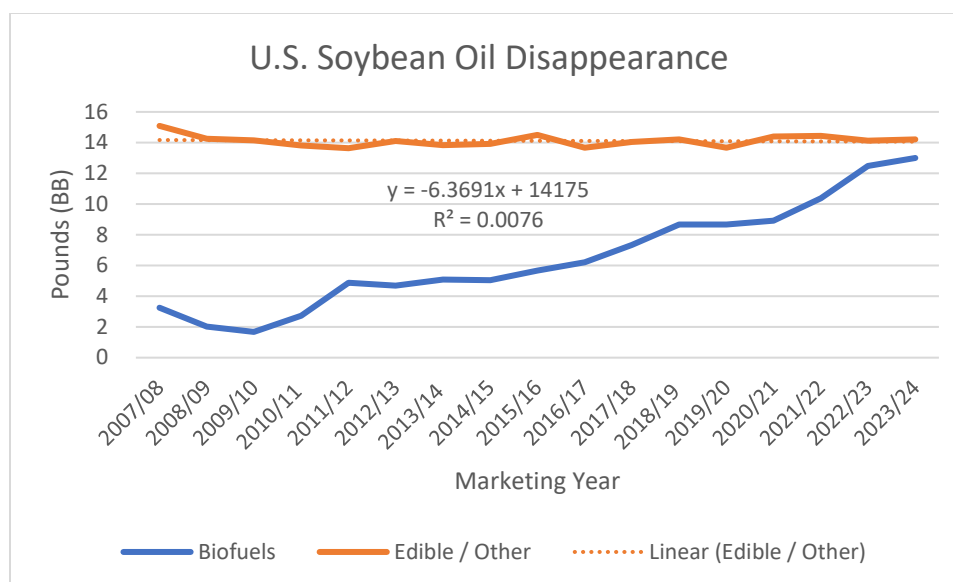


Table 3. U.S. Soybean Oil Use⁵

130.4 cont

The added demand of these biofuels programs has been met by increases in yield of roughly 10 bushels per acre over the same time period as well as increased oil yields from each bushel of soybeans during processing. In addition to the overwhelming evidence that domestic soybean farmers do not generate high-ILUC risk feedstock, GTAP-BIO's modeling also reflects other trade and agricultural dynamics that have developed over the last ten years that should assuage CARB's concerns that ILUC values for crop-based BMBD should only go up.

- b. The hypothetical ILUC value GTAP-BIO assessed for soy-based biodiesel back in 2015 when CARB last updated the modeling to incorporate the world's agricultural and trade dynamics as of 2004 was 29.1 g CO₂e/MJ of fuel. Since then, GTAP-BIO has been updated several times to reflect the ever-evolving areas of global trade and agriculture such that soy-based biodiesel's hypothetical ILUC value is 9.1 g CO₂e/MJ as of the global economy in 2014. ILUC cannot be observed on the ground, nor verified by empirical evidence, but GTAP-BIO nevertheless continues to model the potential induced effects of biofuel production and shows that U.S. soy-based biodiesel comes with a much lower risk of land use conversion than CARB previously considered since U.S. soy biodiesel is overwhelmingly produced from domestic soybean oil.
- c. Moreover, we take issue with CARB's addition of countries of origin to the 2015 Table 6 ILUC values. GTAP-BIO models shocks of *biofuel* supply in predetermined countries. It does not model shocks of specific-origin feedstock-fuel combinations, or pathways, without specifically baking in

⁵ <https://www.ers.usda.gov/data-products/oil-crops-yearbook>

those assumptions to the model *a priori*. While in practice, certain pathways may model fuel production with likely feedstock origins (e.g., U.S. soy), GTAP-BIO does not dictate feedstock origin in its modeling.

This is best exemplified by using two hypothetical canola biodiesel scenarios where one is produced in the U.S., and another is produced in Canada. For the U.S. scenario, GTAP-BIO will probably source the canola oil from the U.S. first and then most likely source additional gallons from Canada, as needed. For the Canadian scenario, GTAP-BIO will probably source the canola oil from Canada first and may potentially never tap into U.S. canola oil because it can satisfy its needs domestically. Each of these hypothetical scenarios would result in different ILUC values because each country has distinct supplies of feedstock, and their trade dynamics are unique. As such, the knock-on effects GTAP-BIO models depend on those distinctions and must be considered carefully. These differences would be even more important for fuels imported from smaller countries where there is less trade and more LUC risk.

- d. Consequently, Clean Fuels recommends CARB revisit its GTAP-BIO modeling holistically, update the modeling to incorporate the most recent database, and properly model pathway combinations to reflect both high- and low- ILUC risk pathways.
- e. In addition to updating the GTAP-BIO modeling to reflect the latest global developments in trade and agriculture, Clean Fuels recommends CARB pair the model with an updated AEZ-EF. In 2019, IPCC published its Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, including revisions to Volume 4 Agriculture, Forestry and Other Land Use, which AEZ-EF relies upon. To more accurately assess the hypothetical induced land use change effects of crop-based BMBD, CARB should employ an updated AEZ-EF that reflects the latest science on changes in carbon fluxes from land use conversion.
- f. Lastly, should CARB decide to continue on its proposed path, that is, to ignore the latest evidence and science on land use change and continue to employ an outdated version of GTAP-BIO and seek to further penalize crop-based BMBD from certain high-risk countries, Clean Fuels requests that CARB undertake further rulemaking on the “mechanism” that will be developed “through an empirical assessment” to assign additional penalties to those fuels. CARB’s current proposal is overly vague as to this mechanism, preventing Clean Fuels from commenting on this revision with any proper technical analysis.

4. Concerns About the Proposed 20% Cap on Credits for Crop-Based Biomass-Based Diesel

We are concerned that the proposed changes would unfairly penalize soybean oil and canola oil used to produce BMBD and would undermine the innovation and economic viability of an industry that not only reduces emissions from the transportation sector but supports sustainable farming practices and rural economies. No other fuel in California (whether renewable or petroleum based) would face the same scrutiny and barriers as soy- and canola-based BMBD – not even the astonishingly high CI crude oil derived from Alberta's tar sands.

Vegetable oils are effectively "capped" in the LCFS, not by explicit regulatory limits, but by the increasing CI targets and CARB's continued refusal to update the Global Trade Analysis Project (GTAP) modeling hardwired into the LCFS for estimating indirect land use change (ILUC) impacts, despite our numerous requests to update the modeling over the past several years. These factors naturally constrain the use of vegetable oils in biofuel production, as the higher CI targets push the industry towards lower-carbon alternatives. Without updated modeling in GTAP to reflect current market realities and advancements in agricultural practices, imposing further explicit caps is redundant, could stifle innovation, and is downright punitive, punishing a particular biofuel for achieving the success the LCFS was intended to foster in the first place. Instead of penalizing fuels, CARB should be focusing on improving the robustness of the models and encouraging sustainable practices through targeted incentives that might provide a more effective balance between environmental protection, food security, and the promotion of renewable energy.

To illustrate the fallacy of the proposed caps, ethanol previously generated around 80% of all the credits at the start of the LCFS. Now it generates around 10% (per Q1 2024 LCFS data). That reduction in ethanol's credit generation happened without any explicit cap on either the fuel or its feedstocks; instead, the fuel generated fewer credits as the CI targets grew increasingly more stringent. More importantly, that reduction in credits occurred at the same time electrification in the light-duty vehicle sector ramped up significantly, driven by CARB's zero emission vehicle mandates and consumer/infrastructure incentives. Thus, it's clear that an explicit cap on a biofuel's credit generation is not required to facilitate growth in EVs.

We strongly urge CARB to reconsider the proposed caps on vegetable oils in the LCFS. If implemented, any caps:

- Will substantially constraining the lowest cost feedstocks for these petroleum diesel replacements can raise the price of diesel fuel, increasing consumer prices of both the fuel and goods transported by trucking. To illustrate, a recent study by LMC International showed that the use of BMBD has lowered

the cost of diesel fuel by 4% overall, equivalent to about 22 cents per gallon at the credit prices evaluated during the study.⁶

- Could inadvertently destabilize the carbon market in California by limiting the availability of a key feedstock for renewable fuel production at a time when consistent supply is crucial to meet the state's ambitious carbon reduction goals.
- Could create further uncertainty in the LCFS market that reduces much needed investments in clean energy and fuels by signaling the state's willingness to modify the regulation in arbitrary, unpredictable, and scientifically unsound ways to achieve an objective.
- Will delay decarbonization and increase the cost to comply with the LCFS – for every 5 years of delay, 13 times more emissions reductions will be required to have the same climate impact⁷.

By removing these proposed caps, CARB can help ensure that the rules governing the LCFS are both practical and conducive to market stability, thereby encouraging continued investment in clean energy technologies.

130.6

5. Insufficient Time for Proper Consideration

We were surprised by the scope and magnitude of the proposed changes contained in this 15-day Package. Several significant amendments were introduced without any prior workshop to specifically discuss the issues, nor did CARB staff engage with the BMBD industry to inform these proposals. Unfortunately, 15 days is far too short of time to properly analyze and understand the long-term the timing of this 15-day Package and leaves minimal opportunity to provide CARB with further information and analysis before the Board votes to adopt these amendments at its November 8th, 2024 meeting. While detailed discussions about potential changes to LCFS have been going on for approximately three years, these substantial changes are being proposed with only three months remaining in the process.

In summary, Clean Fuels and CABA encourages CARB to adopt the proposed amendments – without the proposed caps, delaying the sustainability provisions, and with the intent to revisit its ILUC values for both high-risk and low-risk feedstocks – at the November 8th Board meeting. The remaining issues should instead be addressed in a workshop next year and considered during a subsequent regulatory process where it can receive full and fair consideration. This approach will ensure that the state's carbon market remains robust, supporting both environmental and economic objectives.

⁶ LMC International, Economic Impact of Biodiesel on the United States Economy 2022: Main Report. https://cleanfuels.org/wp-content/uploads/LMC_Economic-Impact-of-Biodiesel-on-the-US-Economy-2022_Main-Report_November-2022.pdf

⁷ Joos et al, Carbon dioxide and climate impulse response functions for the computation of greenhouse gas metrics: a multi-model analysis, [acp-13-2793-2013.pdf \(copernicus.org\)](https://www.copernicus.org/publications/2013/acp-13-2793-2013.pdf).

Clean Fuels and CABA thank CARB staff for their continued efforts to strengthen the LCFS and provide the vision for the program to meet California's carbon neutrality goals. Thank you for your consideration of these comments. We look forward to continuing to collaborate with CARB staff.

Sincerely,



Cory-Ann Wind
Director of State Regulatory Affairs
Clean Fuels Alliance America



Carlos Gutierrez
Executive Director
California Advanced Biofuels Alliance

BMW Group

August 27, 2024

SUBMITTED ELECTRONICALLY: <https://ww2.arb.ca.gov/applications/public-comments>

Clerks' Office

California Air Resources Board

1001 I Street

Sacramento, California 95814

Subject: Comments on Low Carbon Fuel Standard – 15-Day Notice Comments

BMW of North America, LLC (BMWNA) appreciates the opportunity to comment on the proposed changes to the Low Carbon Fuel Standard program released by the California Air Resources Board (CARB) on August 12, 2024. BMWNA has been a participant in the LCFS program as a generator of incremental credits since 2019. The LCFS program has been an important contributor to helping make transportation fuel more sustainable. The proposed changes demonstrate CARB's continued commitment to improving the LCFS program. BMWNA supports the changes proposed by CARB.

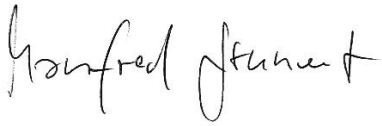
As a member of the Alliance for Automotive Innovation (Auto Innovators), BMWNA concurs with the comments submitted by the Auto Innovators. BMWNA supports the opportunity for OEMs to receive a portion of the base credits from residential electric vehicle charging, as proposed by CARB. As stated by the Auto Innovators, allocating credits to OEMs is critical in supporting the significant investments OEMs need to make in order to meet CARB's electrification targets. CARB can support the distribution of base credits to OEMs by providing greater clarity into how it determines what portion of credits to allocate to OEMs and what methodology will be used to allocate credits among OEMs. Additionally, the Auto Innovators suggest language modifications that would allow the California Clean Fuel Reward (CCFR) to continue to be administered by utilities if CARB decides to continue allocating sufficient base credits to utilities. BMWNA supports this modification.

In addition to the Auto Innovators comments, BMWNA also suggests that CARB use this rule change as an opportunity to modify the dairy biodigester pathway to make it easier for small dairies to participate in the LCFS program. BMW currently generates LCFS credits in partnership with the Straus Dairy Farm, a small dairy farm which generates electricity through a biodigester. The pathway requirements for dairy biodigesters include data and verification requirements that are onerous for small dairy operations. In order to support the participation of more small dairies, CARB should allow small dairies to opt-in the LCFS program under a fixed carbon intensity score with simplified data and verification requirements, as an alternative to current dairy biodigester pathway.

BMWNA supports CARB's modifications to the LCFS and looks forward to working with CARB to continue to improve the program. Thank you for considering BMW NA's comments during this rulemaking. We look forward to working with CARB staff and board members. Please feel free to reach out with any questions you may have.



Sincerely,



Manfred Grunert
Vice President, Government Affairs and Communications
BMW of North America, LLC

Thomas Ruemenapp
Vice President, Engineering
BMW of North America, LLC

BMW of North America, LLC

BMW of North America, LLC has been present in the United States since 1975. Rolls-Royce Motor Cars NA, LLC began distributing vehicles in 2003. The BMW Group in the United States has grown to include marketing, sales, and financial service organizations for the BMW brand of motor vehicles, including motorcycles, the MINI brand, and Rolls-Royce Motor Cars; Designworks, a strategic design consultancy based in California; a technology office in Silicon Valley and various other operations throughout the country. BMW Manufacturing Co., LLC in South Carolina is the BMW Group global center of competence for BMW X models and manufactures the X3, X4, X5, X6 and X7 Sports Activity Vehicles as well as the new BMW XM. The BMW Group sales organization is represented in the U.S. through networks of 350 BMW passenger car and BMW Sports Activity Vehicle centers, 146 BMW motorcycle retailers, 105 MINI passenger car dealers, and 38 Rolls-Royce Motor Car dealers. BMW (US) Holding Corp., the BMW Group's sales headquarters for North America, is located in Woodcliff Lake, New Jersey. Journalist note: Information about BMW Group and its products in the USA is available to journalists on-line at www.bmwgroupusanews.com and www.press.bmwna.com.



Liane M. Randolph
Chair – Low Carbon Fuel Standard
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Proposed Amendments to the Low Carbon Fuel Standard (15-Day Changes)

Dear Chair Randolph,

We appreciate the opportunity to provide feedback on the proposed modifications (15-day Changes) to the Low Carbon Fuel Standard.

Fidelis New Energy, LLC (“Fidelis”) is an energy transition company driving decarbonization through investments in renewable fuels, low-carbon intensity products, and carbon capture and storage. Using proprietary technology and processes, Fidelis aims to develop, invest, and deliver climate positive and carbon negative infrastructure to reach carbon reduction and climate positive targets. Fidelis develops carbon negative sustainable aviation fuel, renewable diesel, renewable naphtha, clean hydrogen, and clean fuel infrastructure, in addition to developing and operating CO₂ capture units, pipelines, sequestration wells, and related transportation and sequestration infrastructure.

132.1

We applaud the California Air Resources Board’s efforts to pursue means of ensuring the continued success of the LCFS. The California LCFS program has been a monumental success displacing over 25 billion gallons of petroleum fuels, delivering cleaner air through PM and NO_x reductions, and driving billions in low-carbon investment.¹

Our comments on proposed 15-Day Changes are provided below.

132.2

- **Fidelis supports the proposed 9% stepdown in the compliance benchmark CI in 2025 and the implementation of the Automatic Acceleration Mechanism (“AAM”) to ensure long-term program stringency.**

- Both the initial stepdown in 2025 and AAM are critical to address the current overperformance of the program and support the necessary investments to meet the long-term program targets and State goals.

132.3

- **Fidelis supports the development of LCFS policies that encourage utilization of sustainable aviation fuel (“SAF”) in California including adopting intrastate jet fuel as a deficit generator.**

¹ California Air Resources Board. “California Low Carbon Fuels Standard April Workshop Slides”, April 10, 2024.
ww2.arb.ca.gov/sites/default/files/2024-04/LCFS%20April%20Workshop%20Slides.pdf

132.3
cont.

- The adoption of SAF is key to reducing greenhouse gas and other harmful emissions like PM from air travel in California. Fidelis recommends that the LCFS adopt intrastate jet fuel as a deficit generating fuel to encourage the adoption of SAF and strengthen the overall LCFS compliance market.
- Broader adoption of SAF should be a core component of not only the LCFS proposed rulemaking, but also the overall strategy of California's actions to reduce emissions from aircraft.

- **Fidelis supports the inclusion of forest waste biomass feedstocks in the California LCFS and recommends modifications to the proposed definition of Forest Biomass Waste.**

132.4

- Fidelis applauds the inclusion of forest biomass waste in the LCFS. Sustainable utilization of forest biomass waste is key to enabling further decarbonization of California LCFS program as well as support healthy, resilient forests.
- Fidelis recommends modifications of the current definition of forest biomass waste to align with federal standards (RFS) and provide clarity for the utilization of thinning and slash in the LCFS.

132.5

Specifically, Fidelis recommends the definition be modified to clarify the eligible utilization of thinnings or residues generated as residues and byproducts in the production of high-grade timber. This modification aligns the intent of the current definition with RFS's inclusion of material generated in thinnings and recognition of the importance of thinnings to support increased productivity for surrounding trees.²

In addition, the 15-Day Changes proposed definition of forest biomass waste as "small diameter, non-merchantable residues ... that do not meet regional minimum marketable standards for processing into wood products" conflicts with the RFS's treatment of thinnings and ignores the critical role biomass utilization plays to support sustainable forests. Due to a variety of potential factors, including surplus regional supply (due to closure of traditional offtake), transportation distance, or handling requirements, thinnings and slash may be left in situ to decompose or be burned even though this material may meet "regional minimum marketable standards". This material that is left or may become left should be eligible for LCFS credit generation. Therefore, it is essential that the definition of forest biomass waste considers the counterfactual fate of the material. Fidelis recommends modifications to the proposed definition to ensure that secondary materials (thinnings, residues) generated through sustainable management are not left in situ to decompose or be burned.

Furthermore, this proposed definition significantly undermines California's ability to meet its wildfire and forest resilience objectives, including the goal of treating a

² 40 CFR §80.2 RFS (Definitions) <https://www.ecfr.gov/current/title-40/section-80.2>

132.5
cont.

combined one million acres with the USFS annually.³ The proposed definition eliminates the ability for bioenergy projects to utilize biomass generated from crucial fuel reduction treatments required to support resilient forests, contradicting the Wildfire & Forest Resilience Action Plan which highlights the importance of biomass utilization to meet its objectives.⁴

132.6

- Fidelis recommends CARB clarify when forest biomass waste is considered a specified feedstock.

* * * *

Thank you for the opportunity to submit these comments.

Respectfully submitted,

Fidelis New Energy, LLC

³ <https://www.gov.ca.gov/2020/08/13/california-u-s-forest-service-establish-shared-long-term-strategy-to-manage-forests-and-rangelands/>

⁴ “California’s Wildfire and Forest Resilience Action Plan” <https://wildfiretaskforce.org/wp-content/uploads/2023/04/californiawildfireandforestresilienceactionplan.pdf>



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SUBMITTED ELECTRONICALLY

August 27, 2024

Liane Randolph
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Comments on the California Air Resources Board's (CARB) Proposed 15-Day Changes to the Proposed Amendments to the Low Carbon Fuel Standard (LCFS)

Dear Chairwoman Randolph and Honorable Board Members:

Marathon Petroleum Company LP (MPC) appreciates the opportunity to provide comments on CARB's Proposed 15-Day Changes to the Proposed Amendments (15-Day changes) to the LCFS.

MPC is a wholly owned subsidiary of Marathon Petroleum Corporation, a leading, integrated, downstream energy company headquartered in Findlay, Ohio. MPC is a supplier of fuels in the State of California and, both directly and through its subsidiaries, invests in low-carbon solutions to meet the energy demands of today and into the future. MPC's commitment to low-carbon solutions is reflected in the successful conversions of its Dickinson, North Dakota and Martinez¹, California petroleum refineries into renewable fuel production facilities. Combined, these two operating facilities are expected to produce up to 2.5 million gallons per day of renewable transportation fuel from renewable feedstock sources with an aggregate life-cycle carbon intensity that is approximately 60 percent less than petroleum-based fuels.

The proposed 15-Day changes include several significant changes, including a cap on soybean and canola oil biomass-based diesel production at a facility, modifications to the biomass-based feedstock sustainability criteria, and a ban on processing new biomass-based diesel pathway applications. MPC believes its recommendations are critical to ensure the LCFS maintains a market-based focus, provides a stable investment signal, and incentivizes new, low carbon technology used in the transportation fuel sector.

MPC's recommendations on the 15-Day changes are listed below. Additional discussion and support for these recommendations are provided in the subsequent sections.

- 133.1 • MPC recommends that CARB not implement a 20 percent cap on the production of soybean oil and canola oil renewable diesel by a company.

¹ Martinez Renewables LLC is a 50/50 joint venture between affiliates of Marathon Petroleum Corporation and Neste Corporation.

- 133.2 • MPC recommends CARB provide two (2) additional years for the feedstock supply chain to adjust to the proposed Feedstock Sustainability requirements and recommends CARB identify that in §95488.9(g) a “new fuel pathway application” means a pathway request for a biomass-based feedstock not previously processed at a facility.
- 133.3 • MPC recommends that CARB not give the Executive Officer discretion to stop accepting applications for new fuel pathways for biomass-based diesel.

A cap on the production of soybean oil and canola oil renewable diesel will create operational challenges for facilities that produce renewable diesel.

133.1 cont

If CARB intends to cap the amount of soybean and canola oil-based renewable diesel that a company can produce, CARB’s proposal may limit a renewable fuel producer’s ability to efficiently operate a renewable diesel facility. Feedstocks used in renewable diesel production do vary in quality. For example, refined, bleached, and deodorized soybean oil and canola oil contains lower levels of free fatty acids, chlorides, moisture, metals, and phosphorus, whereas fats, oils, and greases, such as used cooking oil and tallow, may have higher levels of these contaminants.

Like petroleum refineries, renewable diesel facilities produce transportation fuels from feedstocks through a series of interconnected steps. Piping with specific metallurgy that is capable of handling process conditions is utilized to operate the facility in a safe and efficient manner. Producers must manage feedstock slates based on these conditions to limit the potential for unplanned outages and/or reduced production volumes. The use of fats, oils, and greases alone creates significant challenges, including the risk of increased corrosion, for facilities producing renewable diesel, given these operational considerations. For example, the hydroprocessing catalyst used to convert feedstock oils into renewable products requires feedstocks that contain very low levels of contaminants to extend the lifespan of the catalyst and prevent operational problems.

A cap on those feedstocks with low contaminant levels, like soybean oil and canola oil, may result in increased downtime of renewable diesel production facilities, which will in turn lead to decreased renewable diesel production within the state and/or renewable diesel imports, increasing emissions within the transportation sector. MPC recommends that CARB not implement a 20 percent cap on the production of soybean oil and canola oil renewable diesel by a company.

The new constraints CARB is proposing on the biomass-based feedstock supply chain that renewable diesel producers rely on to deliver significant emission reductions within California’s transportation sector are concerning and will result in disruptions.

133.2 cont

MPC provided feedback² to CARB on its Feedstock Sustainability requirement proposal, Section 95488.9(g), as part of CARB’s 45-Day proposal for amendments to the LCFS Regulation. MPC’s comments highlight challenges with the proposal due to the logistics of the feedstock supply chain. The feedstock supply chain connects small family farms and corporate farms to grain elevators, transporters, and crushers, and ultimately to fuel producers and suppliers of renewable diesel. While CARB attempted to provide additional time for the third-party sustainability certification, CARB accelerated the need to provide physical locations of farms

² MPC Comment letter to CARB’s 45-Day LCFS Proposal. [6890-lcfs2024-B2RXMFwvWWgKU1c7.pdf](https://www.ca.gov/6890-lcfs2024-B2RXMFwvWWgKU1c7.pdf) (ca.gov)

growing and harvesting raw materials used to produce biomass-based feedstocks. This means that CARB is only giving existing pathway holders approximately nine months, from the quarter CARB expects these LCFS amendments to be adopted, to identify and create documentation for the physical locations of farms where biomass-based feedstocks are grown. MPC is concerned that this timing may introduce undue disruptions to the feedstock supply chain, especially since those feedstocks are processed in calendar year 2026 (and reported in the 2026 annual fuel pathway report). Additional time should be given to ensure the feedstock supply chain can timely respond to these changes without any deleterious effects.

Additionally, CARB has included the terms “existing certified pathway” and “new fuel pathway application” in Section 95488.9(g) that have been historically used to identify the status of a fuel pathway for a CA-GREET transition. While these terms define a pathway’s status when transitioning from one version of CA-GREET to another, their meaning in Section 95488.9(g) is unclear. CARB must clarify to stakeholders how provisional fuel pathways will be treated and how CARB will handle an update to an existing pathway, for example, due to a process change or the use renewable natural gas as a feedstock to hydrogen production.

MPC recommends CARB provide two (2) additional years for the feedstock supply chain to adjust to the proposed Feedstock Sustainability requirements and recommends CARB identify that in §95488.9(g) a “new fuel pathway application” means a pathway request for a biomass-based feedstock not previously processed at a facility.

CARB’s proposal to give the Executive Officer discretion to stop accepting new biomass-based diesel fuel pathways beginning January 1, 2031 will stifle innovation in the agricultural sector.

133.3 cont

CARB has previously shared its intent to create policies that can be used by other jurisdictions. Other states such as Oregon, Washington and New Mexico either have LCFS programs that are in place or have legislative approval to implement such a program. Many of these states have relied on and designed their pathway processes based on CARB’s technical acumen, understanding of life-cycle accounting, and administrative history of managing fuel pathways. MPC acknowledges CARB is not responsible for the administration of any other jurisdiction’s LCFS program; however, CARB must consider the likely impacts this proposal has on other programs that may rely on CARB’s pathway approvals.

Additionally, CARB has signaled that the decision to accept a new biomass-based diesel pathway after January 1, 2031 is correlated to a specific number of class 3-8 Zero Emission Vehicle (ZEV) or Near Zero Emission Vehicle (NZEV)³ registrations in California as of December 31, 2029. The addition of Section 95488(d) in CARB’s 15-Day changes will stifle innovation and investment in the agricultural sector, due largely to the uncertainty surrounding CARB’s authority to approve or deny a new pathway that may utilize cover crops as a biomass-based feedstock or new farming practice technologies that reduce the carbon intensity (CI) of the raw materials used in feedstock production. The adoption rate of class 3-8 ZEV and NZEV should not be used as a metric for the approval of biomass-based diesel pathways. Instead, CARB should rely on its CI standards as the signal to inform investors on the value of new low carbon fuels in California. While California’s push for zero-emission technology is apparent, the acceptance of new biomass-based diesel fuel pathways has no correlation to the adoption rate of class 3-8 ZEV and NZEV in California.

³ CARB Advanced Clean Fleet Regulation Title 13, California Code of Regulations, Article 3.4 §2015(b)

Chair Randolph
August 27, 2024
Page 4

MPC recommends that CARB not give the Executive Officer discretion to stop accepting applications for new fuel pathways for biomass-based diesel.

Thank you for the opportunity to comment on these subjects. If you have any questions about anything discussed here, feel free to reach out to me at bcmcdonald@marathonpetroleum.com.

Sincerely,

A handwritten signature in black ink, appearing to read "Brian McDonald", with a stylized flourish at the end.

Brian McDonald
Marathon Petroleum Company LP | West Coast Regulatory Affairs Advisor

Cc: Rajinder Sahota, Deputy Executive Officer, Climate Change and Research
Matthew Botill, Division Chief, Industrial Strategies

Comment Log Display

Here is the comment you selected to display.

Comment 134 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Michael
Last Name	LaCavera
Email Address	michael.lacavera@vopak.com
Affiliation	Vopak Terminal Los Angeles Inc.
Subject	Support for Including Green Methanol as an Opt-In Fuel: LCFS Amendments

Comment

134.1

Dear California Air Resources Board:

Vopak is submitting this letter of support for the inclusion of green methanol as a marine fuel into the Low Carbon Fuel Standard (LCFS).

Vopak operates bulk liquid marine terminals in ports around the world, including the ports of Los Angeles and Long Beach. Vopak does not own the products that we store, but we are a service provider that helps products that are critical to our society, safely and efficiently flow to end users. In Los Angeles and Long Beach, Vopak is a critical part of the infrastructure, handling significant portions of the supply of jet fuel and Sustainable Aviation Fuel (SAF) destined for Los Angeles International Airport (LAX) and bunker fuels and renewable diesel used to fuel many of the vessels calling on the ports.

The commercial aviation industry and the maritime shipping industry are two industries that are not suitable for full electrification. The use of SAF for aviation and green methanol for maritime activities can result in significant reductions in carbon emissions over a relatively short timeline. With regard to green methanol, a major advantage of this fuel is the current existence of infrastructure capable of handling this product in California ports. For example, storage tanks that store traditional marine fuels today can be repurposed to handle green methanol. Similarly, barges that transport traditional bunker fuels to vessels within the port today can also be repurposed to handle green methanol.

In contrast, other zero carbon or low carbon fuels being proposed

for the marine sector will require the construction of completely new facilities and equipment that would take many years to permit and construct. And, since those other fuels present significantly higher risk profiles compared to traditional marine fuels or green methanol, it will be extremely challenging for those projects to obtain the California Environmental Quality Act (CEQA) certifications necessary to move forward.

The use of green methanol will reduce both carbon emissions and improve air quality. Compared to conventional fuels such as diesel, green methanol cuts carbon emissions by up to 95%, reduces nitrogen oxide emissions by up to 80% and completely eliminates sulfur oxide and particulate matter emissions.

(see <https://www.methanol.org/renewable/>)

Amending the LCFS regulations to allow low carbon intensity green methanol to generate credits when used in marine transportation will incentivize its use as a substitute for conventional fuels, leading to an overall reduction of marine transportation related emissions.

Making this change will help California realize its goals to improve air quality and address global climate change.

Sincerely,

Vopak Terminal Los Angeles Inc.
Vopak Terminal Long Beach Inc.

Michael LaCavera
SVP Commercial & BD U.S. & Canada

Attachment

Original File Name

**Date and Time Comment Was
Submitted** 2024-08-27 14:53:35

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

Air Products and Chemicals, Inc.
4000 MacArthur Boulevard, Suite 420, East Tower
Newport Beach, CA 92660



www.airproducts.com

August 27th, 2024

California Air Resources Board
1001 I Street
Sacramento, CA 95814

Comments submitted electronically

RE: Comments Related to the August 12th, 2024 15-Day Amendment Package

Dear Chair Randolph and fellow Board Members,

Air Products is pleased to provide comments in support of the California Air Resources Board (CARB) rulemaking for the Low Carbon Fuel Standard (LCFS) and the August 12th 15-day package amendments. We are very appreciative that CARB has recognized the substantial role that hydrogen will play in decarbonizing transportation, but we believe that the proposed 15-day package amendments leave some impediments in place and create new significant impediments to developing the growing market for low-carbon hydrogen. Our comments focus on further refinements that are needed to support the nascent and growing lower-carbon hydrogen market and help realize California's decarbonization goals and help local jurisdictions meet their air quality and public health goals through deployment of zero emission vehicle (ZEV) vehicles to replace diesel-burning vehicles, particularly in heavily traveled goods movement corridors. We respectfully request another 15-day package before the amendments prior to the Board acting on the amendment package at its November 8, 2024, hearing to address the issues identified below.

Air Products is the only U.S.-based global industrial gas company and the largest hydrogen producer globally, nationally, and in California. The company is a trusted hydrogen supplier for numerous markets, including transportation. Within California, Air Products safely operates ten hydrogen production facilities, about 30 miles of hydrogen pipeline and currently supplies and operates a network of light-duty and heavy-duty hydrogen fueling stations, facilitating the transition to zero-emission transportation. Air Products has also been selected to be part of the California ARCHES LLC Hydrogen Hub Project.

We are committed to rapidly scaling and decarbonizing global hydrogen supplies to support decarbonization efforts internationally. On July 25th, 2022, Air Products announced¹ that it will spend or commit at least \$4 billion in additional new capital for the transition to clean energy over the next five years. In the two years preceding this announcement, Air Products had announced approximately \$11 billion in clean energy investments., bringing its total recent commitment to clean energy investments targeting hard-to-abate economic sectors to \$15 billion.

Executive Summary on Key Issues:

1. **Proposed Change to Reduce the Carbon Intensity Target by 9% in 2025:** Air Products applauds CARB's bold step and supports the recommendation to reduce the carbon intensity (CI) target in transportation fuels by at least 9% in Q1 2025. We also strongly support CARB's retention of the auto-

¹ Air Products Announces Additional "Third by '30" CO2 Emissions Reduction Goal, Commitment to Net Zero by 2050, and Increase in New Capital for Energy Transition to \$15 Billion

acceleration mechanism included in the amendment package which will enable timely stringency adjustments to maintain strong market signals for the development of lower carbon transportation fuels.

2. ***Modify Low-CI Hydrogen Book & Claim Provisions to Maximize Emissions Reductions and Low Carbon***

135.2

Fuel Supply to California: We strongly support the inclusion of a technology-neutral, CI-based, book-and-claim approach for hydrogen. However, we continue request that it be applied to all transportation fuels consumed in California, regardless of where the fuels are produced and transported, and consistent with standard treatment of fuels under the LCFS program. This ensures a broader supply of low CI hydrogen to serve the state, increased fueling reliability for new hydrogen stations, greater competition among low CI hydrogen fuel providers, and therefore lower cost to the end consumer. This change will deliver greater reliability and flexibility in what will be a global market for lower-carbon transportation fuels to replace the existing fossil-based transportation fuels market. Note, that more than seventy (70%)² of the fossil-based transportation fuels we use in California are imported to serve the existing transportation market, even though California is home to one of the largest refinery fleets and fuel production. With more than 38 million population and host to several international ports which move more than 70% of the United States goods across the Western United States, replacing legacy transportation fuels will require a broad supply of low carbon fuels and more specifically a nationally and internationally sourced low CI supply of hydrogen to support the transition to zero emission cars, trucks, drayage and cargo handling.

3. ***Remove New Proposed Requirement for Renewable Hydrogen Only in Mobility Applications:***

135.3

We strongly recommend that CARB remove the requirement to require all hydrogen used in mobility applications after 2030 be renewable as electricity and other applicable transportation fuels are not required to meet an equally stringent standard in the same timeframe. The new policy requires all hydrogen, starting in about 6 years to be renewable and if it does not meet the requirements, it will be artificially assigned a CI value for diesel, regardless of the actual CI. This is a substantial new requirement that was not subject to workshop discussion or public vetting. Further, given the proposed transition away from a technology-neutral approach for hydrogen, this proposed change will severely limit the development of a robust hydrogen transportation fuels supply in California at a time when a transition to ZEV transportation solutions, including new vehicle and new fueling stations, is being advanced. The proposal also places hydrogen on unequal footing with electricity as a zero-emission fuel or biogas and other pathways, which enjoy longer transition (e.g., 2045) horizons to meet 100% renewable content requirements. The new policy also moves CARB away from the technology-neutral approach that the LCFS has always taken and undermines the beneficial role that carbon capture and sequestration will play in the national energy transition, forgoes additional carbon emission reductions and air quality improvements that low carbon hydrogen can provide, and presents timing challenges. The hydrogen production and associated industry cannot rapidly pivot from existing supplies to this level of new sources to serve the growing ZEV fueling market.

4. ***Provide Clarity for Hydrogen Refueling Stations Serving All Vehicle Types:***

135.4

We support the proposed changes in the 15-day package for Hydrogen Refueling Infrastructure (HRI) crediting to align light- and medium-duty stations in one category and heavy-duty in another category for generating credits but continue to seek clarity about how stations that serve all three vehicle types will be treated. This clarity is needed as multi-modal stations are the most efficient and flexible infrastructure, with shared equipment, to serve the growing mobility fleet.

• ² [Annual Oil Supply Sources To California Refineries](#)

- 135.5 5. **Low-CI Electricity Book & Claim Provisions:** Air Products strongly supports CARB's proposal in §95488.8(i)(1) to extend the existing book and claim accounting approach for low-CI electricity to include the process energy associated with other components used to process and distribute hydrogen, like liquefaction and compression. We also appreciate the 15-day amendments treating hydrogen and electricity equitably in terms of the time matching criteria consistently. We believe some important clarifications are still needed in the provisions for the use of low-CI electricity when used to produce hydrogen including striking the newly added qualifier that these provisions only apply to electrolysis as that would unnecessarily limit the extension mentioned above to process energy and the flexibility to provide lower-carbon sources of hydrogen to the mobility market in California.

Detailed Comments:

- 135.1 cont 1. **Proposed Change to Reduce the Carbon Intensity Target by 9% in 2025:** Air Products strongly supports CARB's bold step in recommending to reduce the carbon intensity (CI) target in transportation fuels by at least 9% in Q1 2025. We also support CARB's retention of the auto-acceleration mechanism included in the amendment package which will enable timely stringency adjustments to maintain strong market signals for the development of lower carbon transportation fuels. Both changes will bolster the signal to the market that is needed immediately and over the longer-term to ensure that the program spurs clean fuel innovation and provides the emission reductions that California needs from the transportation sector.

- 135.2 cont 2. **Hydrogen Book-and-Claim Provisions:** Air Products appreciates CARB's willingness to provide a 'book-and-claim' accounting approach for low-CI hydrogen, and we strongly support the provision's focus on a technology-neutral, CI-focused metric to establish eligibility for low-CI hydrogen. A robust book-and-claim system for hydrogen will support development of new lower-carbon hydrogen production projects, reduce costs, and ensure that the low-carbon attributes of a hydrogen pathway are retained and applied to end-uses where the most environmental benefit can be derived at the lowest cost to the consumer by leveraging existing infrastructure and maximizing supply. This sends the necessary long-term signal to significantly increase investments in the production, storage, and distribution of low-carbon hydrogen fundamental to decarbonizing the transportation sector. CARB's design of such a system will serve as a model to other jurisdictions considering or implementing LCFS programs.

To that end, one key improvement needed is to eliminate the requirement that eligible hydrogen must be supplied to California in a dedicated pipeline as proposed in §95488.8(i)(3)(A). This requirement places an unnecessary constraint on a nascent market and will stifle investments at a time when massive capital outlays are needed to bring low-carbon hydrogen to scale. There are no dedicated interstate hydrogen pipelines to California. As such, this requirement favors only in-state hydrogen pipelines and fails to recognize the value of using hydrogen as an input for renewable fuels produced out of state and imported for use in California, or hydrogen imports for mobility that will be transported in dedicated pipelines outside of California before being transported by truck into the state for the consumer. Just as transportation fuels are imported to California currently, transport flexibility will be needed for hydrogen to ensure a reliable and cost-effective supply as additional infrastructure is built, including potential dedicated pipelines to California.

This provision imposes a differential restriction if the hydrogen is produced and transported in a pipeline outside of the state, even when this hydrogen or the alternative fuel derived from the hydrogen is consumed in California and should be creditable under the LCFS. For reliability of supply, California should incent the use of low carbon hydrogen to achieve as many emission reductions as possible in multiple fuel value chains and geographies if the finished fuel is consumed in state and creditable under the LCFS.

We request that CARB modify §95488.8(i)(3)(A) as follows:

“Low-CI hydrogen is injected into a dedicated hydrogen pipeline physically connected to California a distribution system or a production facility that provides transportation fuel to California.”

Alternatively, Staff had indicated in one conversation that time limitations on this flexibility may be appropriate. We've proposed an approach similar to what is proposed for biomethane when used to produce hydrogen, below, but are flexible to other approaches:

“Low-CI hydrogen is injected into a dedicated hydrogen pipeline physically connected to a distribution system or a production facility that provides transportation fuel to California. Low-CI hydrogen reported under fuel pathways associated with projects that break ground after December 31, 2032, must demonstrate physical connection to California and flow to California at least 50% of the time by January 1, 2046.”

We also note that the low-CI hydrogen book-and-claim provisions still includes a requirement to report the contracted price of hydrogen to CARB in unredacted invoices in the 15-day package. We support the need for robust tracking of hydrogen volumes to ensure the quantity and environmental attributes of the hydrogen tracked via book-and-claim is verifiable but find no rationale for including hydrogen pricing. In fact, sharing information on the contracted hydrogen price creates the possibility of irreparable harm to both Air Products and its customers. Even in situations where data is published in an aggregated fashion, the limited supply of this hydrogen from a handful of entities would likely lead to competitors deducing this proprietary information and leveraging that information to their advantage in bidding processes. We continue to urge CARB to strike the requirement to report this information in §95488.8(i)(3)(E).

If the requirement for contract price reporting remains, CARB must recognize that there are instances where no price documentation exists for internal company transfers.

To accommodate internal accounting practices, we urge CARB to modify the provision as follows:

(E) To substantiate low-CI hydrogen quantities injected into the pipeline for dispensing in FCVs or as an input to alternative fuel production, the pathway application and subsequent Annual Fuel Pathway Reports must include the following documents linking the environmental attributes of low-CI hydrogen in kg with corresponding quantities of hydrogen in kg withdrawn from the pipeline: if independent 3rd-party custody/title transfer occurs upon injection into a pipeline, to provide unredacted monthly invoices showing the quantities of low-CI hydrogen (in kg) sourced and the contracted price per kg; and the unredacted contract by which the fuel pathway holder obtained the environmental attributes, or if no independent 3rd-party custody/title transfer occurs upon injection into a pipeline then alternative documentation must be provided documenting quantities of hydrogen in kg and the associated environmental attributes.

3. ***Eliminate New Renewable Requirement for Hydrogen Mobility Fuel Post-2030:*** We oppose the addition of the requirement in §95482(h) that all hydrogen used in mobility applications be renewable after 2030. This is a substantial new requirement that places hydrogen on unequal footing with electricity as a zero-emission fuel, moves away from the technology-neutral approach that the LCFS has always taken, and forgoes additional emission reductions that low carbon hydrogen can provide. Such a change represents a substantial new and limiting requirement that should not be undertaken in a 15-day amendment package. Additionally, it obviates the important work being done at CARB to

develop a wide-ranging market evaluation of all forms of hydrogen (including non-renewable pathways), as directed by SB1075. Further, by failing to recognize the benefits of projects that couple fossil fuels with carbon capture and sequestration to produce low-CI hydrogen, the proposal is at odds with California's priorities. Perplexingly, the proposal leaves significant GHG reductions on the table while stifling the rapid ramp up in hydrogen production, storage, distribution, and use that is foundational to California reaching its GHG reduction targets.

While California was awarded a renewable hydrogen hub under the Infrastructure Investment and Jobs Act, Congress specified that the collection of hydrogen hubs funded pursuant to the Infrastructure Investment and Jobs Act (IIJA) "can be developed into a national clean hydrogen network to facilitate a clean hydrogen economy." It is important to support consistent standards within California that can contribute to national and even international decarbonization efforts, and to avoid isolating California's hydrogen market from others. It is also important to recognize that the federal definition of clean hydrogen is, in fact, technology neutral and based on a carbon intensity standard consistent with the long-standing design of the LCFS.

CARB and other state officials have previously supported hydrogen with CCS in various forums, including in the Scoping Plan, which states, "In addition, CCS can support hydrogen production until such time as there is sufficient renewable power for electrolysis and an abundant water source." (2022 Scoping Plan, pg. 86). Additionally, the Scoping Plan relies heavily on CCS in refining to achieve accelerated greenhouse gas reductions in 2030 and beyond. CCS at refineries would likely include CCS at hydrogen production facilities, as well, and that hydrogen should not be excluded from the mobility market as flexible low-carbon hydrogen sources will be needed to assure reliable and cost-effective supply.

The increasingly stringent CI standards in the LCFS will help transition the hydrogen market to renewable hydrogen over time without a near-term mandated overlay. It will take time for the full transition to renewable hydrogen to occur, but other low carbon technologies will reduce emissions sooner, utilize existing infrastructure and drive innovation for fossil-base technologies. Setting a near-term target like 2030 will have an immediate chilling effect on this technology development because there is no longer a time horizon for credit generation and return on investment needed to support the transition to a renewable hydrogen market that meets California's rapidly increasing demand. As such, we strongly urge that you strike the newly added provision §95482(h) in its entirety.

- 135.4 cont
4. **Promote Multi-Modal Station Hydrogen Refueling Infrastructure (HRI) Credits:** We support the proposed changes in the 15-day package for Hydrogen Refueling Infrastructure (HRI) crediting to align light- and medium-duty (LMD) stations in one category and heavy-duty (HD) in another category for generating credits, but we continue to seek clarity about how stations that serve all three vehicle types are treated.

Air Products believes that multi-modal stations, which include fueling for both LMD and HD vehicles, utilizing shared compression, storage and dispensing equipment, will play an important role in California's hydrogen fueling network, provided that the correct policy signals are in place. Clarity is still needed in the regulation or in guidance as to how the provisions in the separate LMD and HD sections apply and complement one another so as to recognize and encourage efficiencies associated with multi-modal stations. We note that the proposed amendments do not explicitly define multi-use or multimodal stations or include a section with specific provisions for HRI crediting at these stations. As such, Air Products seeks clarity on some issues in this regard.

- Provision §95486.3(a)(1)(C)5 regarding ineligible hydrogen refueling stations indicates that any LMD station that is co-located with a private HD station is ineligible for credit generation. This implies that a LMD station co-located with a public HD station is, in

fact, eligible. Please confirm.

- In provisions §95486.3(a)(3)(A)2 and §95486.4(a)(3)(A)2, HRI crediting for an individual applicant is limited to no more than 1% of the prior quarter's deficits and 2.5% in aggregate for all participants. These percentages are indicated separately for LMD and HD HRI crediting. We interpret that these are in fact additive in the case of multi-modal stations and that the individual limit in the combined station case is 2% and 5.0% in aggregate, respectively. Please confirm.
- In provisions §95486.3(a)(2)(F), we appreciate the increased HRI credit cap of 2000 kg/day for LMD stations while maintaining the 6000 kg/day cap for HD stations. We interpret the separate credit caps for LMD and HD stations to be additive in the case of a multi-modal station. For example, if station is public and serves both LMD and HD customers, at the 50% discount factor, the credit cap would be 4000 kg/day (1000 kg/day from LMD plus 3000 kg/day HD). Please confirm.
- A market scenario involving a public LMD-HRI station co-located with a HD-HRI station will likely be designed with common or shared hydrogen supply, compression, and other equipment. The regulation should include provisions to accommodate credit generation within the capital expenditure limitations for stations with shared equipment. We propose the following language be added to the regulation:

"§ 95486.4(a)(4)(J) "For co-located LMD and HD station, the cumulative value of HRI credits generated for a co-located station must be less than the difference between 1.5 times the allowable LMD and HD initial capital expenditure, or off-site facilities, reported pursuant to section §95486.4(a)(6)(C)1 and the sum of total LMD and HD grant revenue or external funding before the co-located station is both approved and operational, pursuant to section §95486.4(a)(6)(C)5. and 6 in the prior quarter.

1. *The estimated value of HRI credits, for the purpose of this determination, shall be calculated using the number of HRI credits generated for the HD-HRI station in the quarter plus the number of HRI credits generated for the LMD-HRI station for the quarter and the average LCFS credit price for the quarter published on the LCFS website.*
2. *The estimated cumulative value calculated under this provision will be made available only to the respective reporting entity in LRT-CBT and will not be published on the LCFS website.*
3. *This will not affect the reporting entity's ability to generate non-HRI credits for the hydrogen dispensed at the station."*

We also appreciate CARB clarifying that on-site hydrogen generation is not included in the Capital calculation in §95486.3(a)(6)(B)(1). We request that a similar provision be included in the HD-HRI crediting provision in §95486.4.

4. **Low-CI Electricity Book & Claim Provisions:** Air Products continues to support CARB's proposal in §95488.8(i)(1) to extend the existing book and claim accounting approach for low-CI electricity to include the process energy associated with other components used to process and distribute hydrogen, like liquefaction and compression. We also appreciate the 15-day amendments treating hydrogen and electricity equitably in terms of the time matching criteria consistent with our prior comments.

We do note the addition of the qualifier 'electrolytic' in §95488.8(i)(1)(C) when referencing the use of low-CI electricity book & claim for hydrogen. This will unnecessarily limit the ability to use low-CI electricity attributes for key components of the hydrogen fuel value chain. Liquefaction is a key processing step that will enable efficient delivery of hydrogen to the growing transportation market but requires a substantial electrical load. Shared liquefaction facilities capable of providing low and

renewable carbon hydrogen to fueling stations will be needed and these facilities may process qualifying hydrogen other than electrolytic. To maximize the potential to lower hydrogen fuel CI and incentivize new renewable electricity resources, it is important that these shared facilities be able to access low-CI electricity attributes regardless of the hydrogen that they process. We request that this provision remain as it was in the 45-day package and applicable to all types of hydrogen.

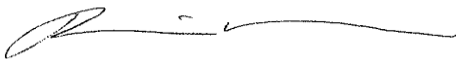
We continue to seek confirmation, consistent with the current regulation and staff discussions that low-CI electricity book & claim can be employed both in-state and out-of-state. We also note that CARB did not propose to limit the low-CI electricity book & claim provisions to California in the Initial Statement of Reasons which would significantly reduce reliable and cost-effective supply of low carbon hydrogen to the state of California. While the California Public Utilities Code is referenced in the regionality requirement provision §95488.8(i)(1)(C)(1), we understand that the initial clause of this provision “The low-CI electricity must be supplied to the grid within the local balancing authority where the electricity is consumed” is intended to apply to hydrogen production and associated renewable power both inside and outside of the state of California. Please add the parenthetical “(or local balancing authority for hydrogen produced outside of California)” similar to what is provided in 94488.8(i)(1)(A) in the current regulation.

As we noted in our comments on the 45-day package and consistent with discussions with CARB staff, the new Tier 1 Simplified Hydrogen Calculator needs to reflect the ability to book & claim low-CI electricity to process energy consistent with what is reflected in the rule language.

§95488.10 (a)(4) should acknowledge that low-CI electricity can also be used for process energy for hydrogen used as a transportation fuel – and not just for the “hydrogen production via electrolysis” – consistent with §95488.8(i)(1). This change ensures consistency in the regulation.

Air Products appreciates the opportunity to provide this feedback on the August 12th 15-day package and we would be happy to meet with CARB to discuss any of these topics further. Please feel free to contact me at hellermt@airproducts.com.

Respectfully,



Miles Heller
Director, Greenhouse Gas, Hydrogen, and Utility Regulatory Policy



August 27, 2024

The Honorable Liane Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Comments on Proposed Changes to the Low Carbon Fuel Standard

Dear Chair Randolph:

I am writing on behalf of the Bioenergy Association of California to comment on several of the proposed amendments to the LCFS. BAC strongly supports the proposal to adopt more stringent carbon reduction targets, including a more aggressive target in 2025. At the same time, however, we strongly oppose proposed changes that:

- 136.1 • Define eligible forest biomass in a way that effectively excludes forest waste from California's wildfire reduction, forest restoration, and public safety efforts;
- 136.2 • Exclude the use of biochar for carbon sequestration or other purposes in the calculation of a fuel's carbon intensity;
- 136.3 • Define "food scraps" in a way that is not practically achievable for most diverted organic waste projects;
- 136.4 • Exclude biomethane used in natural gas vehicles after 2040; and
- 136.5 • Eliminate credit for avoided methane emissions after 2040 even when those avoided emissions are not required by law.

BAC represents about 100 members that are converting organic waste to energy to meet the state's clean energy, climate change, wildfire reduction, landfill reduction, and clean economy goals. BAC's public sector members include cities and counties, Tribes, air quality and environmental agencies, waste and wastewater agencies, public research institutions, environmental and community groups, and a publicly owned utility. BAC's private sector members include energy and technology companies, waste haulers, agriculture and food processing companies, investors and consulting firms, and an investor-owned utility.

Many BAC members operate or are developing projects to produce low carbon fuels from organic waste. The fuels that they produce are among the lowest carbon fuels in existence and are helping to meet the requirements of SB 1383 (SLCP reductions), SB 32 (overall carbon reductions), AB 1279 (carbon neutrality), and other important state

policies such as the state's wildfire mitigation plans, plans to eliminate open burning of agricultural waste, and more.

BAC submits these comments on the *Proposed 15-Day Changes to the Low Carbon Fuel Standard Regulation*, released in August 2024, Appendix A-1.

I. The More Stringent Carbon Intensity Reductions are Warranted to Meet California's Climate Laws.

136.6

BAC strongly supports the more stringent carbon intensity reductions in the proposed 15-day language, including the 9 percent reduction required in 2025.¹ These proposed changes will better align the LCFS program with the requirements of SB 32 and SB 1383, which require 40 percent reductions in California's overall greenhouse gas emissions and methane emissions, as well as a 50 percent reduction in anthropogenic black carbon emissions, by 2030. The proposed changes will also better align with the target of AB 1279 to achieve carbon neutrality by 2045.

136.1 cont

II. The Proposed Changes Would Exclude Most Forest and Agricultural Waste Biomass.

BAC strongly supports the inclusion of meaningful sustainability requirements in the LCFS, including requirements to ensure that the use of forest and agricultural waste are environmentally beneficial. The proposed changes in the 15-day language, however, would effectively exclude forest waste that is collected from wildfire mitigation, forest restoration and public safety projects. In addition, the sustainability criteria for both forest and agricultural waste – which were developed to address concerns about purpose grown crops – would also eliminate many beneficial projects that use forest waste biomass and agricultural residues.

A. Definition of “forest biomass waste” on page 14 of Attachment A-1.

BAC understands the desire to avoid cutting down healthy trees for the primary purpose of fuels production, but the definition of “forest biomass waste” on page 14 would also exclude many or even most wildfire mitigation and forest restoration projects in California. That is because wildfire mitigation, forest restoration, and fuel removal to address bark beetle or other forest health issues generally includes some amount of merchantable residues. In addition, all forest biomass waste can be converted to wood pellets or biochar, which are “wood products,” so the exclusion of biomass that can be converted into other wood products effectively excludes all forest biomass waste.

To ensure that LCFS eligible forest biomass waste is environmentally sustainable and protects forest health, BAC recommends the following edits to the definition:

¹ Proposed Changes to the Low Carbon Fuel Standard Regulation, August 2024, Attachment A-1, Tables 1, 2 and 3.

“Forest Biomass Waste” means **residues that are 1) removed for wildfire mitigation, forest restoration projects, or the protection of public safety, or 2) small-diameter, non-merchantable residues, limited to forest understory vegetation, ladder fuels, limbs, branches, and logs that do not meet regional minimum marketable standards for processing into wood products.**”

These changes will also make the definition of forest biomass waste consistent with the requirements of Section 95488.8(g)(1)(A)(3) which references wildfire mitigation, the need for defensible space (which often requires clearcutting), forest restoration, and threats to public safety or infrastructure.

B. Requirements for Agricultural and Forest Biomass – Section 95488.9(g)

BAC is also concerned that section 95488.9(g), which was originally written to ensure the sustainability of crop-based fuels, has been expanded to cover all waste biomass. The requirements in this section are entirely appropriate for purpose grown crops, but most are not appropriate for agricultural or forest residues where the feedstock is a waste product and the fuels producer has no control over the crop growing practices. For example, a fuels producer that uses almond shells or orchard prunings to produce fuels or electricity has no control over the pesticides or erosion control methods used by the farmer who is growing the crop or orchard. Applying the same standards to agricultural or forest residues as to purpose grown crops does not make sense and will effectively close the door to fuels that could be produced from agricultural and forest residues.

BAC recommends the following corrections to Section 95488.9(g):

(g) Sustainability Requirements for **Biomass-Purpose Grown Crops**.

(A) **Biomass Purpose Grown Crops** used in fuel pathways must only be sourced on land that was cleared or cultivated prior to January 1, 2008 and actively managed or fallow, and non-forested since January 1, 2008. **Biomass Purpose Grown Crops** may not be sourced from land that is covered under international or national law or by the relevant competent authority for nature protection purposes.

(B) **Biomass-Purpose Grown Crops** must be produced according to best environmental management practices that reduce GHG emissions or increase GHG sequestration, including but not limited to:

III. The Proposed Changes Exclude the Use of Biochar for Carbon Sequestration or other Purposes.

BAC supports the use of Carbon Capture and Sequestration or Use (CCSU) to drive down carbon intensities and generate carbon negative emissions where possible. The proposed definition of eligible CCSU in Section 95490(a) and in the definition of CCS on

page 8 would, however, limit sequestration to geologic storage and limit the use of captured carbon to fuels production. These restrictions exclude the use of biochar, which can be a co-product of hydrogen, electricity or biofuels production from waste biomass. Biochar can be used for carbon sequestration in soil or to reduce emissions from cows, livestock manure and compost. As the Climate Action Reserve has found, biochar is “capable of locking up carbon and keeping it from re-entering the atmosphere for centuries.”² Biochar can also be used in the production of concrete, pavement, tires, ink and other products. And biochar can replace charcoal for water filtration and purification. These are all beneficial uses that either sequester carbon or displace fossil fuel and higher emitting alternatives. Excluding the use of biochar will harm the economics and viability of forest waste and agricultural waste to fuel projects and contradicts the recommendations in the 2022 Climate Change Scoping Plan to increase the use of bioenergy with CCS (BECCS).

BAC urges CARB to revise the definition of CCS in section 95490(a) as follows:

(a)(1) Alternative fuel producers, petroleum refineries, and oil producers that capture CO₂ on-site, including at the location of the production of hydrogen used as an intermediate input, and **geologically**-sequester CO₂ **geologically or in the form of biochar**, either on-site or off-site.

BAC urges CARB to revise the definition of CCS on page 8 as follows:

“Carbon capture and sequestration (CCS) project” means **either 1)** a project that captures CO₂ by an eligible entity specified in section 95490(a) of this subarticle, transports the captured CO₂ to an injection site, and injects and permanently sequesters the captured CO₂ pursuant to the Carbon Capture and Sequestration Protocol and as specified by section 95490 of this subarticle, **or 2) a project that captures carbon in the form of biochar during the conversion of waste biomass to fuels and that biochar is used in a manner that sequesters the carbon.**

These changes will allow for the use of biochar to sequester or use carbon that is captured during gasification or pyrolysis of waste biomass.

IV. The Proposed Changes Would Codify a Definition of “food scraps” that is Overly Restrictive and Impractical.

BAC urges CARB to revise the definition of “food scraps” to include all potential sources and forms that could otherwise end up in a landfill. As written, the definition is overly restrictive and would exclude many sources and forms of food scraps. The proposed definition could also be interpreted to exclude food scraps that are combined with other organic wastes in a liquid slurry.

² <https://www.climateactionreserve.org/how/protocols/ncs/biochar/dev/>.

BAC urges CARB to revise the definition of “food scraps” as follows:

“Food Scraps” is the portion of municipal solid waste (MSW) that consists of inedible or post-consumer food collected from residences, hospitality facilities, institutions, commercial establishments, distribution centers, manufacturing facilities, and grocery stores. All food scraps are assumed to follow the state-wide average landfill disposal rate of [97.5%]. This definition excludes fats, oils, or greases (FOG).

Alternatively, BAC recommends that CARB adopt a much simpler definition of “food scraps” that simply states:

“Food Scraps” are the portion of municipal solid waste that consist of inedible, post-consumer or production food wastes that would otherwise be landfilled.

V. The Proposed Changes Should Not Eliminate Credit for Biomethane Used in Natural Gas Vehicles.

136.4 cont

BAC supports the transition to zero-emission vehicles, but believes that it is far too soon to set an end date for the use of biomethane in natural gas vehicles as an eligible fuel under the LCFS. Section 95482(g) of the proposed regulation provides that, for any project that breaks ground after 2029, the biomethane it produces would not be eligible to generate LCFS credits if it is used in a natural gas vehicle. There are several reasons why this section could undermine the state’s decarbonization and SLCP reduction efforts.

First, the state is years behind schedule in meeting the requirements of SB 1383, particularly the requirement to diverted 75 percent of organic waste from landfills by 2025. That means that new projects will still be breaking ground after 2029 and should still be eligible to sell their biomethane to remaining natural gas vehicles for as long as those vehicles are on the road.

Second, the transition to ZEVs is slowing down and may not happen on the schedule that CARB is hoping, so setting an end date now for the use of biomethane in natural gas vehicles is premature at this point. And, even if the transition to ZEV’s happens at the pace that CARB hopes, there will still be legacy natural gas vehicles on the road for years after 2040.

In addition, some fleets may have combinations of natural gas and hydrogen or electric vehicles and may seek to procure biomethane for a combination of fuels and vehicle types. It does not make sense to allow the use of biomethane for electricity or hydrogen generation, but not in natural gas vehicles if those vehicles are still on the road. The LCFS is a carbon reduction program adopted pursuant to AB 32, so the carbon reductions provided by biomethane under the program should be eligible regardless of

the vehicle type that uses the fuel (and assuming that the different vehicle type will affect the carbon intensity of the fuel).

Finally, the perverse result of this regulation is likely to be that some natural gas vehicles on the road after 2040 will have to revert to using fossil fuel gas, which would totally undermine the goal of the LCFS program.

BAC urges CARB, therefore, to remove section 95482(g) from the proposed regulation and to allow the use of biomethane in natural gas vehicles as long as those vehicles are legally on the road.

VI. The Proposed Regulation Should Not Eliminate Credit for Avoided Emissions that are Not Required by Law.

136.5 cont

As BAC noted in its comments in February, the LCFS should not exclude credit for avoided methane emissions that are not required by law. This includes avoided methane emissions from livestock manure, which is not currently regulated, as well as avoided emissions from diverted organic waste projects where bioenergy can provide far greater carbon reductions than alternative products procured pursuant to CalRecycle's SB 1383 regulations. Establishing end dates for avoided methane crediting, when the methane reductions are not required by law, is not appropriate and will slow the development of methane reduction projects.

SB 1383 requires a 40 percent reduction in methane by 2030, but it does not include requirements for dairy methane reductions. On the contrary, the law requires a number of findings before the state can regulate dairy methane emissions³ and until those findings are made, the State cannot regulate dairy methane emissions. Therefore, dairy biogas producers should receive full credit for avoided methane emissions from dairy manure that is used to produce biofuels participating in the LCFS program.

Diverted organic waste is a more complex category since SB 1383 requires 75 percent of organic landfill waste to be diverted from landfills by 2025. But, neither SB 1383 nor CalRecycle's regulations require that diverted organic waste be converted to bioenergy. CalRecycle's SB 1383 regulations explicitly allow alternatives to bioenergy that emit far more carbon. Those alternatives include compost production and mulch, which are less expensive to produce than bioenergy, but also have greater carbon emissions.

CalRecycle affirmed this recently when it determined that a diverted organic waste to hydrogen project will have lower emissions than if that same waste were converted to compost (the finding required under Article 2 of CalRecycle's SB 1383 regulations). As long as CalRecycle's SB 1383 regulations allow higher emission alternatives to biofuels (biomethane, hydrogen or electricity generated from that waste), then the LCFS should continue to provide credit for the difference between bioenergy and other, higher emitting compliance products.

³ Health and Safety Code section 39730.7(b)(4).

For all these reasons, BAC urges the Air Board to go back to its earlier proposal to allow credit for avoided methane emissions for three consecutive 10-year periods for projects that break ground before 2030, especially since those are the early adopters that have taken on more financial and regulatory risk to get projects built. BAC recommends allowing at least three 10-year periods of avoided methane crediting for projects that break ground before 2030 and two consecutive periods for projects that break ground after 2030. This will help to accelerate additional methane reductions before the 2030 compliance date in SB 1383 and will continue to stimulate new projects after 2030.

VII. CHANGES NEEDED FOR DAIRY BIOMETHANE AND HYDROGEN

BAC supports two additional changes to facilitate the highest and best use of dairy biomethane as a low carbon transportation fuel, establishing a temporary CI for dairy biomethane that is converted to electricity or hydrogen and allowing the use of book and claim for RPS eligible dairy biomethane or hydrogen that is used to generate electricity for vehicle charging. Both of these changes will accelerate the production and use of dairy biomethane, which is essential to meet the requirement of SB 1383 to reduce California's methane emissions 40 percent by 2030.


The temporary CI for dairy biomethane to electricity is important for producers to obtain the full value of biomethane to electricity production and will further the Air Board's goal of moving to electricity and hydrogen for use in zero emission vehicles. Ironically, there is a temporary CI for biomethane that is used as RNG in natural gas vehicles, but the Air Board has made clear that it wants biomethane to transition to other uses or to be converted to electricity and hydrogen. Adopting a temporary CI for dairy biomethane to electricity or hydrogen will encourage this transition by giving full value to biomethane producers. In the absence of that temporary CI, producers would lose money by choosing to produce the cleanest and lowest carbon fuels – electricity or hydrogen – from biomethane. That is a perverse incentive that doesn't make sense given the Air Board's focus on transitioning to electricity and hydrogen in the transportation sector.

The Air Board can also help accelerate the transition to electricity for vehicle charging by authorizing the use of book-and-claim for RPS eligible biomethane or hydrogen that is converted to electricity. This would be consistent with the authorization to use book-and-claim for low CI electricity, which must also be RPS eligible, and it would help to lower the CI of eligible electricity by enabling additional electricity generation from carbon negative dairy biomethane. Book-and-claim for biomethane or hydrogen to electricity should, however, be limited to RPS eligible biomethane or hydrogen to ensure that the electricity itself is also RPS eligible, as required by the current LCFS regulations.

Both of these changes will accelerate progress in reducing dairy methane emissions and transitioning to electricity and hydrogen powered vehicles.

Thank you for your consideration of these comments.

Sincerely,

A handwritten signature in cursive script, reading "Julia A. Levin". The signature is written in a dark ink and is positioned above the printed name.

Julia A. Levin
Executive Director



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August 27, 2024

Comments to the California Air Resources Board Regarding 15-Day Changes in the Low Carbon Fuel Standard Rulemaking

The San Francisco Public Utilities Commission (SFPUC), the San Francisco Municipal Transportation Agency (SFMTA), and the San Francisco International Airport (Airport) offer the following comment on the California Air Resources Board's (CARB) modifications to its Low Carbon Fuel Standard (LCFS) program proposed in the August 12, 2024 Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information ("15-Day Changes").

On page 6 of these 15-Day Changes, in the Summary of Proposed Modifications, CARB states:

In section 95486.1(a)(4), staff proposes to remove the pre-2011/post-2010 delineation for Fixed Guideway System crediting. This adjustment provides equal treatment to all fixed guideway systems for the purposes of LCFS crediting and improves LCFS support for transit services in California.

Specifically, this proposal would delete a short section in the existing regulation that restricts the application of an energy efficiency multiplier (Energy Economy Ratio or EER) to only those portions of Fixed Guideway (electric rail) Systems that began operations after 2010. By deleting this section, as CARB notes, the EER multiplier would apply to older systems as well as newer systems.

Our agencies strongly support this modification which we see as both technically accurate and policy that supports and incentivizes the continued use and maintenance of clean transit systems. Applying the EER multiplier to LCFS credit generation for pre-2011 systems will generate substantial additional revenue for transit operations throughout the state, in tangible alignment with several of CARB's priorities outlined in its 2022 Scoping Plan for Achieving Carbon Neutrality, including the need to reduce vehicle miles traveled through use of public mass transit.

The SFPUC, SFMTA, and Airport sincerely thank CARB staff for addressing comments from, and their time taken to meet with, transit providers and environmental groups advocating for this improvement to the regulation. Please contact the following staff with any questions.

Dan Willis
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Iowa Renewable



Fuels Association

August 27, 2024

Chair Liane Randolph & Members of the Board

California Air Resources Board

1001 I Street

Sacramento, CA 95814

Via electronic submission

Re: IRFA Comments Proposed 15-Day Changes to the Proposed Regulation Order

Dear Chair Randolph and Members of the California Air Resources Board,

Iowa Renewable Fuels Association (IRFA) appreciates the opportunity to comment on the proposed 15-day changes (15-Day Changes) to the Low Carbon Fuel Standard (LCFS) program. IRFA is an independent state trade association representing biodiesel, renewable diesel, ethanol, and renewable natural gas producers from across the state. Iowa is the largest biodiesel producing state, with 10 plants capable of producing around four hundred million gallons annually or roughly twenty percent of the United States total biodiesel production. Ultimately, California is a major market for our low carbon, low-cost fuels.

CARB's 15-Day Changes to revise the LCFS was quite surprising, as the final package diverged significantly from what was included in the Initial Statement of Reasons (ISOR) and the April 10 public workshop. Of top concern for biofuel producers and farmers across Iowa and the rest of the nation is a proposal that would cap the use of soybean oil and canola oil as feedstocks for biofuels at 20 percent by company.

Placing an artificial limit on the market, combined with the inclusion of sustainability guardrails, as proposed will fail to reduce emissions and will only increase costs. Iowa biofuel producers and farmers remain frustrated that CARB insists on using data and methods that are over two decades old to set carbon intensity (CI) scores for soy, while refusing to consider new economic data. Further, CARB fails to consider the potential indirect emission impacts of their expanding preference for waste fuels.

Iowa Renewable Fuels Association opposes the proposed discretionary authority provided to the Executive Officer to stop accepting new pathways for biomass-based diesel. In addition to discriminating against the lipid-based fuel platform, we are concerned this could have unintended impacts for non-lipid pathways which could produce biomass-based diesel as a co-product. We are also concerned that the aggressive step-down of CI benchmarks, which partially result from the removal the proposed regulation of fossil jet fuel, combined with other changes, will reward

importers of waste feedstocks while penalizing farmers across Iowa and the broader United States.

As CARB seeks to finalize updates to the LCFS program in the coming months, we strongly encourage the agency to ensure these updates are based on science as required by AB-32. The determination to make such drastic changes to previous CARB proposals so late in the game was shocking to the soybean and biofuels industries. For CARB to move from arguing that, based on the modeling, a vegetable oil feedstock cap was detrimental to the goals of the LCFS at the April public workshop, to now recommending a wildly stringent cap on those feedstocks without data or science, is quite difficult to comprehend. CARB's own April 10th analysis showed that a feedstock cap would increase greenhouse gas (GHG) emissions in California, which is contrary to requirements in AB-32.

Vegetable Oil Feedstock Cap

138.2 cont

The inclusion of a virgin vegetable oil feedstock cap in the 15-Day Changes was alarming to farmers and the entire biofuels value chain, as reflected in market activity. You may understand our surprise based on the April 10 workshop in which CARB noted that liquid fuels would continue to be needed in the transportation sector in California for at least the next decade. In that same workshop, CARB also argued that the imposition of a virgin vegetable oil feedstock cap would increase the utilization of petroleum diesel in the transportation sector. In the staff's own presentation on April 10, staff noted that nearly eighty percent of vehicles on the road in California to still use combustion engines by 2030. Further, they noted that such a stringent cap on virgin vegetable oils may result in 2.8 billion gallons of fossil diesel utilization in 2030, versus 1.9 billion gallons using a scenario that does not impose the cap proposed by the Environmental Justice Advisory Committee.

In a full reversal of staff's prior analysis, which is only four months ago, staff is now essentially recommending to the board that more fossil diesel be sold into the market in 2030. This recommendation appears to not only go against the goals of AB-32, but also science. This recommendation seems to flatly disagree with the Intergovernmental Panel on Climate Change, which notes in its sixth assessment report that using existing low carbon technologies is a crucial component to avoiding catastrophic temperature increases, stating that "biodiesel and renewable diesel fuels...could offer important near-term reductions" for several technologies, including buses, rail, and long-haul trucking.¹

¹ Jaramillo, P., S. Kahn Ribeiro, P. Newman, S. Dhar, O.E. Diemuodeke, T. Kajino, D.S. Lee, S.B. Nugroho, X. Ou, A. Hammer Strømman, J. Whitehead, 2022: Transport. In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.
https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_Chapter10.pdf

In our current interpretation, the cap may lock out of the market producers of the lowest cost, lowest carbon intensity soybean oil-based biofuel (soy methyl esters). The current language limits crediting of soy and canola to 20 percent of reported gallons. This leaves integrated agriprocessing/biofuel producers two choices: 1) exit the market entirely, or 2) be denied a government benefit on 80 percent of their fuel. If this is the current interpretation of the proposed provision, it would significantly and arbitrarily disadvantage the sustainable oilseed biodiesel community.

We echo the concern of the American Soybean Association and others that new requirement appears to contradict the statutory guidance laid out in AB-32 to minimize costs.

Sustainability Guardrails

138.6

Iowa Renewable Fuels Association was surprised to find that not only was a feedstock cap in the 15-Day Changes, but the sustainability guardrails were also retained. The cap, sustainability guardrails and Indirect Land Use Change score all additively, and redundantly, address land use change. This has the equivalent effect of giving soy and canola a much higher CI score increasing the compliance cost associated with delivering the product, despite the lack of direct evidence.

Broadly we are concerned that the requirement proposed by CARB is unneeded given the longstanding, excessively high ILUC figure (relative to more recent modeling efforts). Furthermore, we are extremely disheartened that CARB has not followed the example of governments across North America, where farmers who submit data for compliance are also given the opportunity to be incentivized for conservation efforts. This additional cost without benefit contradicts language authorizing the LCFS. Section 38562 (b)(7) of AB-32 directs CARB to, "Minimize the administrative burden of implementing and complying with these regulations." Adding supply chain traceability to a bulk delivery system adds significant administrative burden without changing the GHG emissions of the pathway.

CARB's efforts could be improved and enhanced by outreach to U.S. Department of Agriculture (USDA) personnel who have engaged in activity regarding climate-smart farming practices. USDA recently closed a comment period on its Request for Information on Procedures for Quantification, Reporting, and Verification of Greenhouse Gas Emissions Associated with the Production of Domestic Agricultural Commodities Used as Biofuel Feedstocks which IRFA provided feedback on. With the information received, USDA seeks to quantify and qualify the benefits of climate smart agriculture practices for biofuel programs at the state, national, and international level. Communication between CARB and USDA could be enlightening regarding ongoing agricultural sustainability practices.

Through the current sustainable aviation fuel (SAF) federal tax credit (40B), the CI of soy-based biofuels can improve through no-till and cover cropping on the field that the soybeans were produced. Other farming practices like low-till, nutrient management, enhanced efficiency fertilizers, buffers, wetland and grassland management, tree planting on working lands, planting for higher carbon sequestration, and soil amendments all can and should be accounted to assign a lower CI score to an agricultural feedstock. USDA already tracks all these practices through several of their managed conservation programs. In addition, there are a variety of other practices that scientifically lower the CI score of soybean feedstocks for biofuels, and USDA is actively working to develop mechanisms to account for those.

Given the work being undertaken by USDA and EPA as part of the implementation of the Inflation Reduction Act, Iowa Renewable Fuels Association urges CARB to reconsider its proposed sustainability requirements to allow soybean growers the opportunity to participate in the California biofuels market through innovative and climate smart agriculture practices.

Outdated Scoring

138.2 cont

For the last several years, state soybean associations, national associations, and biofuel producers have urged CARB to consider updating its scoring methodology for crop-based biofuels. CARB has refused to even consider the request.

We remain deeply concerned that without a comprehensive update to the Global Trade Analysis Project model for biofuels (GTAP-BIO) that CARB utilizes, soy-based feedstocks will be phased out of the LCFS even without the additional limitations being proposed in the 15-Day Changes. Current data indicates a much lower CI score for soybeans, as growers continue to improve soil practices, limit water use, lower on-farm emissions and more. On the one hand, CARB is recommending stringent sustainability guardrails for U.S. soy, but on the other hand is still on track to likely phase-out soy-based biofuels from credit generation by approximately 2035 or sooner.

CARB has indicated plans to update all major models for lifecycle emissions calculations except for GTAP-BIO in the updated LCFS rulemaking. The soy industry has made vast improvements in sustainability and efficiency over the past two decades, with even greater improvement goals ahead. At the same time, CARB continues to rely on a 2014 model that uses data from 2004. The ILUC score accounts for half or more of the CI score for soy-based biofuels. CARB's current modeling assigns soy biomass-based diesel with an ILUC impact of 29.1g CO₂e/MJ whereas updated results from the model used to calculate ILUC scores indicate a value of between 9 and 10 gCO₂e/MJ

for soybeans². The recently released 40BSAF-GREET 2024 model has an ILUC score of 12.2 for soy-based sustainable aviation fuel in federal programs.

The benefits of the LCFS can only be achieved if CI values are accurately captured. If land use change concerns are large enough to justify sustainability guardrails and capping virgin vegetable oil feedstocks, then the modeling should also be updated to reflect current land use change data.

138.4 cont **Entities Eligible to Apply for Fuel Pathways**

We are concerned about CARB's 15-Day Changes to give the Executive Officer discretion to stop accepting new pathways for biomass-based diesel starting in 2031. We do not understand what provision of AB-32 statute is served, or justifies, this arbitrary and highly selective change. CARB must under statute minimize costs and maximize GHG reductions. It is unclear how this is served by rejecting new pathways. In fact, the requirements of current law are met by allowing the most available pathways. If these pathways cannot achieve cost-effective GHG savings, they will not be utilized by the market in the LCFS. In essence, an increase in pathways can only serve to improve GHG benefits in California. Singling out a single fuel for prejudicial treatment is baffling given the goals of the LCFS and the authority that establishes it. Executive Order S-01-07 establishing the LCFS specifically cites diversity of fuels as a motivation for the program, and this proposal contradicts one of the stated purposes of the program. In addition, this provision if implemented could also significantly disadvantage other biofuel production processes which may produce biomass-based diesel as a co-product, for example in system where SAF is a main product.

Conclusion

Iowa Renewable Fuels Association is encouraged by the continued successes of programs that support the development of cleaner, low-carbon fuels. However, it is critical that CARB finalizes updates in a way that does not arbitrarily exclude agricultural feedstocks through policies that are not science-based and run afoul of CARB's mandate, including capping vegetable oil feedstocks and applying onerous sustainability guardrails that add cost without rewarding farming practices that lower CI.

CARB's 15-Day Changes, released in August 2024, is deeply concerning. CARB has singled out soybean and canola oil for adverse, prejudicial treatment. No scientific evidence is ever given for this treatment. In fact, CARB has refused to update the science as required by law for these feedstocks. This alone calls into question the integrity of a performance-based LCFS. On top of this, CARB is now proposing feedstock caps, traceability requirements and authority to reject applications for these

² Taheripour, F., Karmai, O., and Sajedinia, E. (2023). *Biodiesel Induced Land Use Changes: An Assessment Using GTAP-BIO 2014 Data Base*. Purdue University

fuels produced from them. Again, CARB has not shown any scientific justification. In fact, the LCFS is already over penalizing soy for any land use change requirements.

Biofuel producers across Iowa remain eager to continue working with CARB to support the role of agriculture in diversifying the fuel supply while reducing GHGs and increasing clean air in California and beyond. IRFA appreciates the opportunity to comment and look forward to collaborating with CARB and other relevant stakeholders on implementation of policies that expand the use of all low-carbon feedstocks, including soybean oil.

Sincerely,

A handwritten signature in black ink that reads "Monte Shaw". The script is cursive and fluid, with the first name "Monte" and last name "Shaw" clearly distinguishable.

Monte Shaw
Executive Director
Iowa Renewable Fuels Association

August 27, 2024

Liane Randolph
Chair
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812
Via electronic submission

RE: Growth Energy Comments on Proposed LCFS Amendments

Chair Randolph:

Thank you for the opportunity to provide written comments regarding the proposed Low Carbon Fuel Standard (LCFS) amendments. Growth Energy is the world's largest association of biofuel producers, representing 97 U.S. plants that each year produce more than 9.5 billion gallons of renewable fuel; 121 businesses associated with the production process; and tens of thousands of biofuel supporters around the country. Together, we are working to bring better and more affordable choices at the fuel pump to consumers, improve air quality, and protect the environment for future generations. We remain committed to helping our country diversify our energy portfolio in order to grow more green energy jobs, decarbonize our nation's energy mix, sustain family farms, and drive down the costs of transportation fuels for consumers.

Growth Energy has previously submitted extensive comments demonstrating the vital role low carbon biofuels and higher biofuel blends can play in meeting California's ambitious climate goals. As we have previously noted, biofuels have been among the largest contributors to the success of the LCFS program to date and are poised to continue to do so with appropriate updates to the program.¹

As our comments in response to the April workshop also noted, we continue to have serious concerns over the proposed amendments. Of particular concern are the details added to the sustainability certification requirements, the California Air Resources Board (CARB) neglecting to consider farm-level carbon reduction practices and technologies, the unilateral discretion given to the Executive Officer on new fuel pathway applications, and the authority given to the Executive Officer to modify land use change (LUC) penalty values in table 6 for the purposes of determining a fuel's carbon intensity (CI).

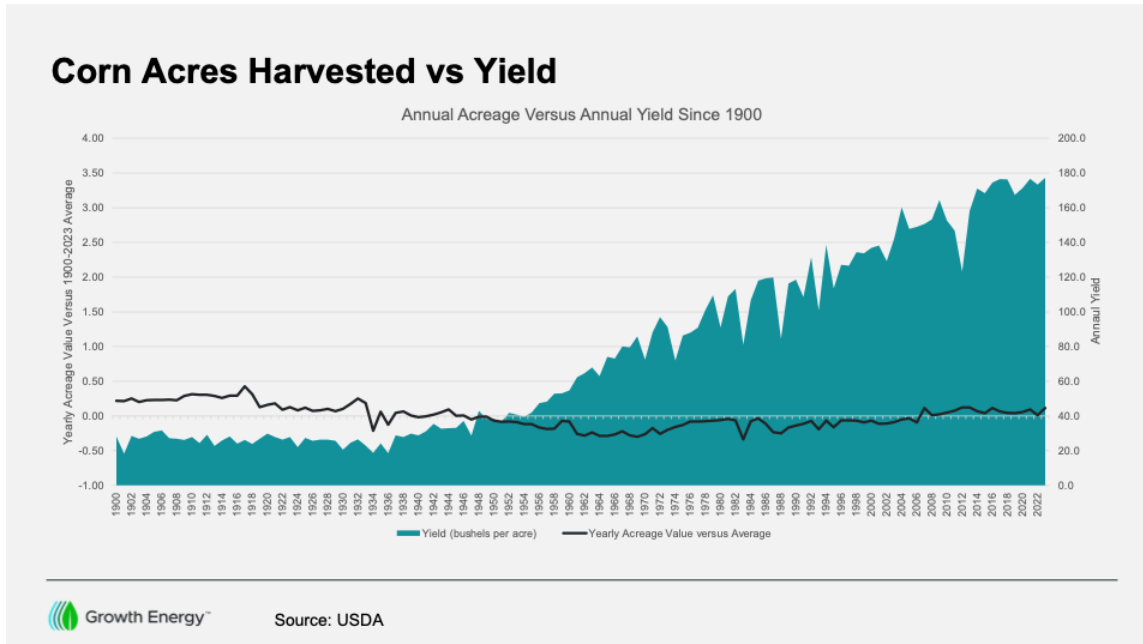
¹ https://www.transportationenergy.org/wp-content/uploads/2023/07/Decarbonizing-Combustion-Vehicles_FINAL.pdf

Continued Concerns Over Proposed Sustainability Certification

139.1

In our comments on the April 10th workshop, we reiterated our concerns over the onerous and costly requirements on biofuels producers and farmers and how CARB's Economic Impact Analysis (EIA) of the proposal does not discuss the sustainability certification requirement's financial burden of implementation. In the recirculated EIA, this impact is still not sufficiently addressed. Rather, the EIA acknowledges potential direct and indirect land use change "is at least partially (and potentially fully) accounted for by the LUC scores added to crop-derived pathways."² This acknowledgement renders the need for a sustainability certification moot as potential LUC concerns for crop-based feedstocks are addressed in Table 6. Corn starch bioethanol is given an automatic 19.8 gCO₂e/MJ penalty for indirect land use change (ILUC).³ Adding the sustainability certification requirement to the current ILUC score amounts to an unfair and unnecessary double penalty for corn starch bioethanol.

As we have previously commented, the concerns over LUC factors are unfounded relative to corn starch bioethanol. In fact, the United States is planting grain corn on roughly the same number of acres as was planted in 1900.⁴ At the same time, the per acre yield has increased more than 600%.⁵ As shown in the graph below, the number of acres harvested annually have consistently hewn to the average since 1900.



² https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/recirculated_draft_eia.pdf

³ https://ww3.arb.ca.gov/fuels/lcfs/iluc_assessment/iluc_analysis.pdf

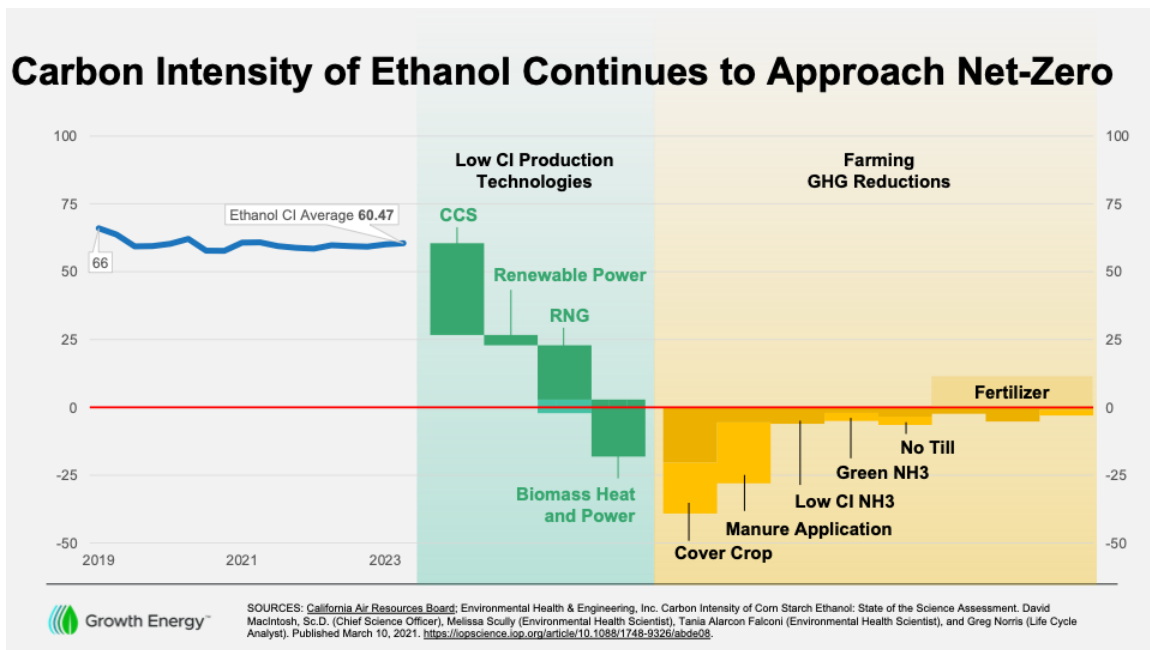
⁴ https://www.nass.usda.gov/Publications/Todays_Reports/reports/cropt19.pdf,
https://www.nass.usda.gov/Charts_and_Maps/Field_Crops/cornac.php

⁵ <https://www.agry.purdue.edu/ext/corn/news/timeless/YieldTrends.html>

139.2

While the most recent proposal details the “best environmental management practices” required for biomass used in fuel pathways and those climate-smart agriculture (CSA) practices result in the reduction of carbon emissions, CARB continues to disregard these and other practices when factoring CI scores. Some of these practices include precision application of fertilizer, use of low CI fertilizer, no or low-till farming practices, and the use of cover crops.⁶ The use of these practices for measured carbon reduction is not new. Other state agencies are using some of these same practices to reduce the release of soil carbon in the state’s natural and working lands.⁷

CSA practices are an important component to bioethanol’s continued efforts to get to net-zero. We urge CARB to recognize these practices and their carbon-reduction potential and allow CSA practices to be considered when determining a pathway’s CI.



139.3

Finally, with respect to the proposed sustainability audit, the proposal’s audit requirements address issues that, while important to environmental and social justice, fall outside the scope of the LCFS. According to the April 10 staff presentation, the proposed sustainability audit process would require auditors to conduct: “review of management systems”, “review of social practices”, and an assessment of the “economic sustainability of the applicant.” The proposed amendments require approved certification systems for the sustainability requirement to take “social and economic criteria” into account alongside environmental concerns. While important and laudable goals themselves,

⁶ <https://growthenergy.org/policy-priority/climate-smart-agriculture/>

⁷ <https://www.gov.ca.gov/2020/10/07/governor-newsom-launches-innovative-strategies-to-use-california-land-to-fight-climate-change-protect-biodiversity-and-boost-climate-resilience/>

“social and economic criteria” have no bearing on GHG reduction. Additionally, many aspects of these audit provisions are addressed by federal programs. For instance, the Fair Labor Standards Act has clear employment guidelines specifically for the agriculture industry.⁸ Furthermore, if the proposal is adopted, crop-based biofuels would be the only feedstock for which these criteria would be audited.

Expanding Specified Source Feedstocks

We acknowledge CARB’s recognition of the use of a variety of “waste, residue, by-product or similar material in a fuel pathway”, particularly the inclusion of distiller’s corn oil, and its consideration as specified source feedstock. Biofuels producers are pushing innovations to use every part of the corn crop. While traditionally considered waste, corn stover and corn kernel fiber have increasingly been used as a feedstock for bioethanol production. As a byproduct of corn bioethanol production, we encourage CARB to recognize and include corn stover and corn kernel fiber in the list of specified source feedstocks.

Biofuel Cap and Executive Officer Discretion on Fuel Pathways and LUC Values Betrays Technology Neutrality

CARB has made clear its intentions to increase the role and market for zero emissions vehicles (ZEVs) in the state. However, the revised amendments give the Executive Officer discretion to reject new fuel pathway applications for particular crop-based fuels solely based on achieving a threshold of 132,000 registered Class 3-8 ZEVs. It endows the Executive Officer with such an authority without a proper rulemaking. This, combined with a 20 percent cap on the use of specific biofuels for credit generation opportunities sets a dangerous precedent for the use of all GHG reducing feedstocks and technologies, violating the LCFS’ commitment to technology neutrality. The program already requires the use of a lifecycle model and assesses penalties for land use change, further limits make little to no sense. Using the full range of Class 3-8 trucks allows for the very real possibility this threshold can be met with smaller lighter vehicles (Class 3-4), thus leaving the larger, heavier vehicles (Class 7-8) reliant on liquid fuel that may only be available in fossil fuels if new biofuels pathways are not allowed. This could be especially true after an update to CA-GREET where legacy pathways are termed out. This situation would result in environmental backsliding and loss of GHG benefits.

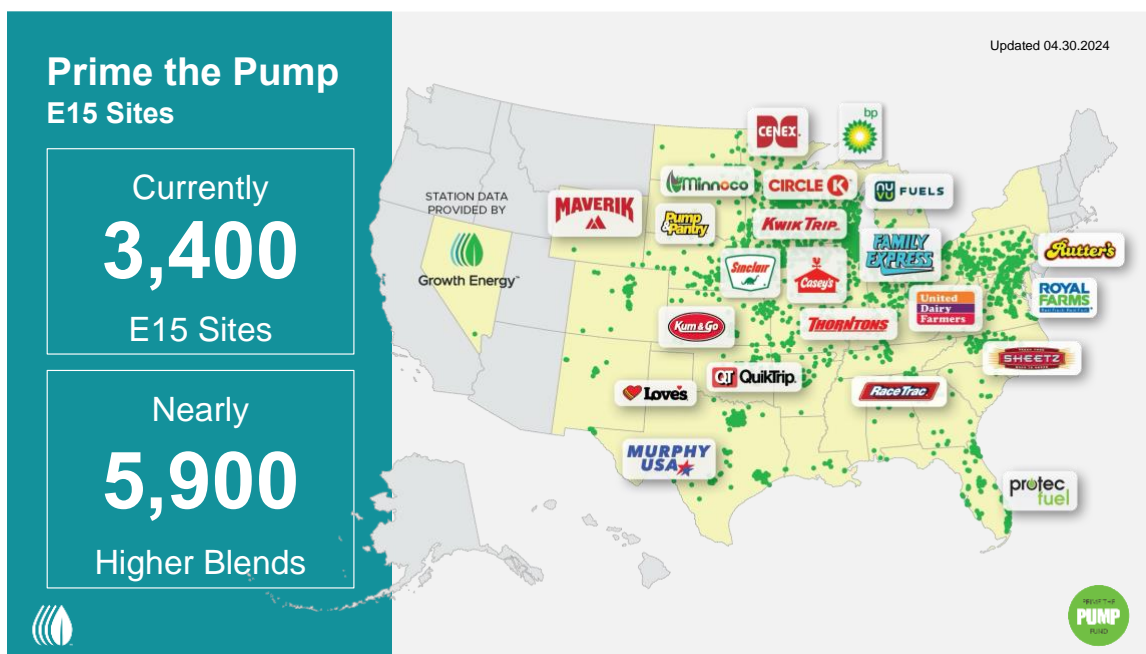
Similarly, the proposed discretion of the Executive Officer to revise LUC values in Table 6 if such a value is deemed not “conservatively representative of a particular region/feedstock/fuel combination” also betrays the Standard’s technology neutrality. This proposed provision, much like the sustainability certification requirement, singles out crop-based feedstocks.

⁸<https://www.dol.gov/agencies/whd/agriculture/flsa>

Not only are concerns over LUC values unwarranted for cornstarch bioethanol, but the proposal does not provide any opportunity for a LUC value to be revised down, even if the Executive Officer were presented with “the best available empirical data” indicating a lower value. For instance, data showing corn bioethanol with a LUC value less than the 19.8 gOC₂/MJ would not be considered. To that end, we also believe the 19.8 gCO₂e/MJ score is outdated and not based on the most up to date research. A review of more recent science indicates a decreasing trend in land use values with the newer data indicating values closer to 4 gCO₂e/MJ.⁹

Approval of E15

We acknowledge CARB’s consideration of the role E15 can play in reducing the state’s greenhouse gas (GHG) emissions while also providing a cost-savings opportunity for California drivers.¹⁰ Consumers have embraced E15’s reputation as a more environmentally beneficial, more affordable fuel. Since the US EPA approved E15 in 2011, at which time there were zero retailers offering it, its availability rapidly expanded to now 3,400 retail sites in 33 states. Since then, drivers in America have relied on E15 to drive 100 billion miles.¹¹



In contrast, with Nevada, Oregon, the Phoenix metro area, and most recently Montana approving E15 for sale, California remains the only state to have not approved this cost-effective, environmentally beneficial fuel that can be used in nearly all the state’s 31

⁹ <https://iopscience.iop.org/article/10.1088/1748-9326/abde08/pdf>

¹⁰ <https://ww2.arb.ca.gov/sites/default/files/2024-04/LCFS%20April%20Workshop%20Slides.pdf>

¹¹ <https://growthenergy.org/2024/01/29/100-billion-miles-e15-growth-energy/>

million gasoline-powered vehicles.¹² If CARB not only approved E15, but replaced E10 with E15, this switch would be responsible for the GHG-reduction equivalent of removing more than 400,000 ICE vehicles from California's roads *without negatively impacting California drivers*.¹³ Neither will it have a negative impact on land use change for bioethanol.

We urge CARB to complete the analysis of and approval process for E15 so that Californians can take advantage of this more affordable, cleaner burning fuel that can be used to power more than 96% of the light duty vehicles on the road today.

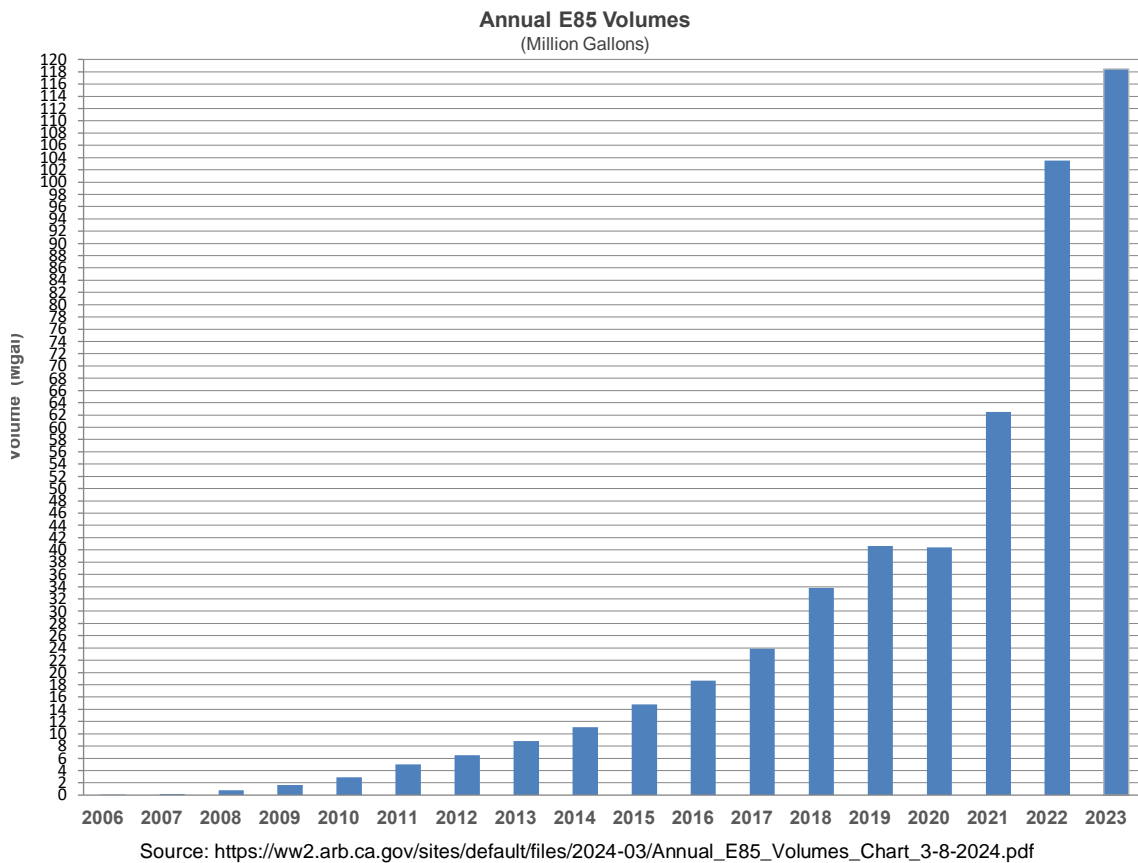
E85, Flex-Fuel Vehicles, and CCUS

Additionally, we appreciate CARB's August 2023 updates to the California Transportation Supply (CATS) Model that recognize the value of carbon capture utilization and sequestration (CCUS) in carbon reduction during bioethanol production. By accounting for CCUS, a process incentivized by the Inflation Reduction Act, the pathway carbon intensity (CI) for E85—approved for use in California—was updated such that it reduces the assumed CI score for bioethanol from 66 gCO₂e/MJ to 35 gCO₂e/MJ.¹⁴ We appreciate CARB's recognition of the bioethanol industry's efforts to further reduce carbon emissions via CCUS, a process which is incentivized by the Inflation Reduction Act of 2022. This is a welcome update to CATS and a recognition of the positive impact bioethanol has on California's emissions reduction goals.

¹² <https://ethanolproducer.com/articles/montana-becomes-49th-state-to-approve-the-sale-of-e15>

¹³ <http://www.airimprovement.com/reports/national-e15-analysis-final.pdf>

¹⁴ https://ww2.arb.ca.gov/sites/default/files/2023-08/CATS%20Technical_1.pdf



Additionally, California's existing approval of E85 has resulted in significant growth of its use in flex-fuel vehicles (FFVs): more than 118 million gallons have been sold at 375 locations across the state in 2023 alone.¹⁵ The current size of California's FFV fleet stands at more than 1.3 million vehicles.¹⁶ The use of E85 will promote even greater reductions in GHG emissions and reductions of air toxics. We would continue to encourage CARB to implement policies that strongly incentivize and as necessary, require the production and use of flex-fuel vehicles, as well as continued investment in infrastructure for expanded access to E85 in the state. In doing so, the Board will be achieving multiple goals: improving air quality and GHG emissions, reducing the state's dependence on fossil fuels, and providing consumers with an affordable choice to power their vehicles. Again, this can be done without any negative land conversion impact.

Expand Access to Low-CI Power Sourcing for Biofuels Producers

With respect to Low-CI power sourcing, the proposal fails to recognize its carbon-reduction potential in biofuels production. The proposal currently only allows this mechanism for hydrogen as a transportation fuel, Direct Air Capture projects, and

¹⁵ https://ww2.arb.ca.gov/sites/default/files/2024-03/Annual_E85_Volumes_Chart_3-8-2024.pdf

¹⁶ <https://afdc.energy.gov/vehicle-registration?year=2022>

electricity as a transportation fuel. Firstly, this fails the LCFS' fundamental policy goal of carbon intensity reduction in transportation fuels used in California. Allowing bioethanol producers to source *new* contracted low-CI power that is not included in a utility resource plan via a power purchase agreement does not impact electricity demand.

Secondly, biofuels production occurs largely in electricity markets outside of California. This renders the argument against expanding low-CI power sourcing due to purported resource shuffling moot. Additionally, by not expanding this provision to biofuels, it denies the state the opportunity to lead other jurisdictions towards increasing their low-CI power generation capability.

Finally, similar to other proposed provisions in the amendments, limiting the approved use of indirect accounting for Low-CI power sourcing to a handful of fuels and processes violates the LCFS' commitment to technology neutrality.

Accelerate the Use of Sustainable Aviation Fuel (SAF)

As producers of one of the most scalable feedstocks for SAF production, we encourage CARB to continue to work with SAF producers, biofuel feedstock producers, and airlines to continue to seek ways to accelerate use of these important fuels to help decarbonize the aviation sector.

Thank you for the opportunity to provide input on the recent proposed amendments. The LCFS Program is a critical tool to addressing climate change, and we look forward to working with CARB to ensure the role of biofuels in making California's fuel mix more sustainable and help the state achieve its progressive climate goals through the expanded use of bioethanol.

Sincerely,



Christopher P. Bliley
Senior Vice President of Regulatory Affairs
Growth Energy

August 27, 2024

Ms. Liane M. Randolph
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: California Air Resources Board's Potential Changes to the Low Carbon Fuel Standard

Dear Chair Randolph,

Iwatani Corporation of America (ICA) would like to thank the California Air Resources Board (CARB) for the opportunity to comment on the potential changes to the Low Carbon Fuel Standard (LCFS) program. ICA owns and operates a network of hydrogen refueling stations across California and is rapidly expanding to serve the fast-growing hydrogen market in California. Our expansion plans include stations that support a variety of on-road fuel cell electric vehicles in the light-duty, medium-duty, and heavy-duty sectors. Since 1941, Iwatani has regarded hydrogen as the ultimate clean energy source and has consistently engaged in initiatives to encourage its widespread use. ICA is committed to supporting the zero emissions vehicle (ZEV) market by expanding the fueling infrastructure and supplying hydrogen to both light-duty and heavy-duty vehicles. Under the corporate slogan "A world where all enjoy true comfort – this is Iwatani's desire," we strive to solve environmental concerns with the aim of achieving a carbon free society through the use of hydrogen.

Annual Carbon Intensity Benchmarks

ICA previously submitted comment letters on CARB's proposed LCFS amendments in February and May 2024 and encouraged CARB to increase the stringency of the CI reduction targets through 2030 which will balance the demand and supply of LCFS credits in the market and increase the LCFS credit price. ICA greatly appreciates CARB staff's decision to modify the near-term increase in stringency to a 9% CI reduction in 2025 and enable auto acceleration mechanism (AAM) as this should help restore the LCFS credit price in the near term. ICA believes that the proposed CI reduction target (i.e., 30% in 2030) may not be enough to stabilize the LCFS credit price longer term and appreciates the opportunity

140.1

140.1
Cont.

to revisit the CI reduction targets to ensure the proposed amendments will enable future investment in clean fuels that are required to meet CARB's goals.

ZEV Fueling Infrastructure Pathways

On August 12th, 2024, CARB published the additional modifications for the proposed amendments (15-Day Changes) in which there are some significant changes to the credits for ZEV fueling infrastructure pathways including the Hydrogen Refueling Infrastructure (HRI) pathways. While under the current LCFS regulation as well as the initial Proposed Amendments, the HRI pathway application could be received by CARB before December 31, 2025, in the Modified Proposed Amendments, CARB staff have proposed to eliminate the current HRI crediting program and new applications can only be received before the effective date of the 2024 amendments. This will have a detrimental impact on companies developing light-duty vehicle (LDV) stations, including ICA and others who have business plans to expand the network of stations for LDV sector under the CEC's GFO-22-607¹ or privately funded. This has a significant impact on the station business case for stations that have been under development for years considering the original deadline for the HRI program (December 31, 2025), and we are just informed that the HRI program will be eliminated in less than 3-4 months. The elimination of the current HRI program not only disrupts the business plans of the companies like ICA, but it also endangers the LDV hydrogen mobility market. While the Modified Proposed Amendments replaces the current HRI program with the light- and medium-duty (LMD) HRI program, the proposed LMD HRI is highly restrictive and has several limitations including shorter program length (10 years vs. 15 years), cap on the number of credits generated and the value of credits generated, and higher renewable percentage requirement (80% vs. 40%). While ICA supports the addition of MD HRI to the LCFS program, we believe that light-duty stations should remain eligible for the current LDV HRI pathway until December 31, 2025, and the de-rating of capacity for the LMD HRI should be removed to enable investments to build larger HRI which can accommodate both MDV and LDV by receiving appropriate amount of HRI credits (under the modified Proposed Amendments, CARB is requiring stations to be 40% larger while providing 20% fewer credits). We would also

¹ <https://www.energy.ca.gov/solicitations/2022-10/gfo-22-607-light-duty-vehicle-and-multi-use-hydrogen-refueling-infrastructure>

Iwatani

Iwatani Corporation of America

appreciate additional time to review and discuss the LMD HRI proposal with CARB staff to ensure the program is structured in way that maximizes successful station developments.

140.3 ICA also wants to point out that the definition of “Medium-Duty Vehicle” (MDV) in the Modified Proposed Amendments is not aligned with the common definition of MDV and ICA urges CARB to utilize the standard definition of MDV which refers to MDV as Class 3-6 (10,001 lbs – 26,000 lbs GVWR).

ICA does appreciate CARB’s efforts to incentivize building stations with the appropriate capacity that can support expanded vehicle volumes over time. We also appreciate the desire to create HRI pathways that support station growth for light-duty, medium-duty, and heavy-duty vehicles. Moreover, as we stated in our previous letter submitted to CARB, the revenue from the LCFS/HRI credits plays a critical role in the economic feasibility of operating ZEV infrastructure which is why the expected long-term value of LCFS credits, and the HRI pathways are so important. The LCFS credit price has had a descending trend in the past three years and with the recent LCFS credit prices, it is very challenging to make an investment case for building and operating a hydrogen station for both light-duty and heavy-duty vehicles. The LCFS/HRI programs have been imperative to the development of ZEV infrastructure to date and will continue to be an enabler if structured effectively.

140.4

In summary, ICA deeply appreciates CARB’s desire to support ZEV infrastructure expansion and for your willingness to consider comments to help all parties achieve their goals. ICA urges CARB to reconsider the sunset time for the current HRI program and allow the current HRI program to continue until December 31, 2025. Once the current HRI program ends, the LMD HRI program should start accepting new applications with no capacity factor for public stations.

140.5

Sincerely,

Hossein Tabatabaie

Director of Product Management



Sustainability in Action

August 27, 2024

The Honorable Liane Randolph
Chair, California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Proposed 15 Day Changes to the Low Carbon Fuel Standard Regulation

Dear Chair Randolph and Members of the Board:

Thank you for the opportunity to comment on the 15 Day Changes to the Low Carbon Fuel Standard (LCFS) Regulations. CARB staff and Board Members have placed a great deal of time and effort into this version of the regulations. We greatly appreciate their availability and willingness to hear viewpoints from various stakeholders. Our comments are relative to two segments of the regulations that address organic waste feedstock and verification requirements for electricity transactions.

Section 95488.8 - Organic Waste Fuel Pathway Application Requirements

141.1 The Summary of Proposed Modifications on Page 11 notes that the draft regulations seek to clarify that only the organic portion of municipal solid waste diverted from landfill disposal is considered a specified source feedstock. Republic Services agrees with this approach and realizes that residential and commercial organics collected at the curb or otherwise delivered to material recovery, digestion or composting facilities are often highly contaminated with non-organic materials (ie. plastics).

141.2 Edits to the definition of Food Scraps attempt to take this clarification into account but as a result may eliminate certain types of entities that generate Food Scraps and may not address the issue of plastic contamination in the manner described in the Summary of Proposed Modifications.

141.3 Further there has been a definition added to the regulation relative to Recovered Organics. This definition is narrow in that there are other sources of organics that don't necessarily flow through the facilities noted in the draft text.

To assist in addressing this comment, Republic has included some draft text that we believe meets the intended outcomes noted in the Summary of Proposed Modifications. The edits to the definitions incorporate changes put forth by CARB in the draft regulation. Republic's edits are as follows with suggested text additions in red and underlined.

141.4

“Recovered Organics” is the organic fraction of municipal solid waste that is collected separately or otherwise manually or mechanically separated from the waste stream, typically at a materials recovery facility, digestion facility, compost facility or transfer station.

These edits serve to incorporate the varied sources of organics that may be used for feedstock as the sole origin of organic material may not be through processing of MSW. The deletion of the Organic Material definition in the draft text would seem to necessitate a broader definition in this regard.

141.5

“Food scraps” is the portion of municipal solid waste (MSW) that consists of inedible or post-consumer food collected from locations which include but are not limited to, residences, commercial and industrial businesses, hospitality facilities, institutions and grocery stores. Feedstocks that are not typically landfilled do not qualify as Food Scraps, which include fats, oils, or greases (FOG), and liquids at the point of collection. The portion of material that is plastic and other contamination commingled within Recovered Organics does not qualify as Food Scraps.

The edits are intended to broaden the array of sources that Food Scraps may be generated from. The last sentence within the revised definition was added to clearly address the issue noted on Page 11 of the Summary of Proposed Modifications (ie. Modifications to Section 95488.8 Fuel Pathway Application Requirements – subsection 2). Relative to this issue, these edits should assist in avoiding confusion as to whether any contamination contained within organic material would void all of the organic material from being an eligible feedstock. Our extended experience with organics collection programs indicates that contamination of all types in the organic streams will be present (source separated or processed from MSW). While we recognize CARB’s intent to not include the contamination to be counted as feedstock, we do not want the entire stream of organic material voided as a feedstock due to the existence of contaminants in the Food Scraps.

Text has been included in the draft regulations that references Specified source feedstocks. Relative to organic materials, Section 95488.8(g)(1)4 includes in eligible feedstocks *“The organic portion of municipal solid waste that is diverted from landfill disposal”*. This reference further reinforces the concept of only organic portions of municipal solid waste being eligible as a feedstock for a fuel pathway. However, the above edits included in the definition of Food Scraps may provide clarity to the intended outcome noted by CARB in the Summary of Proposed Modifications as noted herein.

The deletion of the text relative to “materials from industrial food manufacturing or processing” is proposed because in some instances, this material is still being landfilled yet may be a viable feedstock for digestion or composting and thus an organic feedstock under the LCFS regulation.



Sustainability in Action

- **Section 95500(c)1E – Verification of Quarterly Fuel Transaction Reports for EV Pathways**

141.6

Review of the draft regulation and subsequent discussions with CARB staff indicated that Less Intensive Verification methods for electricity transactions are already built into the regulation (last section (h) on Page 304). We appreciate CARB staff pointing this language out to us as it addresses our comments included in our February 2024 comment letter on the 45 day draft regulation. The definition of Less Intensive Verification Services is fairly descriptive, but we are assuming providing two-way access to data or submittal of reports from the software systems utilized by the charging infrastructure will suffice. Please advise if that is not the case or provide more description of the level of detail that may be required.

Regards,

A handwritten signature in blue ink that reads "Michael Caprio".

Michael Caprio
Director Government Affairs - CA

Comment Log Display

Here is the comment you selected to display.

Comment 142 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Timothy
Last Name	Johnson
Email Address	tjohnson@dieseldirect.com
Affiliation	Senior Vice President @ Diesel Direct
Subject	Diesel Direct Comments on the CARB LCFS Rulemaking

Comment

142.1

The demand for renewable diesel depends on an even-playing field with petroleum diesel indexes. When this cost-balance is disrupted, even the greenest and proudest customers utilizing renewable diesel tend to default to the least expensive product. Their ability to be competitive in the market depends on it.

Though the environmental benefits & fleet performance of RD99 greatly exceeds that of fossil-diesel, most users of RD99 are not able to pay more in a highly competitive world even though they support the goal of using this sustainable commodity.

We therefore respectfully request that CARB not enact the phaseout of RD pathways, an arbitrary cap on feedstocks or unnecessary sustainability requirements

Attachment**Original File Name****Date and Time Comment Was
Submitted**

2024-08-27 15:11:03

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

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Sustainability in Action

August 27, 2024

The Honorable Liane Randolph
Chair, California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Proposed 15 Day Changes to the Low Carbon Fuel Standard Regulation

Dear Chair Randolph and Members of the Board:

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Sustainability in Action

Section 95500(c)1E – Verification of Quarterly Fuel Transaction Reports for EV Pathways

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Regards,

A handwritten signature in blue ink that reads "Michael Caprio". The signature is fluid and cursive.

Michael Caprio
Director Government Affairs - CA



August 27, 2024

Liane Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Proposed 15-Day Changes to Proposed Regulation Order

Dear Chair Randolph:

The Biotechnology Innovation Organization (BIO) -- the world's largest biotechnology focused trade group with members that produce agricultural, environmental, industrial, and health care products -- submits these comments to the California Air Resources Board (CARB) in response to the August 12, 2024, Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information for the Proposed Low Carbon Fuel Standard (LCFS) Amendments.

On February 20, 2024, BIO submitted comments on CARB's proposed LCFS amendments and we continue to urge CARB's consideration of the comments we previously submitted in addition to these comments regarding areas elaborated in the 15-Day Notice.

Specific to the 15-day changes and the overall pending rulemaking, BIO members produce the feedstock, biofuels, sustainable aviation fuel, and renewable energy from which California's LCFS, along with the state's environment and economy has benefitted so greatly the last 14 years. As a result, it was shocking and extremely disappointing to see that the 15-Day Changes to the pending LCFS Amendments contain several problematic proposals that threaten the tremendous progress the program has achieved since it was first enacted in 2007.

Specifically, BIO opposes:

Virgin Soybean/Canola Oil Cap

144.1

The proposed addition of section 95482(i) would limit a producer's ability to generate credits from soybean and canola oil-based fuels to no more than 20 percent of total biomass-based diesel (BBD). Under the proposal, biomass-based diesel from virgin soybean and canola oil in excess of 20% would be assessed the Carbon Intensity (CI) of the applicable diesel pool benchmark for that year, or the certified CI of the applicable fuel pathway, whichever is higher.

For companies that already have a certified fuel pathway prior to the effective date of the amendments and for which the percentage of biomass-based diesel produced from virgin soybean oil or canola oil was greater than 20% of combined reporting biodiesel and renewable diesel quantities for that company's 2023 LCFS reporting, the provision would take effect Jan. 1, 2028, to provide time to adjust feedstock supply contracts as needed. All other companies would be subject to the requirement upon the effective date of the amended regulation.

CARB has not provided any basis for the proposed limitation on biofuels derived from these oilseeds other than to claim that fuels derived from crop oils should be available to markets outside of California.

Soybean and canola oil-based biofuels are already available in markets outside of California, including expanding volumes in Midwest markets and West Coast clean fuel standard incentivized states, along with growing volumes of biomass-based home heating oil in certain Northeast markets. California's LCFS is not hindering the availability of these products to other states – and there is no evidence that it is or will. Efforts to cap the use of soybean and canola oil-based BBD out of a desire to increase food security are misdirected. Raw food commodities, that include soybean and canola oil, comprise a small share of the overall cost of food production and contribute a small share of the retail price of food. Packaging, marketing and logistics make up over 80% of the retail cost of food items.

Currently, virgin vegetable oils make up approximately thirty percent of the feedstock portfolio used in the California biofuels market. In its 15-Day Changes, CARB has recommended imposing a combined twenty percent cap on vegetable oil feedstocks, per company. However, in its own presentation on April 10, CARB staff noted that it anticipates nearly eighty percent of vehicles on the road in California to still use combustion engines by 2030.

Moreover, using CARB's own analysis, imposing a cap on virgin vegetable oils, which already receive an unfavorable score through old modeling data and would face restrictions through other sustainability measures in the proposal, will lead to an increase in fossil diesel usage compared to the status quo by 2030. Without proof to the contrary, CARB has determined that more fossil diesel on the market in 2030 as opposed to increasing virgin vegetable oil biofuel usage is better for the long-term goals of the LCFS.

As steps are taken to address climate change both today and in the long-term, virgin vegetable oil biofuels will remain an important tool in the toolbox in both existing diesel engines and new ultra-low carbon liquid fuel engine technologies. Carbon emissions

continue to accumulate, and increased utilization of biofuels can help mitigate increasing emissions occurring at present.

Sustainability Guardrails

144.2 BIO was surprised to find that not only was a feedstock cap in the 15-Day Changes, but the sustainability guardrails were also retained. The cap, sustainability guardrails, and Indirect Land Use Change (ILUC) score all additively, and redundantly, address land use change. This has the equivalent effect of giving soy and canola a much higher CI score increasing the compliance cost associated with delivering the product, despite the lack of direct evidence.

144.3 Broadly, we are concerned that the requirement proposed by CARB is unneeded given the longstanding, excessively high ILUC figure (relative to more recent modeling efforts). Furthermore, we are extremely disheartened that CARB has not followed the example of governments across North America, where farmers who submit data for compliance are also given the opportunity to be incentivized for conservation efforts.

Adding supply chain traceability to a bulk delivery system adds significant administrative burden without changing the GHG emissions of the pathway. CARB's efforts could be improved and enhanced by outreach to U.S. Department of Agriculture (USDA) personnel who have engaged in activity regarding climate-smart farming practices. To that end, USDA recently closed a comment period on its Request for Information on Procedures for Quantification, Reporting, and Verification of Greenhouse Gas Emissions Associated with the Production of Domestic Agricultural Commodities Used as Biofuel Feedstocks. With the information received, USDA seeks to quantify and qualify the benefits of climate smart agriculture practices for biofuel programs at the state, national, and international level. Communication between CARB and USDA could be enlightening regarding ongoing agricultural sustainability practices.

144.4 Many of these additional sustainability and CI criteria are based on the myth that thousands of acres of land are being deforested to grow biofuel feedstocks. The reality is, under the federal Renewable Fuel Standard, fuel feedstocks must not be sourced from agricultural land cleared or deforested after December 19, 2007.

Furthermore, the USDA's 2022 Census of Agriculture, released in February, highlights a significant decrease of 14 million-acres (4%) in U.S. cropland since 2017, continuing a longstanding trend of declining cropland area. This data underscores the limited need for additional safeguards for U.S. cropland, as the decline in agricultural land suggests that existing regulations sufficiently protect against unwarranted land conversion. Given the limited availability of accredited third-party verification bodies and the stringent qualifications already required by the U.S. EPA's Renewable Fuel Standard aggregate

compliance, BIO believes imposing additional sustainability guardrails on U.S. produced renewable fuels is unnecessary

Frankly, it is more likely that agricultural land will be converted into a strip mall or other commercial development where EV chargers will be placed as opposed to forested land transitioned to a soybean or canola farm.

Fuel Pathway Applications/Biomass-Based Diesel Pathways

144.5

In § 95488(d), CARB proposes to allow the denial of new biomass-based diesel pathways beginning in 2031 if Class 3-8 ZEV registration exceeds 132,000. This is an inappropriate change as it is contrary to the technology-neutral design of the LCFS.

Fuel types and vehicle technologies should be allowed to compete freely in the California market without artificial and arbitrary barriers like this. It is also possible that emerging low-CI feedstocks will become commercially viable after 2031 and arbitrarily cutting off new pathways will deny the opportunity to further reduce the carbon intensity of the diesel fuel consumed in the state.

There is also no language around future BBD pathway registrations under subsequent versions of CA-GREET, which raises concerns about what will happen to BBD participation in the future. This change was not part of the original proposal under this rulemaking and is an inappropriate inclusion in a 15-day package.

Biomethane Pathway Life and Deliverability Restrictions

BIO strongly disagrees with the sunseting of avoided methane crediting for biogas pathways under the LCFS. As CARB has recognized, capturing methane from dairies - greenhouse gas emissions that would otherwise be released to the atmosphere - is one of the primary measures for achieving the state's 2045 greenhouse gas reduction targets and methane reduction target. In addition, we note that use of dairy digesters creates synergistic environmental benefits, as farmers can generate soil amendments that provide nutrients and decrease the amount of fertilizer needed.

144.6

Specifically, CARB is now proposing to reduce the total number of crediting periods for pre-2030 avoided methane emissions projects from dairy and swine manure and landfill-diverted organic waste disposal to two 10-year crediting periods, rather than the three 10-year periods in the original LCFS proposal. Restricting established pathway renewals from 30 years to 20 years is an arbitrary change that devalues biomethane and biomethane production assets.

Projects that came online before 2030 assumed full crediting in the project evaluation. As such, it must be noted that dairy manure methane avoidance projects require significant capital investment and carry with them significant ongoing operating costs, so the proposed reduction seems a major betrayal to California's dairies that have bought into the LCFS program. Accordingly, limits on the crediting period for such projects not only inhibit initial investment but can also threaten the viability of continuing methane avoidance operations over time.

For these and many other reasons, we urge CARB to discard this proposal in order to realize future methane reductions and honor the significant financial commitment California dairy farmers have made to the LCFS and the state's environment.

144.7 BIO also opposes deliverability requirements. The current approach to book-and-claim accounting is practical, aligns with other U.S. policies, and provides the most effective means of reducing GHG emissions, which are global in nature. The development of a system map utilizing 2020-2023 data to impose deliverability requirements in 2037 is arbitrary relative to the 2041 date previously established. It is simply an arbitrary requirement—with no additional environmental benefit or grounding in the physical gas system. This has the potential to deter growth and cause backsliding.

Elimination of Intrastate Sustainable Aviation Fuel from Consideration for Deficit Generation

144.8

Previously, CARB had proposed that intrastate sustainable aviation fuel (about 10% of total jet fueled in California) be included as a deficit-generating fuel. BIO is disappointed that the 15-day proposal removes the inclusion of intrastate sustainable aviation fuel from consideration of credit generation under the LCFS. As other states aggressively pursue policies incentivizing SAF production and use, California remains in stuck in neutral and falling further behind states such as Georgia, Colorado, Illinois, Minnesota, Montana, Nebraska, North Dakota, and Washington State. Such small-minded thinking and action will result in California falling further behind the many other states that will soon enact pro-SAF policies.

144.9 BIO again wishes to take this opportunity to urge CARB to permit the use of E15 in California in whatever way possible. Although E15 is technically not related to this rulemaking, it should be noted that California is the only state that does not permit the sale of E15. This prohibition is illogical as ethanol is a cleaner burning fuel than gasoline. An earlier study commissioned by CARB found that adopting E15 in California could also provide significant environmental benefits, cutting emissions of tailpipe

Page Six
Chair Liane Rudolph
August 27, 2024

pollutants—like particulate matter and carbon monoxide—that cause air quality and human health problems.

According to the Renewable Fuels Association, if all gasoline in California in 2022 had been E15 instead of E10, the state would have seen a 450-million-gallon reduction in petroleum consumption and additional GHG savings of 2.2 billion metric tons, based on CARB's own data. Furthermore, a recent UC Berkely/US Naval Academy study indicates that moving to E15 will save California motorists approximately \$0.20 per gallon, or about \$2.7 billion per year. All required testing for E-15 in California has been completed, and there is no reason to further delay its implementation. Until California vehicles have been converted to hybrids, EVs, or other technologies, it is antithetical to the LCFS for California to continue a 90% fossil fuel mandate, which only benefits petroleum producers.

Conclusion

In closing, proposing what are arguably the most far-reaching changes to the California LCFS in the program's 17-year lifespan at the height traveling season and limiting the comment period to 15 days is contrary to the transparent and input-heavy approach that CARB has generally followed. Frankly, any one of the concerns addressed in this letter could justifiably be the subject of an all-day standalone hearing. Instead, a virtual overhaul of the entire LCFS program – contrary to original technology neutral intent of the initiative - is subject to a two week review and comment time period at a time when many may be on vacation for that entire time.

Again, BIO appreciates the opportunity to comment on CARB's proposed amendments to the LCFS. Please feel free to contact me at gharrington@bio.org or (202) 365-6436 if you have any questions regarding BIO's comments.

Sincerely,

Gene Harrington
Senior Director, State Government Affairs, Agriculture & Environment



August 27, 2024

Chair Liane Randolph and Board Members
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: 15-day notice for comment on additional Low Carbon Fuel Standard proposed amendments announced on August 12, 2024

Dear Chair Randolph and CARB Board Members:

On behalf of the members of the American Coalition for Ethanol (ACE), I am writing in response to additional amendments proposed on August 12 by the California Air Resources Board (CARB) on the Low Carbon Fuel Standard (LCFS).

Crop-Based/Biomass Sustainability Criteria

The subject of sustainability criteria for crop-based biofuels is complex and consequential. ACE members do not believe CARB's broad yet cursory proposal, nor the brief discussion of this topic during the April 10 workshop or additional regulatory red tape proposed in the 15-day comment package of amendments, warrant implementation of such criteria within the context of the overall LCFS.

Rushing to implement such criteria could backfire. As we noted in our February 20 comment letter, the broad proposal to require pathway holders to track crop-based feedstocks to their point of origin and obtain independent third-party certification will discourage participation in the LCFS and hinder the goals of the program.

In general terms, we could support CARB's goal to ensure biomass and crop-based feedstocks used to produce low carbon fuels are not grown on land converted from forests, native grasslands or wetlands after 2008. However, the rushed approach CARB is taking without adequately defining or being transparent about what constitutes "sustainability" beyond the above-stated goal leaves us with more questions and concerns than answers. While CARB seemingly is attempting to dull the biting nature of this proposal by "phasing-in" the documentation and verification of certain feedstock supply chain data, the overall proposal still lacks adequate explanation and transparency about the underlying need or goal for sustainability criteria.

Instead, we recommend initiating a thoughtful stakeholder engagement process so all parties can better understand what CARB wants to accomplish through sustainability criteria. We believe this process can help surface the fact there are multiple existing protocols which can be relied upon to satisfy any real or perceived concerns related to ensuring the LCFS is not causing land use change (LUC) to forests, wetlands and native prairies.

One such protocol is the "R&D Greenhouse Gases, Regulated Emissions, and Energy Use in Technologies (GREET) 2023 Rev1 Technical Report" on indirect effects of biofuels completed by the U.S. Department of Energy to help establish the 40B GREET model for the 40B sustainable aviation fuel (SAF) tax credit. The Department of Energy engaged Purdue University to generate results on induced land use changes (ILUC), crop production, livestock production and rice production with its



GTAP-BIO model, and ICF to develop emission profiles of crop production, livestock production and rice paddy fields.¹

Argonne modified R&D GREET 2023 to create an updated version, R&D GREET 2023 Rev1, that addresses the lifecycle GHG emissions associated with seven SAF pathways for 40B use. The technical report includes updates to ensure the indirect effects of four SAF pathways using dedicated feedstocks (corn, soybean, canola and sugarcane) are covered. It can help inform questions CARB may have relative to indirect effects, including ILUC, from crop-based biofuels.

Second, the U.S. Department of Agriculture (USDA) has an existing and robust apparatus which, since 1985, has been enforcing certain requirements ensuring farmers meet conservation requirements on croplands in order to be eligible for federal farm programs administered by USDA's Farm Service Agency (FSA), Risk Management Agency (RMA) and Natural Resource Conservation Service (NRCS). Known as "conservation compliance," Congress charged USDA with this responsibility to ensure federal farm programs did not entice farmers to grow crops on highly erodible lands or convert wetlands for agricultural production.

Farmers who fail to abide by these rules are ineligible for federal farm programs including FSA loans and disaster assistance payments, NRCS and FSA conservation benefits, and federal crop insurance support.

USDA has 40 years of experience enforcing these provisions. Under federal regulation, farmers and affiliated persons must affirmatively attest (form AD-1026) that they will not plant or produce an agricultural commodity on highly erodible land without following an NRCS approved conservation plan or system, plant or produce an agricultural commodity on a converted wetland, or convert a wetland which makes the production of an agricultural commodity possible. Additionally, activities that may affect compliance such as removing fence rows, combining fields or conducting drainage activities must be pre-approved by USDA to ensure compliance.

USDA's FSA and NRCS are tasked with ensuring eligibility. Leveraging nearly 10,000 staff in state and county offices, NRCS is responsible for making the technical determinations of compliance at the farm level, and FSA's staff of nearly 7,000 state and county offices use this information to make program eligibility determinations for the covered programs. Farmers understand and accept this system. There is no need to re-invent the wheel. Instead, CARB should leverage USDA's existing enforcement infrastructure to verify desired sustainability criteria.

Speaking of federal fuel programs, third, as you know, the U.S. Environmental Protection Agency (EPA) is charged with enforcement of land use and total cropland acres relative to implementation of the Renewable Fuel Standard (RFS). This is yet another safeguard in place to prevent expansion of cropland for biofuel use.

Finally, ACE has previously written about a project we are engaged on with USDA's Regional Conservation Partnership Program (RCPP) to unlock corn ethanol access to LCFS markets and new tax

¹ <https://greet.anl.gov/files/greet-2023rev1-summary> April 2024. Development of R&D GREET 2023 Rev1 to Estimate Greenhouse Gas Emissions of Sustainable Aviation Fuels for 40B Provision of the Inflation Reduction Act. Michael Wang, Hao Cai, Uisung Lee, Saurajyoti Kar, Tom Sykora, and Xinyu Liu, Systems Assessment Center, Energy Systems and Infrastructure Analysis Division, Argonne National Laboratory



incentives based on the adoption of climate-smart agricultural (CSA) practices which reduce GHG emissions.

Specifically, in late 2021, NRCS provided ACE with \$7.5 million in RCPP funds to work with a member ethanol company (Dakota Ethanol, LLC) and farmers in the counties surrounding the facility to: (1) incentivize farmer adoption of CSA practices at scale, (2) partner with leading land-grant university scientists and Sandia National Laboratory to collect data to measure, verify and model resulting soil health and GHG benefits, and (3) use this data to help participating farmers access clean fuel markets and take advantage of other opportunities to monetize CSA practices.²

Since the launch of this South Dakota-based RCPP, ACE and our partners have successfully executed contracts with farmers in the seven counties surrounding Dakota Ethanol, LLC to adopt CSA practices on nearly 20,000 acres of cropland. Currently our technical team, led by South Dakota State University, is conducting ongoing verification of practices and we are making reimbursement payments to participating farmers. Soon our technical team will begin collecting soil samples and other relevant data to pressure test the agro-ecosystem models.

Based on this progress, earlier this year, NRCS invested an additional \$25 million for a larger 10-state RCPP led by ACE.³ The USDA funding will help hundreds of farmers adopt reduced and no-tillage, nutrient management and cover crops on nearly 100,000 acres across 167 counties surrounding 13 ethanol facilities partnering with ACE to implement the project in Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, Nebraska, Ohio, South Dakota and Wisconsin. The sites were strategically chosen to provide our project's scientific team with statistically significant data regarding the GHG effect of conservation practices in different soil types and climates.

ACE and our partners will accomplish three important objectives with this funding support from USDA. First, we will incentivize farmers in 10 states to adopt conservation practices. Three-fourths of the funding will go toward farmer adoption of practices. Second, our team of soil scientists and agronomists will monitor, measure and verify how the conservation practices adopted by the farmers reduce GHG emissions from corn production. The data they collect will be shared with the U.S. Department of Energy who will use it to pressure test existing models such as the GREET model to address real and perceived 'information gaps' which currently prevent farmers and ethanol producers from adequately monetizing climate-smart ag practices. Third, our ultimate objective is to empower ethanol producers and farmers with modeling and calculator tools to earn higher tax credits and premium prices in clean or low carbon fuel markets based on climate-smart ag practices. Our partners, including 13 ethanol companies and team of technical experts, are currently making plans to ensure farmers in the 167 counties are aware of their eligibility and we hope to execute contracts for initial conservation practices following the 2024 fall harvest.

While we may share CARB's goal for better understanding the GHG impacts farming practices have on crop-based biofuels, we disagree feedstocks such as corn must be tracked to their point of origin.

² <https://ethanol.org/ace-news/usda-announces-investment-in-effort-to-utilize-climate-smart-practices-to-secure-market-access-to-clean-fuel-markets-for-farmers-and-ethanol-producers>

³ <https://ethanol.org/ace-news/ace-announces-project-to-unlock-ethanols-access-to-new-markets-and-tax-credits>



Rather, GREET and other models CARB and other regulators use today to penalize corn ethanol for LUC and farm-level practices can be improved and modified to assign carbon credits based on climate-smart agriculture practices. Specifically, GREET currently estimates nitrous oxide emissions from fertilizer use, contains a module for estimating LUC penalties through the Carbon Calculator for Land Use Change from Biofuels (CCLUB), and features a relatively new Feedstock-Carbon Intensity Calculator (FD-CIC) module estimating soil carbon emissions and sequestration credits for practices such as conservation tillage and cover crops on corn production.

Capping Credits for Soy and Canola-based Biomass-based Diesel

CARB's August 12 surprise proposal to cap credits for biomass-based diesel produced from soy and canola oil to just 20% of a company's annual LCFS obligation also lacks transparency and rationale. It would appear this proposal does not apply to distillers corn oil (DCO) or used cooking oil (UCO) but once again, CARB needs to provide more information about the purpose and scientific need for such a radical proposal.

Agriculture and crop-based biofuels are poised to play an even more meaningful role in helping CARB achieve the more ambitious carbon intensity reduction targets set forth in your overall package of amendments, but proposals to limit or cap the volume of carbon credits which can be derived from crop-based biofuels would make it appear CARB is altogether abandoning the "performance-based" nature of the LCFS and simply picking winners and losers.

E15

While it is outside the scope of the proposed amendments to the LCFS, we were encouraged by discussion during the April 10 workshop about how E15 could help reduce retail pump prices. This is true. E15 typically costs 5 to 25 cents per gallon less than E10 and 40 cents to \$1.00 less than non-ethanol gasolines. E15 also has a higher octane rating, so allowing the sale of this fuel would give consumers the option to buy a higher quality product for less money. Moreover, 95% of all U.S. vehicles are approved to use E15 and nearly 3,400 retail sites offer E15 across 30 states.

We implore CARB to finally approve the use of E15 in California, noting that the Center for Environmental Research and Technology at the University of California Riverside found that replacing E10 with E15 in California will significantly improve air quality.⁴

Thank you for your time and consideration of these comments.

Sincerely,

A handwritten signature in black ink, appearing to read "B. Jennings", is written over a light blue horizontal line.

Brian Jennings, CEO
American Coalition for Ethanol

⁴ <https://ww2arb.ca.gov/resources/documents/comparison-exhaust-emissions-between-e10-carfg-and-splash-blended-e15>

Comment Log Display

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Comment 146 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Graham
Last Name	Noyes
Email Address	graham@noyeslawcorp.com
Affiliation	Noyes Law Corporation for Infinium
Subject	Joint Comments RE: Importance of Book-and-Claim Accounting for Power to Liquids Fuels

Comment

Dear Clerk of the Board,

The following is a summary of this comment. Attached please find the full comment submitted on behalf of Aether Fuels, Air Company, Airlines for America, Arcadia, Dimensional Energy, Infinium, TES, and Twelve.

The signatories of this letter are pleased to submit comments regarding the modifications ("15-Day Changes") that the California Air Resources Board ("CARB") has made to its previously proposed amendments to the Low Carbon Fuel Standard ("LCFS"). The specific changes that we are commenting upon are the changes made to proposed §95488.8(i)(1) pertaining to "Book-and-Claim Accounting for Low-CI Electricity Supplied as a Transportation Fuel, Direct Air Capture projects, or Used to Produce Hydrogen as a transportation fuel." These 15-Day Changes modify the fuels that are eligible to use Book-and-Claim Accounting and modify the requirements for Book-and-Claim Accounting. We disagree with these modifications because the proposed LCFS regulations do not authorize Power-to-Liquid ("PtL") fuels to use Book-and-Claim Accounting despite the vital importance of PtL fuels to transportation decarbonization. This comment is submitted consistent with the requirements of Government Code §11346.8(c).

Please let me know if there are any questions relating to this comment or filing.

Best Regards,

Graham Noyes

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Attachment	www.arb.ca.gov/lists/com-attach/7479-lcfs2024-AGoAaQBoUG1XJQRb.pdf
Original File Name	Joint eFuel LCFS 15d_withlogo_FINAL.pdf
Date and Time Comment Was Submitted	2024-08-27 15:14:42

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

August 27, 2024

The Honorable Liane M. Randolph
Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

(Comment submitted electronically)

RE: CARB's 15-Day Low Carbon Fuel Standard Proposal Effectively Bans Power-to-Liquid Fuels from California, Adversely Impacting California's Ability to Reduce Carbon Emissions from Aircraft and Existing Internal Combustion Engines

Dear Chair Randolph,

The signatories of this letter are pleased to submit comments regarding the modifications ("15-Day Changes") that the California Air Resources Board ("CARB") has made to its previously proposed amendments to the Low Carbon Fuel Standard ("LCFS"). The specific changes that we are commenting upon are the changes made to proposed §95488.8(i)(1) pertaining to "Book-and-Claim Accounting for Low-CI Electricity Supplied as a Transportation Fuel, Direct Air Capture projects, or Used to Produce Hydrogen as a transportation fuel." These 15-Day Changes modify the fuels that are eligible to use Book-and-Claim Accounting and modify the requirements for Book-and-Claim Accounting. We disagree with these modifications because the proposed LCFS regulations do not authorize Power-to-Liquid ("PtL") fuels to use Book-and-Claim Accounting despite the vital importance of PtL fuels to transportation decarbonization. This comment is submitted consistent with the requirements of Government Code §11346.8(c).

We support CARB's LCFS program, as it sends a market signal to decarbonize the transportation sector, is performance based, and provides long-term policy stability that supports investment. However, we respectfully request that CARB continue to authorize facilities that produce PtL fuels to source low-carbon intensity electricity ("Low-CI Electricity") via Book-and-Claim Accounting. PtL fuels, also known as eFuels or synthetic fuels, are drop-in replacement fuels for use in airplanes, ships and motor vehicles that do not trigger the costs or delays inherent to engine or infrastructure changes.

CARB's proposed LCFS regulatory amendments are highly damaging to the nascent PtL industry in that the proposed regulatory structure would require that PtL fuel production

146.3
cont.

facilities source grid mix power both for hydrogen and for their other energy needs. This structure would inhibit the growth of PtL fuels and the expansion of new sources of renewable power. One of the key benefits of PtL fuels is their deep reduction in carbon intensity (over 90%) compared to fossil fuel incumbents. The deep CI reduction hinges on reliance on carbon-free electricity. CARB's LCFS regulations, if they fail to allow Book-and-Claim mechanisms for PtL fuel producers' electricity procurement, will undercut the tremendous potential of PtL fuels to contribute to the decarbonization of internal combustion vehicles ("ICVs") and, importantly, the aviation sector. Indeed, the proposed LCFS regulatory change impedes fulfillment of the goals of CARB's 2022 Scoping Plan to dramatically decarbonize transport and power and reduces the likelihood that California will achieve its goal to displace 80% of its fossil jet fuel supply with sustainable aviation fuel ("SAF"). It also makes it very challenging to achieve the on-road and jet fuel CI reduction target of 90% by 2045 that CARB has proposed.

146.4a

Other 15-Day Changes that CARB has proposed undermine the viability of California's climate policies and further necessitate authorizing Book-and-Claim Accounting for PtL fuels. Specifically, as stated in the Notice pertaining to the 15-Day Changes, CARB is proposing that, "Biomass-based diesel from virgin soybean and canola oil in excess of 20 percent will be assessed the carbon intensity of the applicable diesel pool benchmark for that year, or the certified carbon intensity of the applicable fuel pathway; whichever is higher." This proposal places a cap on the use of virgin soybean and canola oil as a feedstock. In 2023, bio-mass diesel generated almost twelve (12) million credits, more than 50% more than electricity, the second highest credit generating fuel. Thus, CARB is effectively placing a cap on the amount of LCFS credits that can be generated by Biomass-based diesel, the largest LCFS credit generator. Even if CARB's aggressive medium and heavy-duty electrification programs are successful, these vehicle classes have long lifespans and use large quantities of distillate fuel such that the cap on Biomass-based diesel credit generation will result in increased demand for petroleum diesel fuel unless there are viable low-carbon fuel alternatives, such as PtL fuels.

146.4b

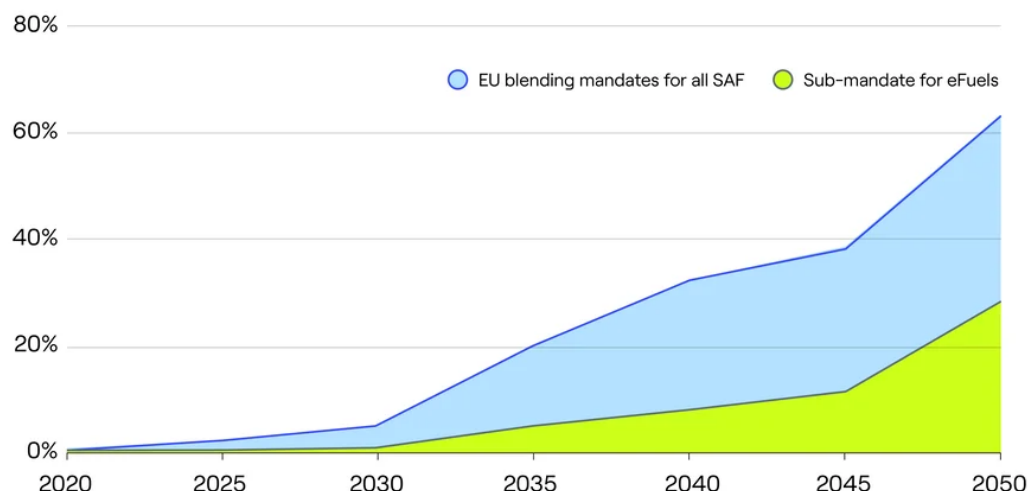
PtL fuels have the potential to provide ultra-low carbon fuel alternative to petroleum derived transportation fuels and to scale rapidly - but only to the extent that PtL producers continue to be allowed to source Low-CI Electricity. Now is the time to enable not disadvantage PtL fuel producers within the LCFS program structure, particularly given the fact that the industry is beginning to commercialize in response to the market signal that the existing LCFS regulatory structure sent to the nascent industry.

PtL fuel producers do not use biomass feedstocks for production but instead utilize carbon dioxide (CO₂) that would otherwise be emitted as waste and water as their only feedstocks to produce PtL fuels. To convert water to hydrogen via electrolysis, PtL fuel production facilities require a substantial amount of power, which needs to come from carbon-free sources in order for the resulting fuels to achieve deep CI reductions. Due to this electricity demand, the proposed regulatory changes would dramatically increase the CI of PtL fuels (i.e., to a level at or above the petroleum baseline CI value) and perpetuate the use of fossil jet fuel and other petroleum-based fuels in the broader transportation sector. This

146.4
cont.

will effectively stunt the innovative PtL industry, the importance of which has already been recognized in the road, aviation and maritime sectors and in other jurisdictions such as the European Union and United Kingdom. The sub-mandate for PtL fuels within the EU ReFuelEU Mandate for SAF is illustrative.¹

EU ReFuelEU mandate for SAF and sub-mandate for PtL fuels



International Recognition of the Importance of PtL Fuels

The International Council on Clean Transportation (“ICCT”) is an independent, nonprofit research organization founded to provide exceptional, objective, timely research and technical and scientific analysis to environmental regulators. This past November, ICCT published a white paper assessing the feasibility of meeting the targets in the Biden Administration’s SAF Grand Challenge based on “resource availability, production costs, technology readiness level, and policy support.”² ICCT’s white paper emphasized the importance of eSAF in meeting the 2050 SAF Grand Challenge goal of 35 billion gallons, as follows:

We find that the near-term 2030 production target can be met with sustainable resources, but the 2050 target will be far more challenging to reach. In the longer-term, biomass volumes will need to be supplemented with a combination of other fuel

¹ Centre for Aviation, “EU Parliament approves sustainable aviation fuel mandate; up from 2% in 2025 to 70% in 2050,” (September 21, 2023), at <https://centreforaviation.com/analysis/reports/eu-parliament-approves-sustainable-aviation-fuel-mandate-up-from-2-in-2025-to-70-in-2050-661409>.

² O’Malley, J., Pavlenko, N., & Kim, Y.H. (2023). Meeting the SAF Grand Challenge: Current and Future Measures to Increase U.S. Sustainable Aviation Fuel Production Capacity. International Council on Clean Transportation. Available at <https://theicct.org/wp-content/uploads/2023/11/ID-37-%E2%80%93SAF-Grand-Challenge-white-paper-letter-40036-v3.pdf>.

sources or fuel burn reduction to meet the energy needs of the entire U.S. aviation sector. . . .

E-fuels, or synthetic aviation fuels produced from renewable electricity, could help to bridge the supply gap in later years. . . . Though the technology remains in the demonstration phase, e-fuels have gained significant interest in Europe and other markets due to their ‘drop-in’ advantages and theoretically unlimited supply. For example, the EU has adopted an e-fuel mandate of 1.2% of aviation fuel, averaged over 2030 and 2031, and 5% of aviation fuel volumes by 2035 (European Commission, 2023). These e-fuels are estimated to be costlier than most biomass-derived SAFs in the near-future, but their costs could rapidly come down as electrolyzer technology matures and the cost of renewable electricity declines (Zhou et al., 2022). . . . With the use of policy incentives, including the IRA’s 10-year production tax credits for hydrogen and carbon capture, utilization, and storage (CCUS), e-fuels will likely become cost-competitive within a much shorter timeframe.³

Conclusion

Due to the vital importance of Low-CI Electricity to the production of PtL fuels, and the importance of PtL fuels to meeting both California’s 2045 carbon neutrality goal and California’s specific goals to displace fossil jet fuel with SAF, we respectfully recommend that CARB modify the proposed LCFS amendments such that PtL fuel production facilities are authorized to procure Low-CI Electricity for electrolytic hydrogen production and their other energy needs via Book-and-Claim Accounting.

Thank you for the opportunity to provide comments on this important topic.

Sincerely,

³ *Id.* at 21.



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Submitted via electronic submittal: https://ww2.arb.ca.gov/applications/public-comments?utm_medium=email&utm_source=govdelivery

August 27, 2024

The Honorable Liane Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Comments on Proposed Low Carbon Fuel Standard Amendments (15-Day Notice), released on August 12, 2024

Dear Chair Randolph:

Brightmark LLC (“Brightmark”) appreciates the opportunity to submit comments on the Proposed Low Carbon Fuel Standard Amendments (15-Day Notice) posted on August 12, 2024 (“Proposed LCFS Amendments”). We appreciate the California Air Resources Board (CARB) engaging with stakeholders regarding changes and updates to the Low Carbon Fuel Standard (LCFS) program.

California’s leadership in climate action through aggressive reduction targets and corresponding programs, like the LCFS, accomplishes actual pollution reduction and public health benefit outcomes by establishing market certainty to drive private investment. The State’s leadership and programs provide key solutions to the global climate challenge, however, more needs to be done.

Establishing and maintaining market certainty has been a hallmark of the LCFS program. While the most recent Proposed LCFS Amendments acknowledge the need to be more aggressive with the step-down target, the changes to avoided methane crediting undermine investment expectations and threaten to create more market uncertainty for certain low carbon fuel projects.

The Proposed LCFS Amendments introduction of new parameters for avoided methane crediting periods and lower-than-needed CI targets **erode confidence and increase investment uncertainty** in the LCFS program and **risk stranding existing assets** that have relied on the program.

California has a long history of supporting aggressive actions to address environmental challenges, like climate change. Governor Newsom has called for an even more aggressive approach to achieve climate neutrality. As CARB has stated, “[s]ignificant reductions in transportation emissions are needed to achieve state’s air quality and climate goals.”

The success and market certainty of the LCFS program should be based on increasing the demand for credits, not limiting fuels and credit generation. Increasing demand for credits will result in greater overall emission reductions and a more diverse and stable credit pool.

Brightmark Overview

Brightmark was founded in 2016 with the mission of solving some of the greatest environmental challenges facing the United States. One of these solutions is capturing methane emissions from organic waste and producing biogas and digestate through the natural process of anaerobic digestion. Agricultural activities contribute approximately 30% to total U.S. greenhouse gas (GHG) emissions, a significant portion attributable to methane emissions from animal waste.¹

Brightmark operates over 30 net-negative carbon intensity projects on dairy farms across the U.S., including in California. Through these projects, Brightmark derives RNG from biogas captured from organic waste streams, cleaned, and conditioned to achieve the quality standards necessary to blend with or substitute for geologic natural gas. We work with dairy farmers to harness the energy potential of their dairy manure, provide them with solutions to meet their greenhouse gas reduction goals and enhance farm profitability. We are committed to reimagining waste and building projects that benefit farms, their dairy, their communities, and the planet.

These facilities provide a win/win scenario for farmers and local communities; they help address methane emissions from organic waste produced locally and turn that waste into renewable energy and fertilizers. To date, our projects have offset over 1,100,000 metric tons of CO₂eq.

The LCFS program, and the certainty it provides to the market, is a key factor in the long-term success of projects like these in addressing environmental challenges. The CARB LCFS workshops throughout 2022 and 2023 highlighted the success of the LCFS, showing that the program is over-performing and helping California meet its reduction goals sooner than originally targeted.

Proposed LCFS Amendments

In the Proposed LCFS Amendments, a new concept was introduced to reduce the number of 10-year crediting periods from three to two related to avoided methane crediting. This is extremely problematic for projects that secured feedstock and financing agreements relying on an LCFS program that allowed for three 10-year crediting periods. Even more problematic, this change will impact projects originally granted pathways through the cap-and-trade program and not allow those projects enough time in the LCFS program, risking the viability of legacy projects. This sudden change at the 11th hour of rulemaking threatens future projects and risks stranding existing assets.

¹ U.S. Department of Agriculture Economic Research Service, citing the U.S. Environmental Protection Agency *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021*, April 2023 (EPA 2023).

To address the current uncertainty in market pricing, we support CARB using the three main levers: (1) Carbon Intensity (CI) targets, (2) CI step-down, and (3) Auto Acceleration Mechanism (AAM) in the Proposed LCFS Amendments. To maintain existing investments, encourage future investments to meet long-term climate goals, and provide a stable credit market, CARB should develop a mix of percentage decreases based on an outcome that stabilizes the credit bank. CARB should also maintain the current regulatory structure for avoided methane crediting and deliverability of low carbon fuels.

The credit bank is projected to reach 30-35 million credits through the end of 2024 reporting, with the bank projected to increase in size by up to 7-12 million credits in 2024 alone. Increases of credits in the bank in 2024 due to delayed rule implementation are causing downward price pressure needing immediate attention.

147.2

While we appreciate CARB adjusting the step-down target to 9% in the Proposed LCFS Amendments, a step-down target of 9%, coupled with a 2030 CI target of 30%, will not adequately address the credit bank oversupply. To account for the credit oversupply, Brightmark supports more aggressive CI targets and allowing the AAM to be triggered as early as possible.

The delays in the regulatory amendment process have prevented the implementation of the amendments in the first quarter of 2024. It is imperative that CARB implements a steep CI step-down to ensure that the bank returns to post 2023 levels (a reduction of approximately 23 million credits) by the end of 2025. This will help stabilize credit prices to maintain existing investments and increase future investment.

To address credit oversupply, research by ICF supports a reduction target of 40% by 2030, combined with a step-down of 10-12% in 2025, and an AAM triggered much earlier. Because of the delay in LCFS rule implementation, the credit bank increases through 2024 are not addressed in the CI targets and step-down proposals. As with California's Renewable Portfolio Standard program, the industry rises to the occasion with aggressive targets and the LCFS program's lack of aggressive targets is eroding confidence and increasing investment uncertainty.

Focusing on Solving the Problem

The goal of the LCFS is to reduce the carbon intensity of transportation fuels through greenhouse gas emission reductions. The LCFS is currently the only market with the economic incentive to develop carbon negative projects, including dairy biomethane. Due to the low energy density feedstock and higher required residence time, dairy digester projects result in higher costs per MMBtu produced.

147.1 cont

As was stated above, the success and market certainty of the LCFS program should be based on increasing the demand for credits, not limiting fuels and credit generation. Avoided methane crediting, at three 10-year crediting periods, should continue in the LCFS program until a

realistic and proven replacement policy is implemented. Significant investments have been made in existing and future projects based on the current rules and trust in the LCFS program that emission reductions from these projects would be valued for delivering positive outcomes.

147.3 Brightmark supports the continued alignment of RNG deliverability requirements with those of the federal Renewable Fuel Standard program. Biomethane projects that can theoretically deliver to California should be included, as the program currently operates. Current rules require that a project's CI score measure the additional carbon impact of traveling further in the CI calculation.

147.4 Brightmark also supports more efficient program operations and appreciates the inclusion of a full credit true-up, during the temporary pathway and annual true-up process, in the Proposed LCFS Amendments. However, we encourage changes to the "4-to-1" penalty for the case where a verified CI is higher than the certified CI. A more symmetric rule is needed for over and under performance, which can be impacted by a variety of external factors separate and apart from the facility itself. We recommend that, if the verified CI is higher than the certified CI, the project should simply repay CARB for any excess credits claimed, and not be subject to any further enforcement liability (unless there is malfeasance or other such cause). Projects should not be penalized unfairly and ensure that quarters while generating credits under the temporary pathway are exempt from the Verified CI Exceeded in Section 95486.1(g). In addition, more efficient program operations could benefit from allowing dairy RNG projects to account for actual lagoon cleanouts instead of imposing a required cleanout in the CI pathway calculations.

147.5

Market and Regulatory Certainty

The success of the LCFS to date shows the market's ability to deliver together in partnership with CARB. At its core, the LCFS is a market-based, fuel-agnostic regulation that does not pick winners and allows all fuels to compete.

Market and regulatory certainty are based on trust in California as a reliable place to sell low-carbon fuel and credits to meet and exceed climate goals. Markets with wide fluctuations between high and low prices are not sustainable. Sustained low price environments damage industries and erode confidence, and incite investment in other markets. For CARB to promote a long-term, stable environment that encourages investment in new, and maintain existing, CI-reducing projects more aggressive targets are needed. CI targets need to support credit prices to maintain a level for capital recovery of previous and future investments.

The ultimate goal of California and the market participants, like Brightmark, is decarbonization and eventual carbon neutrality of not only transportation, but all sectors of the economy. To reach this goal, California needs negative CI fuels for transportation and negative CI biogas for other uses (power, thermal, etc.). In-state and out-of-state RNG production are connected, the same developers that develop in-state projects develop out-of-state projects. The current RNG

production's success will lead to the development of additional RNG projects necessary to decarbonize the non-transportation sectors to achieve long-term goals.

Negative CI fuels require significant economic incentives and market certainty, which has eroded with current LCFS prices. Long-term depression of credit prices will lead to stranded assets and a lack of private investment in decarbonizing California's economy. CARB should send a strong signal by dramatically increasing the LCFS reduction targets and helping return certainty to the market.

We appreciate the opportunity to provide comments. Please do not hesitate to reach out with any questions.

Respectfully Submitted,



Bob Powell,
Founder & CEO



August 27, 2024

Chair Liane Randolph
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Via Electronic Submission

Re: Comments on the 2024 Proposed Amendments to the Low Carbon Fuel Standard

Dear Ms. Randolph and Members of the California Air Resources Board,

Heartwell Renewables appreciates the opportunity to provide comments on the California Air Resources Board's (CARB) proposed 15-Day Changes to the Proposed Amendments to the Low Carbon Fuel Standard (LCFS) Regulation (15-day package).

Heartwell Renewables is a unique joint venture between affiliates of The Love's Family of Companies and Cargill to produce and market renewable diesel (<https://heartwellrenewables.com/>). Heartwell's renewable diesel (RD) production facility is currently under construction in Hastings, Nebraska. Once operational in early 2026, the facility will produce an estimated 80 million gallons of RD per year. This facility is a significant investment for both companies, and the facility will be fully feedstock flexible although expects to primarily utilize low carbon intensity (CI) feedstocks.

Thank you in advance to the staff for consideration of the points raised below:

148.1

- **Heartwell does not support different treatment between RD production facilities.** CARB already incentivizes feedstocks based upon CI score. Additional penalties or restrictions, such as the proposed 20 percent cap on soy and canola feedstocks, will result in restricted commercial flexibility for no environmental benefit. Further, the Heartwell Renewables RD facility operations will begin in 2026. As the new facility comes online, under the proposed regulations Heartwell would be impacted by the 20 percent cap while other operational facilities would not be impacted until 2028. Heartwell Renewables foremost recommends no restrictions on feedstock flexibility and elimination of the proposed 20 percent cap. Second, any such restrictions should be applied equally and fairly across facilities; the proposed 20 percent cap should not be implemented sooner than 2028 for new facilities.

148.2

- **Heartwell does not support different treatment between renewable diesel and sustainable aviation fuel (SAF).** The 20 percent cap is proposed to apply only to biomass-based diesel. Yet both RD and SAF use the same feedstocks as inputs and the technologies are very similar. In fact, most SAF production results from facilities that also have the capability to produce RD. There is no basis to provide flexibility to SAF while limiting RD. Heavy-duty electrification will take decades, and the market will naturally adjust over time in response. Heartwell Renewables recommends parity in regulations between RD and SAF production.

Thank you for this opportunity to provide comments regarding these proposed amendments to the LCFS. Heartwell Renewables is a joint venture between two industry leaders in fuels and agriculture. We have a shared commitment to reducing GHG emissions in the transportation sector. We look forward to working with CARB staff and leadership on issues impacting the future of renewable diesel.

Thank you for your consideration,

Spencer Haines

Spencer Haines

Heartwell Renewables Board of Managers

Patrick Locken

Patrick Locken

Heartwell Renewables Board of Managers



August 27, 2024

The Honorable Steven S. Cliff, Ph.D.
Executive Officer
California Air Resources Board
1001 I Street
Sacramento, California 95814

The Honorable Liane M. Randolph
Chair
California Air Resources Board
1001 I Street
Sacramento, California 95814

RE: Proposed Low Carbon Fuel Standard Amendments

Dr. Cliff and Chair Randolph:

NATSO, Representing America's Travel Centers and Truckstops, and SIGMA: America's Leading Fuel Marketers (together, the "Associations") represent more than 80 percent of retail sales of motor fuel in the United States.¹ On behalf of the diverse and forward-thinking retail fuel industry, we are eager to work with the California Air Resources Board ("CARB" or the "Agency") to advance policies that lower transportation emissions in California.

When properly deployed, low carbon fuel standards incentivize consumer adoption of advanced renewable fuels. Over the past decade, California's Low Carbon Fuel Standard (the "LCFS" or the "Program") has created a system wherein the cost of compliance is directly tied to market participants' ability to innovate and offer low-carbon alternatives to petroleum fuels. The Program's market-oriented mechanisms have historically mitigated any resulting inflationary impacts by incentivizing our members to integrate low-carbon fuels into their fuel supply. In response to the LCFS, many of the Associations' members have modified their operations in California to offer low-carbon fuels such as renewable diesel and biodiesel to California consumers.²

Successful decarbonization policies align economic incentives with environmental objectives. The Proposed Amendments³ will create a misalignment between the market's economic incentives and CARB's environmental objectives. The Proposed Amendments advance environmentally incoherent outcomes while simultaneously threatening to raise fuel prices for consumers.

¹ NATSO currently represents approximately 5,000 travel plazas and truckstops nationwide, comprising both national chains and small, independent locations. SIGMA represents a diverse membership of approximately 260 independent chain retailers and marketers of motor fuel. The retail fuels and convenience industry provide 2.38 million jobs at approximately 120,000 retail establishments across the country.

² This has resulted in a reduction of more than 12.5 percent in the average carbon intensity of the transportation fuel pool from the 2010 baseline, exceeding the 2022 benchmark of 10 percent reduction. See "Low Carbon Fuel Standard 2023 Amendments", California Air Resources Board, available at https://ww2.arb.ca.gov/sites/default/files/2023-09/lcfs_sria_2023_0.pdf.

³ "Proposed Low Carbon Fuel Standard Amendments", California Air Resources Board, (August 12, 2024), available at https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_notice.pdf

As discussed in further detail below:

149.1

- There is no environmental rationale for imposing company-wide 20 percent caps on credits for biomass-based diesel produced from virgin soybean and canola oil (the “Proposed Cap”).⁴ The LCFS is designed to reward the most environmentally compelling feedstocks through a progressive reduction in carbon intensity (“CI”). The Proposed Amendments would abandon this approach, representing a dramatic departure from the direction indicated Agency staff has signaled throughout the workshop process. Indeed, CARB has worked extensively to develop robust feedstock sustainability provisions; the Proposed Amendments would undermine this progress by disallowing soy- and canola-based fuels, now subject to new, robust sustainability provisions, from contributing to lower transportation emissions in California.
 - A structure under which fuels are no longer assigned a CI score based on their actual environmental attributes is antithetical to the stated purpose of the LCFS and decidedly undermines the Program’s environmental integrity. The imposition of a cap on soy- and canola-based feedstocks would also severely hinder the ability of markets to comply with the ambitious CI reduction targets included in the Proposed Amendments.
 - The Proposed Cap will overly expose California’s transportation emissions to a small number of economically viable, low-carbon feedstocks, many of which are imported from overseas and thus exposed to protectionist policy changes now under consideration at the federal level.

149.2

- The proposed increase of the CI reduction targets to a nine percent reduction beginning in 2025 threatens to raise prices for consumers. Ambitious targets will inevitably increase the associated costs of compliance for fuel producers and distributors, and will ultimately be passed down to and borne by consumers in the form of higher fuel prices.
 - California lawmakers and regulatory agencies have repeatedly expressed concerns with, and sought to mitigate, escalating fuel costs throughout the State. This has often resulted in accusations of unfair or deceptive practices by businesses when, in reality, they generally reflect the costs of bringing fuel to market in a jurisdiction governed by an LCFS program. The Associations are supportive of aspirational, consumer-focused policies that result in increased consumption of low-carbon fuels. At the same time, policymakers must be clear-eyed about the impact that regulations may have on costs and prices. CARB should facilitate compliance with CI reduction targets in a market-oriented manner that balances its regulatory objectives with the resulting inflationary consequences for consumers at the pump.

⁴ The “Proposed Cap” in this comment letter is used to refer to the proposed amendment to assess biomass-based diesel from virgin soybean (“soy”) and canola oil in excess of 20 percent the carbon intensity of the applicable diesel pool benchmark for that year.

- 149.3 • The Proposed Amendments would perpetuate an environmentally indefensible preference for alternative jet fuel compared with renewable diesel and biodiesel. By prompting biofuel feedstocks to migrate from over-the-road use cases to aviation use cases, both consumer costs and overall emissions will increase because fewer gallons of biofuel will displace fewer gallons of petroleum-based fuel. (Lost gallons of biodiesel and renewable diesel will be replaced by gallons of petroleum diesel.)
- 149.4 • The Proposed Amendments to restrict the use of the book-and-claim process for renewable electricity credits (“RECs”) used for hydrogen production, and the proposed restrictions on hydrogen produced using fossil natural gas and carbon capture and sequestration each present several challenges that threaten to surrender the decarbonization potential of a burgeoning hydrogen industry.
- 149.5
- 149.6 • The Proposed Amendments to permit electric vehicle (“EV”) charging stations that are not publicly accessible to generate credits will undermine the incentive for private companies to continue investing in EV charging stations and ultimately compel consumers and taxpayers to subsidize private companies’ refueling costs.

Fuel retailers support the development of heavy-duty electric and hydrogen-powered vehicle technologies and the associated refueling network. Indeed, the Associations’ members have received more federal EV charging grant dollars than any other sector. Fuel retailers have ample experience responding to carbon intensity accounting price signals and leveraging government incentives to lower the price commercial fleets pay for fuel, while simultaneously displacing petroleum-based fuels with more environmentally attractive alternatives. It is irresponsible to rely exclusively on a prodigious pace of electrification to decarbonize the over-the-road transportation sector.⁵ Transitioning to battery electric trucks requires expensive grid upgrades with uncertain time horizons.

CARB seems to presume that the market will promptly overcome these unambiguous impediments and, building on this incorrect assumption, is comfortable sacrificing existing environmentally and economically compelling diesel substitutes. Instead of depending on one technology to act as a silver bullet, however, over-the-road transportation should continue maximizing its use of low-carbon technologies that can deliver substantial emissions and cost savings in the heavy-duty sector *today*. This should in no way compromise the market’s ability to gravitate toward electrified and hydrogen-powered vehicles as they become more commercially viable at scale.

The LCFS is an instrumental tool to achieving the Agency’s near- to medium-term decarbonization goals. We are eager to work with you to achieve what we consider to be mutually compatible objectives.

⁵ A recent analysis of grid upgrades necessary for heavy-duty electrification found that a single highway fast-charging site will require the same amount of electricity as a sports stadium or a small town. See Gideon Katsh, et al., CALSTART et al., “Electric Highways: Accelerating and Optimizing Fast-Charging Deployment for Carbon-Free Transportation” (November 11, 2022) available at <https://calstart.org/electric-highways-study/>.

There is no environmental rationale for the Proposed Cap.

In response to existing tax policies,⁶ the California LCFS, and other incentive programs,⁷ fuel retailers have invested billions of dollars in the physical and intellectual capital necessary to realign their operations to offer lower-carbon alternatives to consumers. We have supported these efforts. As a result, advanced biofuels now constitute more than half of the diesel supply in California.⁸ This outcome, as CARB has frequently touted, has dramatically reduced carbon emissions in the heavy-duty transportation sector.⁹ In 2020, biodiesel and renewable diesel eliminated 15 million metric tons of carbon dioxide in California alone, the equivalent of taking more than 3 million passenger cars off the roads.¹⁰

CARB has proposed to limit LCFS credits for biomass-based diesel produced from virgin soybean oil and canola oil to 20 percent of annual biomass-based diesel reported on a company-wide basis. The current biomass-based diesel fuel pool in California represents approximately 65-70 percent of the diesel fuel consumed (with the balance being petroleum-based). Within the biofuel pool, approximately 20 percent is tied to virgin soy feedstocks.¹¹ CARB's thinking appears to be that by establishing a 20 percent cap, petroleum diesel will nevertheless be replaced with biomass-based diesel in the coming years, just with minimal growth of virgin feedstocks and more growth of new, waste-based feedstocks, all without risking retail price increases.

This line of thinking is flawed and will result in economically and environmentally suboptimal outcomes. By restricting credit generation for these low-carbon alternatives, CARB risks undermining the growth of the clean diesel market; limiting biodiesel and renewable diesel in favor of technologies that will not be fully scalable for many years threatens both environmental progress and innovation. Soy- and canola-based renewable diesel gallons will in all likelihood be displaced with petroleum or other higher CI feedstock gallons, rather than new advanced biofuels

⁶ Generally, since 2004, Section 40A of the Internal Revenue Code has provided a credit of a fixed dollar amount per gallon of biodiesel and renewable diesel used, sold, or mixed in a trade or business. Initially, that credit was \$0.50 per gallon, and was increased to \$1.00 per gallon beginning in 2009 (Pub. L. 110-343). Most recently, those provisions were extended by Public Law 117-169 and are currently effective through December 31, 2024. This \$1.00 per gallon blenders' credit for biodiesel and renewable diesel, in concert with the LCFS, has resulted in lower prices and fewer carbon emissions associated with transportation energy. It has also promoted America's energy security.

⁷ See the Renewable Fuel Standard at 42 U.S.C. 7545(o).

⁸ California Air Resources Board, "For First Time 50% of California Diesel Fuel Is Replaced by Clean Fuels | California Air Resources Board," [ww2.arb.ca.gov](https://ww2.arb.ca.gov/news/first-time-50-california-diesel-fuel-replaced-clean-fuels), August 23, 2023, <https://ww2.arb.ca.gov/news/first-time-50-california-diesel-fuel-replaced-clean-fuels>.

⁹ *Id.* "The use of cleaner fuels offers an essential tool to reduce pollution now," said California Air Resources Board Executive Officer, Dr. Steven Cliff. "A 50% reduction in diesel means cleaner air, healthier communities and a commitment to reaching carbon neutrality in California by 2045."

¹⁰ California Energy Commission, "Renewable Diesel Production," January 2022, <https://www.energy.ca.gov/sites/default/files/2022-01/CEC-600-2022-034.pdf>.

¹¹ See "LCFS Data Dashboard", California Air Resources Board, *available at* <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>

or other “zero emission” fuel technologies that may be optimal but, at the present time, remain aspirational.

The LCFS is designed to reward market participants that pursue low-carbon alternatives. Renewable fuel feedstocks, whether they be soy, canola, or used cooking oil (“UCO”), all carry varying environmental attributes. This is precisely why the LCFS assigns carbon intensity scores to gallons of fuel. Under this scheme, fuels using lower-carbon feedstocks are incentivized more because they generate higher credit values. Incentives for soy-based renewable diesel are already lower than incentives for other biofuels based on the environmental attributes of the respective fuels. The market is incentivized to foster a diverse and forward-thinking approach to biofuel development, driving advancement across various technologies and more effectively contributing to California’s clean energy goals.

If the LCFS begins to incentivize only the first 20 percent of companies’ soy- or canola-based biomass-based diesel blends, and then “flips a switch” and the next 80 percent of such blends receive the same CI score as petroleum-based diesel fuel, the LCFS ceases to be grounded in sound science. If one fuel is cleaner than another fuel, it should be incentivized to a degree commensurate with its environmental attributes.

Rather than imposing the Proposed Cap on certain feedstocks, CARB should instead continue pursuing more rigorous sustainability requirements to further lower the CI of fuels that utilize those feedstocks. The Proposed Amendments found in section 95488.9(g) that impose sustainable farming requirements, for example, are generally well-designed. At the same time, however, technology-specific caps dampen demand for the renewable fuel that these agricultural commodities produce. In this respect, the caps make it less likely that farmers will actually implement the sustainable practices found in 95488.9(g) since the return on investment will be artificially limited.

The Proposed Cap is also remarkably short-sighted given the increasing likelihood that the federal government will erect barriers to UCO imports that currently comprise a large share of California’s renewable diesel pool. Domestic agricultural interests are in the middle of an aggressive campaign to convince policymakers to limit the current flow of UCO imports from China into California.¹² A bipartisan coalition of U.S. senators recently encouraged the Biden Administration to limit the “Clean Fuel Production Tax Credit” – enacted as part of the Inflation Reduction Act and scheduled to take effect in 2025 – to fuels produced from domestic feedstocks.¹³ In the not unlikely event that the credit is implemented with that limitation, UCO imports would immediately begin to dry up. If this occurs against the backdrop of a 20 percent cap on soy- and canola-based feedstocks, there may not be enough compliant fuels to satisfy the Program’s obligations.

¹² See Letter from various agricultural groups including the American Farm Bureau Federation, American Soybean Association, National Corn Growers Association, and National Farmers Union strongly in favor of the imposition of domestic feedstock requirements; available at <https://www.fb.org/files/backgrounder/07.17.24-SAF-Coalition-Letter.pdf>

¹³ See Letter from U.S. senators urging the limitation of imported feedstocks; available at https://www.brown.senate.gov/imo/media/doc/45z_foreign_feedstocks_letter_final_7312024.pdf

The Proposed Cap also introduces unnecessary new compliance challenges by setting different timelines for different companies. Those with existing certified pathways prior to the adoption of the amendment have until January 1, 2028, to adjust their feedstock contracts, while other companies must comply immediately. This disequilibrium creates winners and losers for no environmental or economical reason. Companies in the future will be hesitant to put capital at risk on long-term projects or other clean fuel commitments due to the potential for regulatory changes to “pull the rug out from under them.” This uncertainty will inevitably undermine confidence in biofuel markets and impede progress toward clean energy incentives.

All of these phenomena result in higher retail fuel prices.

Finally, the Proposed Cap is a violation of the California Administrative Procedures Act (the “APA”). The principle of fair notice is a fundamental underpinning of the California APA, and serves to ensure that regulated industries are able to engage meaningfully in the rulemaking process. Indeed, the APA requires a 45-day notice for any “substantial” changes to a proposal that are not “sufficiently related” to the original text.¹⁴ The addition of the Proposed Cap is both a substantial change and one that diverges significantly from the initial proposal. Limiting stakeholders to a 15-day comment period undermines the fair notice requirement and thus impedes the ability of the public to evaluate, and respond to, the Proposed Amendments.

II. The proposed increase of the CI reduction targets to a nine percent reduction beginning in 2025 threatens to raise prices for consumers.

149.2 cont

The ambitious CI reduction targets proposed by the Agency will compel fuel retailers to either blend greater quantities of low-carbon alternatives or purchase additional credits.¹⁵ The retail fuels market is the most transparent, competitive commodities market in the United States. In as competitive and transparent a market as retail fuel, increased compliance costs are passed on to consumers in the form of higher prices.

Policymakers and regulators in California have consistently raised concerns about, and sought to mitigate, high fuel prices across the State.¹⁶ These concerns are incongruous with the

¹⁴ See Cal. Gov. Code § 11346.8(c) (“No state agency may adopt, amend, or repeal a regulation which has been changed from that which was originally made available to the public pursuant to Section 11346.5, unless the change is (1) nonsubstantial or solely grammatical in nature, or (2) sufficiently related to the original text that the public was adequately placed on notice that the change could result from the originally proposed regulatory action.”).

¹⁵ Many of the technologies necessary to meet the Proposed Amendments’ new stringent CI targets – such as next generation biofuels, carbon capture and storage, and advanced engine technologies – are not close to available at scale. CARB’s desired pace of escalation will outpace the development and deployment of these technologies.

¹⁶ See Steven Greenhut, “Newsom’s ‘Price Gouging’ Shtick Running out of Gas,” Orange County Register (Orange County Register, August 23, 2024), <https://www.ocregister.com/2024/08/23/newsoms-price-gouging-shtick-running-out-of-gas/>; see also Lynn La, “When Will There Be Relief on California Gas Prices?,” CalMatters, May 8, 2024, sec. WhatMatters, <https://calmatters.org/newsletter/california-gas-prices-relief/>; see also Omar Mohammed, “Gavin Newsom Gets Warning about Gas Prices,” Newsweek (Newsweek, January 4, 2024), <https://www.newsweek.com/gavin-newsom-chevron-california-lower-future-investment-1857844>; see also Kenneth Schrupp, “Newsom Blames Oil Companies for Gas Prices, but His Own Energy Czar Disagrees,” The Center Square,

Proposed Amendments, which would impose upward pressure on fuel prices in California. The Associations would support a more comprehensive policy strategy that aligns regulatory objectives with the State’s purported commitment to keeping fuel costs low. The Associations support policies that encourage the adoption of renewable, low-carbon fuels, and have invested heavily in marketing those fuels to Californian consumers. Policymakers – including but not limited to CARB – should be cognizant of the impact that the Proposed Amendments may have on fuel prices.

III. **The Proposed Amendments would perpetuate an environmentally indefensible preference for alternative jet fuel compared with renewable diesel and biodiesel.**

Biofuel producers today convert used cooking oil, animal fats, vegetable oils, and other “feedstocks” into advanced renewable fuels. The technology and feedstocks that can be used to produce alternative jet fuel today are generally the same as those currently used to produce over-the-road fuels.¹⁷ Because there is a limited supply of feedstocks – exacerbated by the ongoing War in Ukraine and global supply chain issues – many producers face trade-offs about which kinds of fuels to produce.

If the Proposed Amendments are finalized, it would exacerbate LCFS policies that treat alternative jet fuel preferentially relative to renewable diesel and biodiesel. First, the proposed virgin oil feedstock cap excludes alternative jet fuel. This will divert feedstocks away from renewable diesel and biodiesel (which are capped) toward alternative jet fuel (which is not). Second, the Proposed Amendments would continue exempting fossil jet fuel from standards to which fossil diesel fuel is subject. This is curious because CARB is ostensibly seeking to increase alternative jet fuel consumption, and the best way to do that is to increase the price of the fuel it is intended to displace (*i.e.*, fossil jet). It’s also worth noting that the aviation industry urged CARB to continue exempting fossil jet fuel *at the same time* that it was touting its efforts to decarbonize aviation fuel.¹⁸

a. Feedstock is finite.

The Environmental Protection Agency has repeatedly acknowledged that finite feedstock availability is “likely to cause any growth in renewable jet fuel to come at the expense of biodiesel

August 12, 2024, https://www.thecentersquare.com/california/article_e9d2fd3e-58f9-11ef-8712-4b83ae63798f.html; see also The Editorial Board, “Who’s to Blame for High Gas Prices?,” Orange County Register (Orange County Register, March 14, 2024), <https://www.ocregister.com/2024/03/14/state-policies-drive-higher-gas-prices/>; see also Wes Venteicher, “California’s Oil Czar on What’s Plaguing Gasoline Prices,” E&E News by POLITICO, April 15, 2024, <https://www.eenews.net/articles/californias-oil-czar-on-whats-plaguing-gasoline-prices/>.

¹⁷ See Environmental Protection Agency, “Renewable Fuel Standard Program: Standards for 2023-2025 and Other Changes”, 87 FR 80582 (December 30, 2022) P. 80596 (“For example, the same refinery process that produces renewable diesel from waste fats, oils, and greases or plant oils also produces hydrocarbons in the distillation range of jet fuel that can be separated and sold as alternative jet fuel instead of being sold as renewable diesel.”)

¹⁸ See Anne C Mulkern, “Facing Legal Threat, Calif. Grounds Plan to Cut Airline Emissions,” E&E News by POLITICO, August 15, 2024, <https://www.eenews.net/articles/facing-legal-threat-calif-grounds-plan-to-cut-airline-emissions/#:~:text=grounds%20plan%20to%20cut%20airline%20emissions>. (Airlines for America, a trade group for commercial carriers, praised the decision and said the proposal “would have led to higher jet fuel prices.”)

and renewable diesel.”¹⁹ Feedstock migration from biodiesel and renewable diesel to alternative jet fuel on account of disparate LCFS treatment will cause overall carbon emissions to increase. This is because the alternative jet fuel production process is significantly less efficient than the biodiesel/renewable diesel production process.²⁰ For every unit of feedstock used to produce clean fuel, fewer gallons of alternative jet fuel can be produced relative to gallons of biodiesel/renewable diesel. That creates fewer petroleum gallons displaced and greater aggregate emissions.

Preferential treatment for alternative jet fuel will push the market away from the existing, efficient use of biodiesel and renewable diesel in trucks toward a costlier, less efficient, less environmentally compelling use of alternative jet fuel in planes. It will also crowd out the renewable diesel supply for the rail and shipping industries, which emit comparable emissions to aviation and are also difficult to electrify.²¹ Heavy-duty trucking, shipping, and rail (diesel-operated engines) collectively comprise approximately 30 percent of transportation emissions. Air travel is responsible for only 8 percent of transportation emissions, and only 2 percent of emissions overall.²²

b. *Alternative jet fuel is more expensive, less efficient, and less environmentally compelling than renewable diesel and biodiesel.*

The LCFS is designed to reduce the CI of California’s transportation fuel pool. The climate is agnostic as to whether emissions come from a truck engine or a jet turbine. Indeed, flexibility with respect to how deficits are satisfied is a fundamental underpinning of the LCFS and is precisely how the Program functions today. Regulated parties either elect to lower their emissions or must purchase credits. The aviation industry should not be exempt from contributing to emissions reductions in California.²³

¹⁹ See Supra n.17 at P. 80596 (“[G]iven the limitations on the available feedstocks for renewable diesel and alternative jet fuel production we generally agree that future increases in alternative jet fuel production ... will likely result in less renewable diesel production than we would expect in the absence of increased alternative jet fuel production.”)

²⁰ Alternative jet fuel requires more processing than renewable diesel due to the lower freezing point; this requires greater hydrogen input for jet fuel compared to renewable diesel, which in turn requires more natural gas usage. See LMC International, *Comparative Economic Analysis of Renewable Jet Fuel and Renewable Diesel* (Sept. 2021).

²¹ Trade groups representing the trucking and rail industries have repeatedly raised concerns about how this artificial market disparity will impact renewable diesel supply and availability. See Letter from American Trucking Associations, Association of American Railroads, National Association of Convenience Stores, National Motor Freight Traffic Association, National Tank Truck Carriers, etc. (September 13, 2023) available at <https://www.natso.com/resources/resources/view/document/948>.

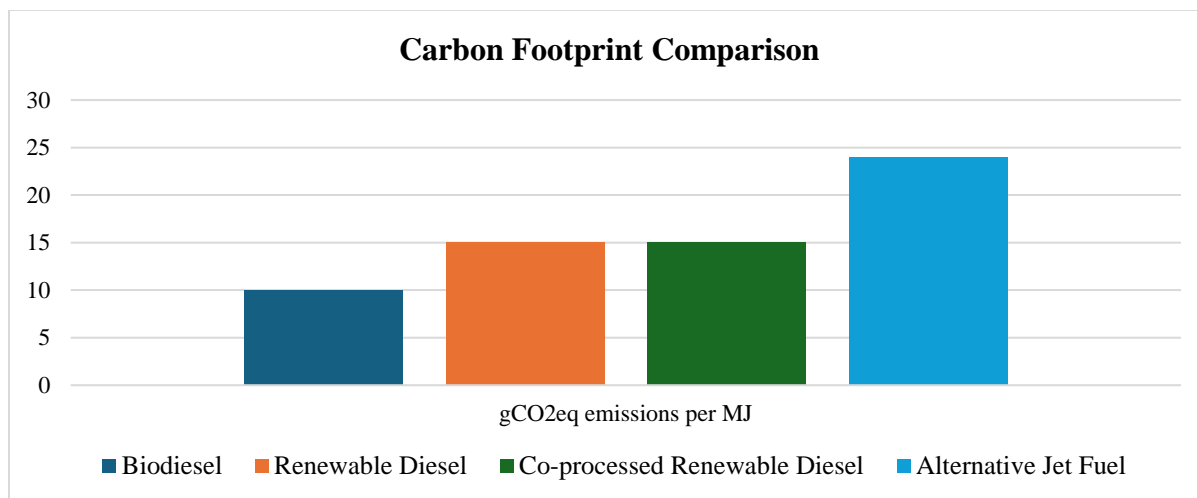
²² See United States Environmental Protection Agency, “Fast Facts on Transportation Greenhouse Gas Emissions,” <https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions>.

²³ Airline representatives are eager to tout their “commitment” to decarbonization, and always vigorously support taxpayer- or consumer-funded incentives, yet they consistently oppose any *obligation* to use lower CI fuels. Upward pressure on diesel prices for consumers as a result of the LCFS has yet to deter CARB from regulating the over-the-road fuels sector. Cost increases to consumers for air travel, which tend to disproportionately impact higher-income Californians, should not be evaluated differently. See <https://www.eenews.net/articles/facing-legal-threat-calif-grounds-plan-to-cut-airline-emissions/>.

The aviation industry can meaningfully contribute to transportation decarbonization in California – and help jumpstart the alternative jet fuel industry – by being obligated to purchase credits for over-the-road fuels and thereby displace petroleum-based fuel with renewable fuel across the State. Proliferation of a robust renewable fuel industry that maximizes its emissions impact will only serve to benefit alternative jet fuel production in the long run as trucking is electrified and existing production capacity can be converted for jet fuel purposes. The International Council on Clean Transportation has similarly argued that “in the longer term, as liquid fuel demand in road evaporates, existing biorefineries can adjust their processes to supply mostly or entirely jet fuel.”²⁴

The cost of saving one kilogram of carbon dioxide (“CO₂”) is higher for alternative jet fuel than it is for renewable diesel. Every gallon of alternative jet fuel delivers lower CO₂ savings than every gallon of renewable diesel; the displacement of one megajoule (“MJ”) of fossil *jet fuel* avoids less CO₂ than the displacement of one MJ of fossil *diesel*. A European study comparing four pathways for used cooking oil (“UCO”), a common feedstock used to produce several types of renewable fuel, found that UCO is “best deployed as biodiesel and renewable diesel in road transport.”²⁵

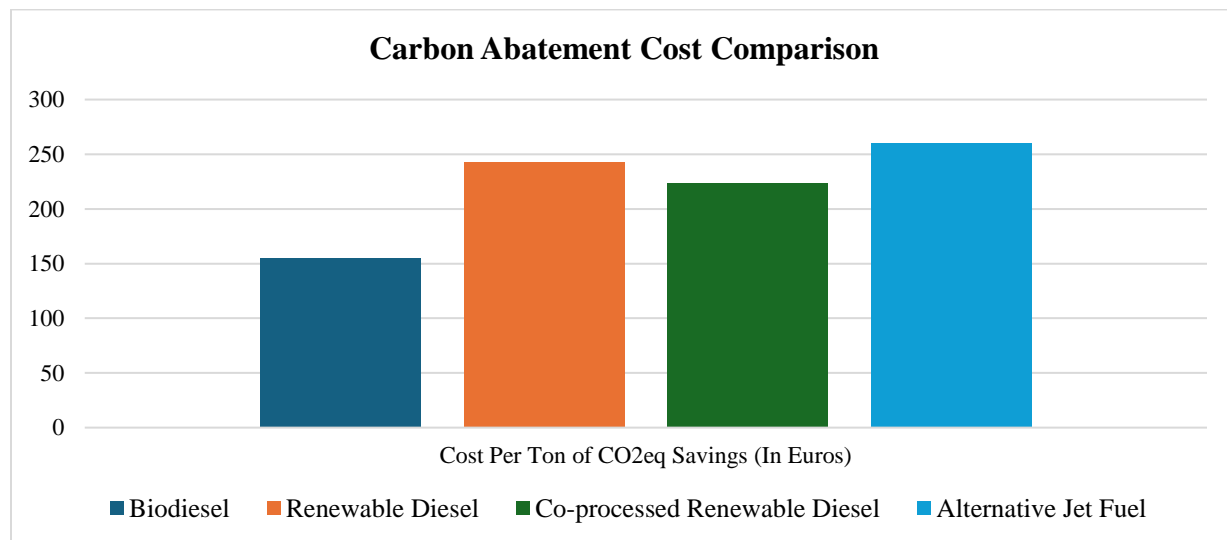
The study determined that, of all the end-uses, biodiesel has the lowest production costs, the highest feedstock efficiency, the highest emission reduction performance and, consequently, the lowest carbon abatement costs. From the perspective of overall climate mitigation, the use of UCO feedstocks for alternative jet fuel production achieves less emission reduction at higher abatement costs, compared to using UCO for road transport fuels.



²⁴ *Infra* n.31. The fuel retail industry has spent the last two decades aligning and optimizing the disparate logistical and transportation systems associated with petroleum fuel and biofuel products. Should alternative jet fuel become more commercially widespread, there will be few supply chain challenges. Unlike in over-the-road transport, alternative jet fuel consumption will be concentrated at a relatively low number of airports compared to the refueling network for heavy-duty trucking.

²⁵ Carlo Hamelinck et al., “Conversion Efficiencies of Fuel Pathways for Used Cooking Oil Study Commissioned by EWABA and MVaK Final Report,” 2021, https://www.studiogearup.com/wp-content/uploads/2021/03/2021_sGU_EWABA-and-MVaK_Options-for-the-deployment-of-UCO.pdf.

Biodiesel achieves 10 gCO₂eq/MJ, which implies about 90 percent emission reduction compared to the lifecycle emissions from petroleum-based diesel. Renewable diesel and co-processed renewable diesel have a slightly higher emission at 15 g/MJ. The carbon footprint of alternative jet fuel is higher, at 24 g/MJ. This means that alternative jet fuel achieves lower emissions reductions than the other pathways.²⁶ Expressed per ton of feedstock, biodiesel and renewable diesel achieve the highest carbon savings because it has the highest feedstock efficiency, combined with low supply chain emissions.²⁷



When the fuel production costs are combined with the carbon savings per unit of feedstock, alternative jet fuel has the highest carbon abatement costs of the four pathways.²⁸ The study concluded that mitigation of the climate impact of the aviation sector may be better achieved with other pathways that draw on novel and scalable feedstocks. Importantly, the study noted that “any use of a limited feedstock such as UCO, just moves this UCO from one sector to another while decreasing the effective contribution to decarbonization of this feedstock.”²⁹

A report issued by the International Council on Clean Transportation similarly concluded that “policies that promote the use of low-carbon fuel regardless of end-use sector will be most effective at developing the advanced fuel industry” and that “in the medium term, advanced fuel industry growth will be maximized if fuel is supplied mainly to the road sector.”³⁰

²⁶ *Id.*

²⁷ *Id.*

²⁸ *Id.*

²⁹ *Id.*

³⁰ Stephanie Searle et al., “Long-Term Aviation Fuel Decarbonization: Progress, Roadblocks, and Policy Opportunities,” International Council on Clean Transportation, January 15, 2019, <https://theicct.org/publication/long-term-aviation-fuel-decarbonization-progress-roadblocks-and-policy-opportunities/>.

Alternative jet fuel displacing over-the-road biofuel consumption is not only more expensive and environmentally deleterious in the aggregate, but it would harm communities disproportionately impacted by climate change. Over-the-road advanced renewable fuels in lower emissions of nitrogen oxide (“NOx”) compared with fossil diesel fuel; feedstock migration from over-the-road biofuels to alternative jet fuel would thus increase ground-level emissions in vulnerable communities that experience heavy truck traffic. Alternative jet fuel, unlike renewable diesel, does not have the salutary benefit of reducing NOx emissions to improve air quality.³¹

CARB should not surrender the market’s ability to deliver dramatic near-term emissions savings by imposing a top-down, hurried transition to one technology through the LCFS. CARB should harness the near-term decarbonization potential of low-carbon options such as biodiesel and renewable diesel, *in addition to* incentivizing more aspirational longer-term technologies such as electrification. Over time, as the heavy-duty fleet gravitates toward electrification, it may eventually become prudent to institute an increased focus on alternative jet fuel production.

Policy should not encourage capital investments to flow toward more expensive, less environmentally attractive fuel technologies when a more efficient, more environmentally compelling alternative is available. CARB should affirmatively seek to limit the extent to which alternative jet fuel crowds out over-the-road biofuels in the coming years.³²

149.4 cont

IV. The Proposed Amendments to restrict the use of the book-and-claim process for RECs used for hydrogen production, and the proposed restrictions on hydrogen produced using fossil natural gas and carbon capture and sequestration each present several challenges that threaten to surrender the decarbonization potential of a burgeoning hydrogen industry.

Many of the Associations’ members – particularly those with highway locations that service heavy-duty commercial trucks – are actively expanding their hydrogen capabilities in response to market- and federal policy signals. They have developed new commercial relationships with companies in the hydrogen value chain, actively participate in multiple “hydrogen hub” projects – including the ARCHES project in California – and are actively exploring hydrogen grant and loan guarantee opportunities.

Unlike light-duty electric vehicle purchases, which can be motivated by non-financial interests, commercial decisions to invest in heavy-duty vehicles will be grounded in economics. Commercial businesses will not buy heavy-duty electric or hydrogen vehicles at scale unless the total cost of operation is less than the cost of diesel-powered trucks. Minimizing fuel costs should

³¹ See LMC International, *Comparative Economic Analysis of Renewable Jet Fuel and Renewable Diesel* (Sep. 2021).

³² Climate research has consistently emphasized the importance of near-term emissions reductions relative to future reductions. More efficient diesel engines coupled with low-carbon, biomass-based diesel can reduce emissions immediately. See G. Cornelis van Kooten, Patrick Withey, and Craig M.T. Johnston, Biomass and Bioenergy 151 “Climate Urgency and the Timing of Carbon Fluxes,” (August 2021) available at <https://doi.org/10.1016/j.biombioe.2021.106162>. (“The current climate emergency dictates that **immediate action is required to mitigate climate change**, which implies that carbon fluxes occurring **20 or more years from now are too late to have any mitigative effect**”) (emphasis added).

therefore be an essential element of any policy intended to decarbonize heavy-duty trucking, including via hydrogen as a transportation fuel.

Hydrogen-powered trucks would leverage *existing* refueling infrastructure and a supply chain familiar to the industry – centralized production, transportation to market and retail fuel sales through a network of well-functioning and convenient refueling locations. As transportation energy retailers and distributors, our membership will rely upon hydrogen producers to provide an economical supply of clean hydrogen in the years ahead.

The LCFS should maximize the market’s ability to realize these objectives. Any additional requirements or restrictions should be pursued only if they do not effectively preclude the industry from developing. We have serious concerns that CARB’s proposal would do just that.

Under the Proposed Amendments, CARB has removed the book-and-claim provision that was previously contained in the 45-day package for “process energy”. Eliminating this provision will have a significant impact on the CI score of liquefied hydrogen, effectively raising its cost. CARB should advance LCFS policies that *improve* the economic viability of low-carbon hydrogen, rather than make it more challenging.

The proposed change will result in an environmentally incoherent outcome. RECs are a market-oriented mechanism that enable producers (including hydrogen producers) to compete over clean electricity to power their production processes. Carbon intensity accounting as an enabler for market signals is a necessary component of the hydrogen value chain. Hydrogen production and lower-cost clean hydrogen should be incentivized and available at retail. Upstream investments in clean electricity generation to power the hydrogen production processes should also be encouraged. RECs facilitate these positive outcomes. If RECs are exceedingly expensive or impossible to obtain, they cannot serve this purpose. This would undermine the LCFS’s objectives.

The Proposed Amendments would also exclude hydrogen produced using fossil fuel gas and carbon sequestration from LCFS credit eligibility beginning on January 1, 2031. Hydrogen produced from a fossil fuel process (“SMR”) that utilizes scientifically proven carbon capture and sequestration (“CCS”) technology, represents a cost-effective and growing base of low-carbon hydrogen supply. Eliminating this supply source also reduces head-to-head competition for other low-carbon (*i.e.*, green) hydrogen producers. Absent competition from low-carbon hydrogen CCS sources, green hydrogen producers can charge an unjustifiable premium for their low carbon hydrogen product. By contrast, including low-carbon CCS sources in the LCFS enables more head-to-head competition for low-carbon hydrogen supply and places downward pressure on hydrogen prices. Removing this source could lead to a significant reduction in available hydrogen, as renewable hydrogen production capacities are still developing and are not yet able to meet current demand.

As renewable generation comes online and transmission capacity increases, it may be appropriate to consider restricting hydrogen feedstocks to mitigate avoidable ancillary emissions; until then, however, any such restrictions will simply impede the growth of the nascent hydrogen industry. CARB should thus incorporate the book-and-claim system for hydrogen production under the LCFS, as it facilitates vital market growth. Similarly, the exclusion of fossil natural gas-

based hydrogen production with CCS from LCFS credits unduly limits the supply of low-carbon hydrogen. This policy not only restricts competition among low-carbon hydrogen sources, but ultimately raises prices for consumers, thereby impeding broader adoption and undermining efforts to achieve a diversified and economically viable hydrogen market.

Any near-term, ancillary, electricity-related emissions would be more than offset by the emission reduction opportunities associated with maintaining hydrogen as a viable means to decarbonize transport.

V. The Proposed Amendments to permit EV charging stations that are not publicly accessible to generate credits will undermine the incentive for private companies to continue investing in EV charging stations and ultimately compel consumers and taxpayers to subsidize private companies' refueling costs.

149.6 cont

CARB should only permit charging stations that are publicly available to generate LCFS credits. By opening up credit generation to other EV charging sites that are only available to a limited universe of companies (*e.g.*, a single company's fleet), it will prompt finite EV charging investment dollars to migrate away from publicly accessible offerings toward more limited offerings. This will only further prolong CARB's efforts to help consumers overcome EV charging range anxiety.

The greatest limitation on light-duty vehicle electrification lies not in the price of the vehicle but rather in the so-called "range anxiety" that consumers feel about the readily available public charging.³³ If CARB is going to impose such stringent CI-reduction schedules on fuel, it should be more hyper-focused on incentivizing behavior to address the challenge of range-anxiety. Instead, the Proposed Amendments would redirect finite private capital toward behind-the-gate, non-publicly accessible EV charging stations that a limited universe of vehicles could utilize, rather than encouraging investment in publicly accessible charging stations that would be available to all current and prospective EV owners.

The extent to which EV penetration is outpacing public charging station deployment is changing the landscape of the light-duty EV market. A recent national, representative survey by Consumer Reports and the University of Chicago found that 61 percent of Americans point to "not enough public charging stations" as the primary issue preventing them from buying or leasing an EV.³⁴ The same survey found that 45 percent of Americans say that easy access to public fast-charging stations would be the most likely variable to affirmatively *encourage* them to buy or lease an EV. A mere 21 percent of respondents pointed to "similar purchase price to gasoline-powered vehicles" as a primary motivator.³⁵ This trend threatens the development and durability of transportation electrification. A 2021 study from the University of California at Davis Institute for

³³ "Fact from Fiction: Why Consumers Don't Buy EVs," Blink Charging, April 8, 2020, <https://blinkcharging.com/fact-from-fiction-the-real-reason-why-consumers-dont-buy-electric-vehicles/?locale=en>.

³⁴ Consumer Reports, "Battery Electric Vehicles and Low Carbon Fuel: Overview of Methodology," April 2022, https://article.images.consumerreports.org/prod/content/dam/surveys/Consumer_Reports_BEV%20AND%20LCF%20SURVEY_18_FEBRUARY_2022.

³⁵ *Id.*

Transportation Studies found that almost 20 percent of EV owners in California switched back to a gas vehicle because of the difficulty of consistently charging a vehicle.³⁶

The availability of EV charging stations at existing locations motorists utilize today is the most effective way to solve range anxiety. Consumers freely drive their gas- and diesel-powered vehicles to every part of the country without concerns about whether they will be able to refuel safely and reliably whenever necessary. Offering EV charging at fuel retailing locations would mean drivers do not need to change their habits—they can refuel on the go at the same convenient locations they do today. The availability of EV charging on large price signs at fuel retailers' locations in communities and along California's highways will effectively relieve EV range anxiety. If EV charging is not available *and reliable* in the neighborhoods consumers want to visit, as well as along Interstate locations, many Americans simply will not purchase an EV, no matter the price.

At the moment, there are several impediments that make it challenging for private businesses to identify a pathway to profitability with respect to EV charging. Most of these impediments involve an electricity market that was not designed for, and is in many ways incompatible with, the retail fuel market.

Robust LCFS credit availability for publicly accessible charging station owners and operators would make installing EV charging stations more attractive for existing fuel retailers. To the extent that allowing private charging stations to generate credits undermines the attractiveness of credits available for public charging owners, it will be counterproductive to CARB's long-term transportation electrification efforts.

VI. Conclusion

Thank you for considering our perspective on these important topics. We would welcome the opportunity to further discuss these issues with you at any time.

Sincerely,

NATSO, Representing America's Travel Plazas and Truckstops
SIGMA: America's Leading Fuel Marketers

³⁶ Scott Hardman and Gil Tal, "Understanding Discontinuance among California's Electric Vehicle Owners," *Nature Energy*, April 26, 2021, <https://doi.org/10.1038/s41560-021-00814-9>.



**ELECTRIC VEHICLE
CHARGING ASSOCIATION**



August 27, 2024

Honorable Chair Liane Randolph and Honorable Board Members California Air Resources Board

1001 I Street
P.O. Box 2815
Sacramento, CA 95812

Re: SUPPORT Proposed 15-day Change Amendments to the Low Carbon Fuel Standard Regulation

Submitted to <https://ww2.arb.ca.gov/applications/public-comments>

Dear Chair Randolph and Honorable Board Members:

The Electric Vehicle Charging Association (EVCA) and CalETC appreciate this opportunity to SUPPORT the Low Carbon Fuel Standard (LCFS) regulation and provide feedback for the California Air Resources Board (CARB) Board member consideration. This letter largely supports the proposed draft regulation order on August 12 version (called 15-day changes) and provides some suggested modifications for consideration to the non-utility provisions. We also appreciate the tremendous effort and accessibility of CARB staff during the extensive public process leading up to this hearing.

EVCA is a not-for-profit trade organization of twenty leading EV charging industry member companies and two zero-emission autonomous fleet operators. The association was established in 2015 to comprehensively represent the entire EV charging value chain and provide a collective industry voice for decision makers.

CalETC is a non-profit association committed to the successful introduction and large-scale deployment of all forms of electric transportation including plug-in electric vehicles of all weight classes, transit buses, port electrification, off-road electric vehicles and equipment, and rail. Our board of directors includes Los Angeles Department of Water and Power, Pacific Gas and Electric, Sacramento Municipal Utility District, San Diego Gas and Electric, Southern California Edison, the Northern California Power Agency, and the Southern California Public Power Authority. Our membership also includes major automakers, manufacturers of zero-emission trucks and buses, developers and operators of charging stations and other industry leaders supporting transportation electrification. CalETC supports and advocates for the transition to a zero-emission transportation future to spur economic growth, fuel diversity and energy independence, ensure clean air, and combat climate change. Please note that the views and comments reflected in this letter represent the positions of the CalETC board of directors and some, but not all, of the members of CalETC.

Over the past 10 years, the LCFS has been tremendously successful in supporting the transition from petroleum to cleaner transportation fuels including electric fuel. Clean low-carbon fuels

have replaced a percentage of petroleum and, in doing so, have reduced climate change pollutants as well as a myriad of air and toxic pollutants that adversely impact communities. The LCFS has served as a catalyst for billions of dollars of investments in clean fuels and infrastructure.

We have been participating in staff workshops for several years and have had several constructive conversations with staff in that time. We very much appreciate their accessibility and commitment to LCFS.

Summary: We very much appreciate the substantial 15-day changes proposed on August 12 to the step-down in CI intensity in Tables 1 and 2 and to the light-, medium-and heavy-duty vehicle fast charge infrastructure (FCI) programs. We have some additional recommendations to the FCI programs below. We also support the August 12 proposed amendments to the fixed guideway and forklift provisions. However, we are disappointed that no changes were made in response to our recommendations regarding the verification provisions, especially since much of this program duplicates the existing regulations from the California Department of Food and Agriculture (CDFA), Division of Measurement Standards (DMS), and we make specific recommendations below on verification.

Recommendations:

1. *EVCA and CalETC opposes the proposed requirements for parties to pay for visits to individual charging stations by third-party verifiers to check for accuracy at public and private charging stations for light -, medium-, and heavy-duty EVs and incremental residential credits when reviewing quarterly fuel transaction reports.* Instead, we recommend parties pay for desk-top reviews by third-party verifiers at central data locations that do not duplicate existing accuracy regulations established by the California Department of Food and Agriculture's Division of Measurement Standards and the California Public Utilities Commission (CPUC) and that generators of small numbers of non-residential credits be exempted from these requirements.

The proposed regulation requiring site hosts to pay for third party verifiers for metered incremental residential credits, non-residential, and FCI credits for charging of light duty EVs and eMHDVs will result in high costs and a chilling of market development by site hosts, automakers, and charging developers. Section 95501 (b)(3) seems to indicate that site visits to each facility with a charging station is required (we see no mention of risk assessments or sampling affecting the number of site visits in the proposed regulation). We believe this requirement represents a massive time investment and cost for extraordinarily little benefit.

Metered electricity fuel credit generators are widely distributed, unlike other fuel providers that generate LCFS credits. Electricity is also economically regulated, unlike other transportation fuels. While there are approximately 10,000 gasoline / diesel

150.1

stations in California, electricity is fundamentally different, with already 10,000 public DCFC, about 90,000 public level 2 charging stations, many thousands of fleet charging stations, and nearly one million residential charging stations. Soon these numbers will need to grow by a factor of eight or nine, as the ACC II, ACT, ACF and other regulations ramp up their compliance requirements. The sheer number of charging stations and their distributed nature makes travel to even a fraction of these an exorbitant cost.

Additionally, this requirement is not needed as EDUs have meter accuracy requirements that cover tens of millions of meters in private and commercial locations and a process to deal with inaccuracy complaints.¹ Moreover, the California Department of Food and Agriculture's Division of Measurement Standards (DMS) regulates EV chargers for metering accuracy as well as many other consumer protection requirements,² and inspections to enforce this regulation are conducted by each California county's Department of Weights and Measures and paid through device registration fees paid to the counties.³ Adding a requirement for site hosts to pay for third-party verification for data that is already aligned with the proposed measurement accuracy requirements in §95491.2(a)(1)(B) in Appendix A-2 Proposed Regulation Order⁴ may cause smaller fleets or properties like multifamily residences to forego participating in the LCFS program and the sectors CARB more broadly wishes to support. We recommend that the new LCFS does not require site visits to the charging stations and defers to existing CPUC and DMS metering accuracy regulations.

Requiring third party verification for residential metered charging is particularly concerning, as there are already hundreds of thousands of EVs being reported to CARB in order to generate incremental residential LCFS credits with kWh measurement via EV telematics or a charging station. Conducting site visits to even a fraction of those sites will be tremendously expensive. It is also unclear how the verifier would check the EV's telematics data and engage with the EV owner. We see no corresponding benefit and recommend that site visits by a verifier to the EV or residential charger not be required.

¹ Utility Meters are certified to ANSI C12 standards by Nationally Recognized Testing Labs (NRTLs). Here is a SMUD example on meter accuracy. For example, <https://www.smud.org/-/media/Documents/Going-Green/EVs/Engineering-Specification-T017---Electric-Vehicle-Chargers-Rev-0---3-6-18.ashx>. And <https://www.smud.org/-/media/Documents/Rate-Information/Rates/Rule-2-17.ashx> Utilities have processes to respond to high bill complaints and this can be escalated to the CPUC's Consumer Affairs Branch: <https://www.cpuc.ca.gov/consumer-support/file-a-complaint/utility-complaint>.

² https://www.cdfa.ca.gov/dms/pdfs/regulations/EVSE-OAL_EndorsedLetter-and-FinalText.pdf

³ https://www.cdfa.ca.gov/dms/docs/publications/2023/2023_Combined_BPC.pdf

⁴ <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/appa-2.pdf>

EVCA and CalETC propose that for incremental residential credits, FCI credits, and non-residential charging of light, medium- and heavy-duty EVs, the only requirement is for desk top reviews to be done by third-party verifiers to check the accuracy of the calculations, except where a risk-based assessment reveals a reasonable concern about accuracy.

150.2

EVCA and CalETC appreciate that the proposed regulation allows for a deferment in verification for small entities with fewer than 6,000 credits per year, but we do not think this goes far enough for the many small locations that are just entering LCFS. We recommend that any entity with fewer than 2,000 credits per year be exempted from all verification and that those applicants with 2,001 to 6000 metric tons of credits per year be eligible for deferment of paying for a verifier to visit the central data location. Our intent is to avoid a chilling impact that verification requirements will have on recent and new sites and to have a better cost -benefit ratio for these sites. Fleets, workplaces, multifamily buildings, grocery stores, small utilities and other businesses are often just one or two locations, and only generating a handful to a few thousand credits per year.⁵ We believe our proposal is reasonable to prevent the costs of verification from removing the financial benefits of generating credits or even discouraging the adoption of charging stations so needed to make ACC II, ACT, ACF, Innovative Clean Transit, Clean Miles Standard, Zero-Emission Airport Shuttle and other regulations effective.

Also, as noted below, we are recommending that many emerging EVs in agriculture, airports, mining, and recreation be allowed to be in LCFS immediately. We recommend these new TE end-uses be subject to the same deferment and exemption thresholds as listed above, and any site visits be determined by a risk-based assessment that considers whether there is a reasonable risk of inaccuracy from the meter or charging equipment itself rather than the calculations and reporting.

Finally, CARB staff indicated that base residential credits should not count toward a 6,000-credit cap for deferment of verification (or our proposed 2,000 credit cap for exemption). However, the current regulation language simply references credits in the LCFS Reporting Tool and Credit Bank & Transfer System (LRT-CBTS). Almost all of the utilities' LCFS credits come from base residential credits calculated by CARB (and therefore not subject to verification). However, the current LCFS LRT-CBTS does not differentiate between a utilities base residential credits and other metered credits. CARB should clarify that only credits subject to verification count towards the credit cap for deferment or exemption.

⁵ Medium and heavy-duty trucks and buses are often generating several thousand credits annually when they are starting out.

2. *EVCA and CalETC largely support the proposed heavy-duty vehicle FCI program but request a few additional changes.*

For all the reasons listed in our February 20, 2024 letter, we support the following amendments proposed in the 15-day changes:

- Extending the HD-FCI program’s application deadline to December 31, 2035 rather than December 31, 2030
- Extending the minimum distance from an existing or pending electric vehicle Federal Highway Administration Alternative Fuel Corridor to five miles instead of one mile
- Lowering the minimum kW per charger from 250 kW to 50 kW
- Removing the cap of 10 chargers per site
- Increasing the limit at one address from 10 MW to a higher number and adding a 20 percent of overall program cap on any single company
- Matching the credit life for the FCI and hydrogen refueling infrastructure (HRI) programs at 10 years rather than having different lifespans for the two programs
- Clarifying the payment requirements
- Modifying the access requirements
- Not requiring certain connectors
- Allowing load management technologies such as battery energy storage

Recommendations:

- a. **Allow zero carbon intensity electricity just like the proposed HRI program.** The proposed 15-day change regulation gives preferential treatment to hydrogen stations over electric vehicle charging stations when assigning the CI for capacity credits. Hydrogen stations utilizing the HRI pathway receive a CI of the “Company-wide weighted average CI for dispensed hydrogen during the quarter or 0 g/MJ, whichever is greater.” DCFC stations utilizing the FCI receive a CI of the “California average grid electricity carbon intensity” regardless of whether the EV charging company is dispensing low-CI electricity such as retiring 0 CI renewable energy credits (RECs) for generating non-residential charging credits. We encourage CARB to harmonize the CI definition for calculating HRI and FCI credits as “Company-wide weighted average for dispensed hydrogen / electricity during the quarter or 0 g/MJ, whichever is greater.”
- b. **Allow the same formula calculating credits for FCI as for HRI.** The formula for a shared HD-HRI station includes a 50% factor and for a private HD-HRI station a 25% factor. However, the formula for FCI is much lower: an FSE at a shared HD-FCI charging site has a 20% factor and an FSE at a private HD-FCI charging site has a 10% factor. We recommend that CARB more fully harmonize the HRI and FCI programs by having these factors be the same for both programs or, at minimum, be more similar than proposed.

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- c. **Clarify language around reservations at shared sites.** The current definition of a shared site states that a “shared HD-FCI site cannot be reserved for one HDV fleet for more than 12 hours each day...” This site-level restriction is reasonable to ensure sites are not effectively private. Language elsewhere in the draft states that “[t]he FSEs at a shared HD-FCI charging site cannot be reserved for one HDV fleet for more than 12 hours each day.” It is our understanding that the prohibition on reservations over 12 hours applies at the site level, rather than the individual FSE level, but the language is not entirely clear. FSE-level restrictions would conflict with fleet needs and undercut the effectiveness of this provision. Some fleet customers at shared, multi-fleet depots will want dedicated stalls so they can optimize usage throughout the day with multiple charges. The sites are still shared and serving multiple fleets even if an anchor tenant may want to reserve some stalls for more than 12 hours. We request confirmation that longer reservations on individual FSE are allowed so long as the overall site remains shared and serving multiple fleets.
- d. **Include land costs for new sites as an eligible initial capital cost, as these stations are extremely difficult to site and new locations are often needed.** It is difficult and expensive to find suitable sites for truck charging due to scarcity of land in urban areas (owning or 10-year leases), zoning restrictions, lease restrictions and, most importantly, the challenge in finding 5-20 MW (sometimes more) of grid capacity. The Venn diagram overlap of these needs is small. Land costs for public charging locations and shared charging depots for HD FCI are very significant and should be included in Section 95486.4(b)(4)(I).
- e. **Clarify what is meant by networking requirements.** CARB proposes a networking and communication requirement we request clarification around the data to be shared and the rationale. The proposed language states “Each FSE must be networked and capable of monitoring and reporting its availability for charging.” This can be read to require public reporting of availability, which would not necessarily be relevant for shared chargers such as those found in multi-fleet charging depots with defined customers and reservations.
- f. **Establish a 5% cap on prior quarter deficits, especially in the early years.** The HD-FCI program is limited to 2.5% of the previous quarter deficits. At 2025 deficit levels, we estimate this would support as little as 635 MW of capacity from HD FCI credits, depending on utilization, uptime, and other assumptions.⁶ According to the CEC’s AB 2127 analysis, the state will need about 2,900 MW of charging from eHDVs by 2025 and 11,600 MW of charging from eHDVs by 2030.⁷ Additional

⁶ This calculation was derived leveraging the formulas from Appendix A-2 Proposed Regulation Order, section § 95486.3.(b)(2)(G) and section § 95486.3.(b)(5)(G) with the following assumptions: previous quarter deficits = 8,082,115 MT (based on CARB CATS model 2025 forecast); shared MHD-FCI charging site model selection; 85% uptime; and 5% utilization.

⁷ The California Energy Commission’s AB 2127 report uses the HEVI-load model to forecast the number of depot and public chargers required for MHD charging under the AATE3 primary scenario. This forecast predicts the

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support is needed to attract the scale of private capital required, particularly at this nascent stage of the market with less than 1,000 HD trucks and vans on the road and with both fleets and OEMs citing infrastructure as a primary limiting factor.

We recommend increasing the 2.5% cap on prior quarter deficits, particularly in the early years of the program, to kickstart the zero-emission truck market especially for near-term trucks applications in the drayage, short-haul, medium-haul, and delivery segments. As momentum builds, CARB might consider reducing the cap in a future rulemaking. We recognize that there are tradeoffs and that the “right” cap depends on perspective. However, we are at a critical launch point for both ACT and ACF and believe a higher cap – we recommend 5% based on the above need - is warranted to begin deploying a network that will enable the market to take off. Solving the chicken-and-egg infrastructure problem by using FCI to build infrastructure in advance of vehicle adoption is critical to the success of ACF, ACT and the Scoping Plan.

California will need to deploy charging infrastructure in advance of vehicle deployment to keep pace with the need to install over 50 HD chargers per day every day through 2030.⁸ HD FCI is a crucial tool to encourage charging infrastructure deployment in advance of vehicles – thereby removing a frequently cited barrier to electrification overall and ACF in particular. Encouraging the early adopters (e.g., shared depots and some fleets) to build the infrastructure to accommodate full electrification is critical even if the initial vehicle deployments are lower. This will help expedite the time frame for increasing the fleet's adoption rate of electric trucks. In the near future, turnaround time for new electric truck orders will be measured in weeks and the lack of infrastructure will delay adoption. Helping fleets move early will allow them to quickly add to their fleet after gaining comfort with the technology.

As mentioned above, the state will need about 11,600 MW of HD charging by 2030 but we estimate the proposed HD-FCI will only provide about 600 MW. The

number of chargers and their respective power ratings that will be required in 2025 and 2030, as seen in Appendix H, Table H-1. The sum of the total MHD charging capacity based on this forecast was calculated to be 2,900 MW and 11,600 MW by 2025 and 2030, respectively, by taking the sum-product of the number of chargers and their respective power rating.

⁸ Based on the more recent CEC AB 2127 report available at:

<https://www.energy.ca.gov/publications/2023/second-assembly-bill-ab-2127-electric-vehicle-charging-infrastructure-assessment>, to support medium- and heavy-duty plug-in electric vehicles, California will need about 109,000 depot chargers and 5,500 public chargers for 155,000 vehicles in 2030, and 256,000 depot chargers and 8,500 public chargers for 377,000 vehicles in 2035. **For 2030:** 114,500 chargers divided by 2146 days (from today) = 53 chargers a day through 2030 needed. What is the baseline of current chargers? 2000? that would bring it to fifty-two chargers a day. **For 2035:** 264500 chargers divided by 3972 days - 67 chargers a day; if we assume a baseline of 2000, then 66 a day through 2035.

chart below also illustrates the size of the need for DC charging infrastructure and the pace of installation needed.⁹ Our analysis above is the same as our February 20 letter and does include medium-duty EVs and that may justify lowering a 5 percent cap in a future rulemaking.

In addition to our recommendation for a 5% cap of prior quarter deficits on HD-FCI, we see a need to clarify the 15-day change language so that it applies only to HD FCI and not to the overall FCI program. We recommend the following: *“If estimated potential FCI credits from all approved HD-FCI FSEs exceed 5.0 ~~2.5~~ percent of deficits in the most recent quarter for which data is available, the Executive Officer will not approve additional FCI pathways for HD-FCI FSEs and will not accept additional HD-FCI applications until estimated potential FCI credits for approved HD-FCI FSEs are less than 5.0-2.5 percent of deficits.”* The second underline is intended to remove confusion as to which category the cap applies. There may be other places where amendments are needed to distinguish between FCI and HD-FCI.

Table 27 - HEVI-LOAD Infrastructure Results for 112,000 BEVs in 2030 and 289,000 BEVs in 2035¹⁰⁵

Charger Power Level	2030			2035		
	Number Chargers (% Depot / % Public)	Charging Energy (%)	Charging Time (%)	Number Chargers (% Depot / % Public)	Charging Energy (%)	Charging Time (%)
19; 25 kW	9,509 (100 / 0)	2.74	21.69	24,638 (100 / 0)	2.29	19.94
50; 75 kW	12,174 (87 / 13)	7.56	37.45	31,529 (88 / 12)	6.46	36.38
100; 150 kW	33,558 (96 / 4)	29.15	2.42	90,599 (97 / 3)	27.34	2.85
225; 250; 300 kW	12,257 (82 / 18)	20.17	23.71	31,362 (85 / 15)	19.10	24.40
350; 450; 500 kW	9,882 (83 / 17)	18.92	9.20	25,190 (86 / 14)	18.19	10.10
750; 900; 1,000; 1,050 kW	1,112 (0 / 100)	7.77	5.46	2,499 (0 / 100)	8.88	6.25
1,200; 1,400; 1,600 kW	1,498 (0 / 100)	13.69	0.07	3,809 (0 / 100)	17.73	0.09
Total	79,990 (88 / 12)	100	100	209,626 (90 / 10)	100	100

- g. Phase in the restriction “the FSE must dispense electricity in a given quarter to generate FCI credits.” We recognize the concern that sites with no electricity dispensed for many years are poor locations, and this should be discouraged. However, the 15-day change is written not at the site level, but at the charger

⁹ https://ww2.arb.ca.gov/sites/default/files/2022-01/Draft_2022_State_SIP_Strategy.pdf

(FSE) level. We respectfully request this requirement be amended to be at the site level. Alternatively, we recommend phasing the requirement in after a grace period of at least one year to account for the fact that widespread truck deployment may lag infrastructure development, which is exactly the problem that FCI can address. The intent of the FCI program is to encourage development of DCFC ahead of the need in order to solve the chicken and egg problem, so low utilization of sites is expected in the early years of the launch of electric HDVs. As a result, the current language is too restrictive and poses operational issues for operators of fleets, shared depots and truck stops.

- h. **Allow the executive officer to grant exceptions to the 5 miles from corridor limit.** Because of the difficulty in finding sites for shared and public charging for eHDVs (see comments above), we respectfully request additional flexibility on siting locations by allowing the executive officer to grant exceptions. The commercialization of new technology is always challenging, and unforeseen circumstances should be expected as it may turn out to be hard to find sites within five miles of a corridor especially if they require 10 MW to 40 MW of power.

3. *EVCA and CalETC largely support the proposed light- and medium-duty vehicle FCI program but request a few additional changes.*

For all the reasons listed in our February 20, 2024 letter, we support the following amendments proposed in the 15-day changes:

- Increasing the MW per site limit (per address) from 1 MW to 2.5 MW
- Removing the geographic limits
- Increasing the cap of prior quarter deficits from 0.5 percent to 2.5 percent
- Allowing private access stations to qualify (e.g. robotaxis, ride sharing vehicles)
- Matching the credit life for the FCI and hydrogen refueling infrastructure (HRI) programs at 10 years rather than having different lifespans for the two programs
- Allowing stations installed after 2022 to apply
- Modifying the payment requirements
- Dropping the connector requirements
- Allowing load management technologies such as battery energy storage

Recommendations

- a. **Allow less than 24-hour access if the executive officer approves.** We believe flexibility is needed as not all situations meriting exceptions may be covered by a permitting authority. There may be good reasons in some urban areas (e.g., safety) where less than 24-hour access is warranted on a case-by-case basis. In addition, the 15-day changes appear to have made it easier for placing public-

access DCFC in cities and towns to serve EV drivers who live in apartments and condominiums and where the DCFC is placed in locations such as curbside of a street or in public, non-profit or private parking lots. Building charging at multifamily residences is a well-recognized challenge and placing level 2 chargers on site is not always attractive or in many cases even possible. CARB has an opportunity with this LD FCI program to address this problem by encouraging DCFCs at nearby locations that will work not only for residents of apartments and condominiums but also for residents of single-family homes in denser urban areas where off-street parking is limited. The 24-7 requirement for public access should, at minimum, be slightly modified so that non-profit, government and private locations with one or two DCFCs that serve the community do not run into problems with rights-of-way laws. For example, a site such as a church or a bank needs to close their parking lot for at least one day a year in order to not lose their property rights. Ideally, CARB should also accommodate, through an exception process, other times that access could be blocked for a few hours (e.g., neighborhood festivals).

- b. **Allow zero carbon intensity electricity just like the proposed HRI program for LMD FCI.** The proposed 15-day change regulation gives preferential treatment to hydrogen stations over electric vehicle charging stations when assigning the CI for capacity credits. Hydrogen stations utilizing the HCI pathway receive a CI of the “Company-wide weighted average CI for dispensed hydrogen during the quarter or 0 g/MJ, whichever is greater.” DCFC stations utilizing the FCI receive a CI of the “California average grid electricity carbon intensity” regardless of whether the EV charging company is dispensing low-CI electricity such as retiring 0 CI renewable energy credits (RECs) for generating charging (FCI) credits. We encourage CARB to harmonize the CI definition for calculating HRI and FCI credits as “Company-wide weighted average for dispensed hydrogen / electricity during the quarter or 0 g/MJ, whichever is greater.”
- c. **Allow the same formula calculating credits for FCI as for HRI.** The formula for a public LMD-HRI station includes a 50% factor and for a private LMD-HRI station a 25% factor. However, the formula for FCI is much lower: an FSE at a public LMD-FCI charging site has a 20% factor and an FSE at a private LMD-FCI charging site has a 10% factor. We recommend that CARB more fully harmonize the HRI and FCI programs by having these factors be the same for both programs or, at minimum, be more similar than proposed.
- d. **Extend the new LD FCI application deadline to 2035.** We recommend that this program’s application deadline be extended to 2035 and not sunset in 2030. We are in a challenging phase of light duty EV adoption as the market needs to capture more skeptical mainstream buyers to meet the “hockey stick” ramp inherent in the ACC II requirements. The light duty FCI remains a very elegant and desirable tool to address the chicken-and-egg problem of how to accelerate EV infrastructure and EV adoption. Without the changes we recommend to the light duty FCI the pace of DCFC build-out could dramatically slow which makes

meeting ACC II much more challenging. Now is not the time to scale back this program. CARB can take a no-regrets approach to supporting the light-duty fast charging market by adopting a 2.5% cap with no geographic restrictions. While the addition of more credits into the market can lower credit prices several factors can counter this including the new acceleration mechanism.

- e. **Clarify that that staff's intent in the 15-day package is for there to be four 2.5% caps for four categories:** (LMD-FCI combined with the current light duty FCI, HD-FCI, LMD-HRI combined with the current light duty HRI, and HD-HRI). The current language is a little confusing because the current FCI program (public light duty) and proposed LMD FCI programs run concurrently as explained in the 15-day change notice. The use of the generic term "FCI" varies throughout the proposed regulatory language sometimes referring to the legacy FCI program and other times to the new FCI programs for LMD and/or HD DC charging. We ask that the final regulation language not use the term FCI by itself to refer to the legacy program, but rather be more specific, such as using the term "light-duty FCI" to refer to the legacy (current program. For example, one way to make the language clearer, is the following: *If estimated potential FCI credits from all approved light-duty FCI and LMD-FCI FSEs exceed 2.5 percent of deficits in the most recent quarter for which data is available, the Executive Officer will not approve additional FCI pathways for LMD-FCI FSEs and will not accept additional LMD-FCI applications until estimated potential FCI credits for approved light-duty FCI and LMD-FCI FSEs are less than 2.5 percent of deficits.*
- f. **Clarify what is meant by networking requirements.** CARB proposes a networking and communication requirement we request clarification around the data to be shared and the rationale. The proposed language states "Each FSE must be networked and capable of monitoring and reporting its availability for charging." This can be read to require public reporting of availability, which would not necessarily be relevant for shared chargers such as those found in multi-fleet charging depots (e.g. robotaxis and ride share vehicles) with defined customers and reservations.
- g. **Include land costs for new sites as an eligible initial capital cost, as these stations are extremely difficult to site and new locations are often needed.** It is difficult and expensive to find suitable sites for truck charging due to scarcity of land in urban areas (owning or 10-year leases), zoning restrictions, lease restrictions and, most importantly, the challenge in finding 5-20 MW (sometimes more) of grid capacity. The Venn diagram overlap of these needs is small. Land costs for public charging locations and shared charging depots for HD FCI are very significant and should be included in Section 95486.4(b)(4)(I).

- 4. **EVCA and CalETC support the proposed carbon intensity targets in Table 1 and Table 2 (e.g., 30% in 2030 and 90% in 2045) including the 9% step-down in the first year.**


EVCA and CalETC applaud staff for aligning the proposed Tables 1 and 2 requirements with CARB's Scoping Plan vision and providing industry and stakeholders with the certainty needed for LCFS to be successful to planners, implementers, and investors.

Currently the LCFS is overperforming as the carbon intensities are too easy for the market to meet, leading to low credit prices that are undermining investment in electric cars, trucks, buses, and charging infrastructure, as well as infrastructure for other low-carbon fuels. Multiple models support increasing the stringency of the LCFS to a minimum 30 percent reduction in carbon intensity by 2030. It is essential that the stringency be increased expeditiously and be implemented as soon as possible to ensure the LCFS continues to contribute substantially to the state's clean air, climate change, and zero-emission transportation requirements and goals. The LCFS has been a highly successful program as part of a broad package of regulations and incentives to address climate change. For the LCFS program to continue to be successful, the annual compliance requirements on regulated parties should be strengthened and extended. Currently, the LCFS credit market suffers from credit oversupply issues. When the 2030 standard was adopted, the CARB Board made it clear the standard could be adjusted if market circumstances called for adjustment. CARB must expeditiously address this market supply issue; increasing the overall stringency of the LCFS regulation is one way to accomplish this.

Regarding the need for a 9 percent step down, the credit bank is currently on track to have 30 million credits or more by the end of 2024. A step down of 7% is likely to reduce the bank by approximately six million credits, which is not enough of a drawdown to stabilize the market. That is why EVCA and CalETC support a strong step down of at least nine percent, which is likely to reduce the bank by sixteen million credits. A nine percent step down is the best and most efficient way to quickly relieve this glut in credits and get the market back on track so that it can efficiently incentivize low carbon fuels and reduce emissions.

We appreciate the opportunity to comment on these important changes to the LCFS regulation. Thank you for your consideration.

Regards,

A handwritten signature in blue ink, appearing to read 'Reed Addis', on a light-colored rectangular background.

Reed Addis
Governmental Affairs
Electric Vehicle Charging Association



Laura Renger, Executive Director
California Electric Transportation Coalition

cc: Rajinder Sahota
Matthew Botill
Jordan Ramalingam



**ELECTRIC VEHICLE
CHARGING ASSOCIATION**



August 27, 2024

Honorable Chair Liane Randolph and Honorable Board Members California Air Resources Board

1001 I Street
P.O. Box 2815
Sacramento, CA 95812

Re: SUPPORT Proposed 15-day Change Amendments to the Low Carbon Fuel Standard Regulation

Submitted to <https://ww2.arb.ca.gov/applications/public-comments>

Dear Chair Randolph and Honorable Board Members:

The Electric Vehicle Charging Association (EVCA) and CalETC appreciate this opportunity to SUPPORT the Low Carbon Fuel Standard (LCFS) regulation and provide feedback for the California Air Resources Board (CARB) Board member consideration. This letter largely supports the proposed draft regulation order on August 12 version (called 15-day changes) and provides some suggested modifications for consideration to the non-utility provisions. We also appreciate the tremendous effort and accessibility of CARB staff during the extensive public process leading up to this hearing.

EVCA is a not-for-profit trade organization of twenty leading EV charging industry member companies and two zero-emission autonomous fleet operators. The association was established in 2015 to comprehensively represent the entire EV charging value chain and provide a collective industry voice for decision makers.

CalETC is a non-profit association committed to the successful introduction and large-scale deployment of all forms of electric transportation including plug-in electric vehicles of all weight classes, transit buses, port electrification, off-road electric vehicles and equipment, and rail. Our board of directors includes Los Angeles Department of Water and Power, Pacific Gas and Electric, Sacramento Municipal Utility District, San Diego Gas and Electric, Southern California Edison, the Northern California Power Agency, and the Southern California Public Power Authority. Our membership also includes major automakers, manufacturers of zero-emission trucks and buses, developers and operators of charging stations and other industry leaders supporting transportation electrification. CalETC supports and advocates for the transition to a zero-emission transportation future to spur economic growth, fuel diversity and energy independence, ensure clean air, and combat climate change. Please note that the views and comments reflected in this letter represent the positions of the CalETC board of directors and some, but not all, of the members of CalETC.

Over the past 10 years, the LCFS has been tremendously successful in supporting the transition from petroleum to cleaner transportation fuels including electric fuel. Clean low-carbon fuels

have replaced a percentage of petroleum and, in doing so, have reduced climate change pollutants as well as a myriad of air and toxic pollutants that adversely impact communities. The LCFS has served as a catalyst for billions of dollars of investments in clean fuels and infrastructure.

We have been participating in staff workshops for several years and have had several constructive conversations with staff in that time. We very much appreciate their accessibility and commitment to LCFS.

Summary: We very much appreciate the substantial 15-day changes proposed on August 12 to the step-down in CI intensity in Tables 1 and 2 and to the light-, medium-and heavy-duty vehicle fast charge infrastructure (FCI) programs. We have some additional recommendations to the FCI programs below. We also support the August 12 proposed amendments to the fixed guideway and forklift provisions. However, we are disappointed that no changes were made in response to our recommendations regarding the verification provisions, especially since much of this program duplicates the existing regulations from the California Department of Food and Agriculture (CDFA), Division of Measurement Standards (DMS), and we make specific recommendations below on verification.

Recommendations:

1. *EVCA and CalETC opposes the proposed requirements for parties to pay for visits to individual charging stations by third-party verifiers to check for accuracy at public and private charging stations for light -, medium-, and heavy-duty EVs and incremental residential credits when reviewing quarterly fuel transaction reports.* Instead, we recommend parties pay for desk-top reviews by third-party verifiers at central data locations that do not duplicate existing accuracy regulations established by the California Department of Food and Agriculture's Division of Measurement Standards and the California Public Utilities Commission (CPUC) and that generators of small numbers of non-residential credits be exempted from these requirements.

The proposed regulation requiring site hosts to pay for third party verifiers for metered incremental residential credits, non-residential, and FCI credits for charging of light duty EVs and eMHDVs will result in high costs and a chilling of market development by site hosts, automakers, and charging developers. Section 95501 (b)(3) seems to indicate that site visits to each facility with a charging station is required (we see no mention of risk assessments or sampling affecting the number of site visits in the proposed regulation). We believe this requirement represents a massive time investment and cost for extraordinarily little benefit.

Metered electricity fuel credit generators are widely distributed, unlike other fuel providers that generate LCFS credits. Electricity is also economically regulated, unlike other transportation fuels. While there are approximately 10,000 gasoline / diesel

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stations in California, electricity is fundamentally different, with already 10,000 public DCFC, about 90,000 public level 2 charging stations, many thousands of fleet charging stations, and nearly one million residential charging stations. Soon these numbers will need to grow by a factor of eight or nine, as the ACC II, ACT, ACF and other regulations ramp up their compliance requirements. The sheer number of charging stations and their distributed nature makes travel to even a fraction of these an exorbitant cost.

Additionally, this requirement is not needed as EDUs have meter accuracy requirements that cover tens of millions of meters in private and commercial locations and a process to deal with inaccuracy complaints.¹ Moreover, the California Department of Food and Agriculture's Division of Measurement Standards (DMS) regulates EV chargers for metering accuracy as well as many other consumer protection requirements,² and inspections to enforce this regulation are conducted by each California county's Department of Weights and Measures and paid through device registration fees paid to the counties.³ Adding a requirement for site hosts to pay for third-party verification for data that is already aligned with the proposed measurement accuracy requirements in §95491.2(a)(1)(B) in Appendix A-2 Proposed Regulation Order⁴ may cause smaller fleets or properties like multifamily residences to forego participating in the LCFS program and the sectors CARB more broadly wishes to support. We recommend that the new LCFS does not require site visits to the charging stations and defers to existing CPUC and DMS metering accuracy regulations.

Requiring third party verification for residential metered charging is particularly concerning, as there are already hundreds of thousands of EVs being reported to CARB in order to generate incremental residential LCFS credits with kWh measurement via EV telematics or a charging station. Conducting site visits to even a fraction of those sites will be tremendously expensive. It is also unclear how the verifier would check the EV's telematics data and engage with the EV owner. We see no corresponding benefit and recommend that site visits by a verifier to the EV or residential charger not be required.

¹ Utility Meters are certified to ANSI C12 standards by Nationally Recognized Testing Labs (NRTLs). Here is a SMUD example on meter accuracy. For example, <https://www.smud.org/-/media/Documents/Going-Green/EVs/Engineering-Specification-T017---Electric-Vehicle-Chargers-Rev-0---3-6-18.ashx>. And <https://www.smud.org/-/media/Documents/Rate-Information/Rates/Rule-2-17.ashx> Utilities have processes to respond to high bill complaints and this can be escalated to the CPUC's Consumer Affairs Branch: <https://www.cpuc.ca.gov/consumer-support/file-a-complaint/utility-complaint>.

² https://www.cdfr.ca.gov/dms/pdfs/regulations/EVSE-OAL_EndorsedLetter-and-FinalText.pdf

³ https://www.cdfr.ca.gov/dms/docs/publications/2023/2023_Combined_BPC.pdf

⁴ <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/appa-2.pdf>

EVCA and CalETC propose that for incremental residential credits, FCI credits, and non-residential charging of light, medium- and heavy-duty EVs, the only requirement is for desk top reviews to be done by third-party verifiers to check the accuracy of the calculations, except where a risk-based assessment reveals a reasonable concern about accuracy.

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EVCA and CalETC appreciate that the proposed regulation allows for a deferment in verification for small entities with fewer than 6,000 credits per year, but we do not think this goes far enough for the many small locations that are just entering LCFS. We recommend that any entity with fewer than 2,000 credits per year be exempted from all verification and that those applicants with 2,001 to 6000 metric tons of credits per year be eligible for deferment of paying for a verifier to visit the central data location. Our intent is to avoid a chilling impact that verification requirements will have on recent and new sites and to have a better cost -benefit ratio for these sites. Fleets, workplaces, multifamily buildings, grocery stores, small utilities and other businesses are often just one or two locations, and only generating a handful to a few thousand credits per year.⁵ We believe our proposal is reasonable to prevent the costs of verification from removing the financial benefits of generating credits or even discouraging the adoption of charging stations so needed to make ACC II, ACT, ACF, Innovative Clean Transit, Clean Miles Standard, Zero-Emission Airport Shuttle and other regulations effective.

Also, as noted below, we are recommending that many emerging EVs in agriculture, airports, mining, and recreation be allowed to be in LCFS immediately. We recommend these new TE end-uses be subject to the same deferment and exemption thresholds as listed above, and any site visits be determined by a risk-based assessment that considers whether there is a reasonable risk of inaccuracy from the meter or charging equipment itself rather than the calculations and reporting.

Finally, CARB staff indicated that base residential credits should not count toward a 6,000-credit cap for deferment of verification (or our proposed 2,000 credit cap for exemption). However, the current regulation language simply references credits in the LCFS Reporting Tool and Credit Bank & Transfer System (LRT-CBTS). Almost all of the utilities' LCFS credits come from base residential credits calculated by CARB (and therefore not subject to verification). However, the current LCFS LRT-CBTS does not differentiate between a utilities base residential credits and other metered credits. CARB should clarify that only credits subject to verification count towards the credit cap for deferment or exemption.

⁵ Medium and heavy-duty trucks and buses are often generating several thousand credits annually when they are starting out.

2. *EVCA and CalETC largely support the proposed heavy-duty vehicle FCI program but request a few additional changes.*

For all the reasons listed in our February 20, 2024 letter, we support the following amendments proposed in the 15-day changes:

- Extending the HD-FCI program’s application deadline to December 31, 2035 rather than December 31, 2030
- Extending the minimum distance from an existing or pending electric vehicle Federal Highway Administration Alternative Fuel Corridor to five miles instead of one mile
- Lowering the minimum kW per charger from 250 kW to 50 kW
- Removing the cap of 10 chargers per site
- Increasing the limit at one address from 10 MW to a higher number and adding a 20 percent of overall program cap on any single company
- Matching the credit life for the FCI and hydrogen refueling infrastructure (HRI) programs at 10 years rather than having different lifespans for the two programs
- Clarifying the payment requirements
- Modifying the access requirements
- Not requiring certain connectors
- Allowing load management technologies such as battery energy storage

Recommendations:

- a. **Allow zero carbon intensity electricity just like the proposed HRI program.** The proposed 15-day change regulation gives preferential treatment to hydrogen stations over electric vehicle charging stations when assigning the CI for capacity credits. Hydrogen stations utilizing the HRI pathway receive a CI of the “Company-wide weighted average CI for dispensed hydrogen during the quarter or 0 g/MJ, whichever is greater.” DCFC stations utilizing the FCI receive a CI of the “California average grid electricity carbon intensity” regardless of whether the EV charging company is dispensing low-CI electricity such as retiring 0 CI renewable energy credits (RECs) for generating non-residential charging credits. We encourage CARB to harmonize the CI definition for calculating HRI and FCI credits as “Company-wide weighted average for dispensed hydrogen / electricity during the quarter or 0 g/MJ, whichever is greater.”
- b. **Allow the same formula calculating credits for FCI as for HRI.** The formula for a shared HD-HRI station includes a 50% factor and for a private HD-HRI station a 25% factor. However, the formula for FCI is much lower: an FSE at a shared HD-FCI charging site has a 20% factor and an FSE at a private HD-FCI charging site has a 10% factor. We recommend that CARB more fully harmonize the HRI and FCI programs by having these factors be the same for both programs or, at minimum, be more similar than proposed.

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- c. **Clarify language around reservations at shared sites.** The current definition of a shared site states that a “shared HD-FCI site cannot be reserved for one HDV fleet for more than 12 hours each day...” This site-level restriction is reasonable to ensure sites are not effectively private. Language elsewhere in the draft states that “[t]he FSEs at a shared HD-FCI charging site cannot be reserved for one HDV fleet for more than 12 hours each day.” It is our understanding that the prohibition on reservations over 12 hours applies at the site level, rather than the individual FSE level, but the language is not entirely clear. FSE-level restrictions would conflict with fleet needs and undercut the effectiveness of this provision. Some fleet customers at shared, multi-fleet depots will want dedicated stalls so they can optimize usage throughout the day with multiple charges. The sites are still shared and serving multiple fleets even if an anchor tenant may want to reserve some stalls for more than 12 hours. We request confirmation that longer reservations on individual FSE are allowed so long as the overall site remains shared and serving multiple fleets.
- d. **Include land costs for new sites as an eligible initial capital cost, as these stations are extremely difficult to site and new locations are often needed.** It is difficult and expensive to find suitable sites for truck charging due to scarcity of land in urban areas (owning or 10-year leases), zoning restrictions, lease restrictions and, most importantly, the challenge in finding 5-20 MW (sometimes more) of grid capacity. The Venn diagram overlap of these needs is small. Land costs for public charging locations and shared charging depots for HD FCI are very significant and should be included in Section 95486.4(b)(4)(I).
- e. **Clarify what is meant by networking requirements.** CARB proposes a networking and communication requirement we request clarification around the data to be shared and the rationale. The proposed language states “Each FSE must be networked and capable of monitoring and reporting its availability for charging.” This can be read to require public reporting of availability, which would not necessarily be relevant for shared chargers such as those found in multi-fleet charging depots with defined customers and reservations.
- f. **Establish a 5% cap on prior quarter deficits, especially in the early years.** The HD-FCI program is limited to 2.5% of the previous quarter deficits. At 2025 deficit levels, we estimate this would support as little as 635 MW of capacity from HD FCI credits, depending on utilization, uptime, and other assumptions.⁶ According to the CEC’s AB 2127 analysis, the state will need about 2,900 MW of charging from eHDVs by 2025 and 11,600 MW of charging from eHDVs by 2030.⁷ Additional

⁶ This calculation was derived leveraging the formulas from Appendix A-2 Proposed Regulation Order, section § 95486.3.(b)(2)(G) and section § 95486.3.(b)(5)(G) with the following assumptions: previous quarter deficits = 8,082,115 MT (based on CARB CATS model 2025 forecast); shared MHD-FCI charging site model selection; 85% uptime; and 5% utilization.

⁷ The California Energy Commission’s AB 2127 report uses the HEVI-load model to forecast the number of depot and public chargers required for MHD charging under the AATE3 primary scenario. This forecast predicts the

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support is needed to attract the scale of private capital required, particularly at this nascent stage of the market with less than 1,000 HD trucks and vans on the road and with both fleets and OEMs citing infrastructure as a primary limiting factor.

We recommend increasing the 2.5% cap on prior quarter deficits, particularly in the early years of the program, to kickstart the zero-emission truck market especially for near-term trucks applications in the drayage, short-haul, medium-haul, and delivery segments. As momentum builds, CARB might consider reducing the cap in a future rulemaking. We recognize that there are tradeoffs and that the “right” cap depends on perspective. However, we are at a critical launch point for both ACT and ACF and believe a higher cap – we recommend 5% based on the above need - is warranted to begin deploying a network that will enable the market to take off. Solving the chicken-and-egg infrastructure problem by using FCI to build infrastructure in advance of vehicle adoption is critical to the success of ACF, ACT and the Scoping Plan.

California will need to deploy charging infrastructure in advance of vehicle deployment to keep pace with the need to install over 50 HD chargers per day every day through 2030.⁸ HD FCI is a crucial tool to encourage charging infrastructure deployment in advance of vehicles – thereby removing a frequently cited barrier to electrification overall and ACF in particular. Encouraging the early adopters (e.g., shared depots and some fleets) to build the infrastructure to accommodate full electrification is critical even if the initial vehicle deployments are lower. This will help expedite the time frame for increasing the fleet's adoption rate of electric trucks. In the near future, turnaround time for new electric truck orders will be measured in weeks and the lack of infrastructure will delay adoption. Helping fleets move early will allow them to quickly add to their fleet after gaining comfort with the technology.

As mentioned above, the state will need about 11,600 MW of HD charging by 2030 but we estimate the proposed HD-FCI will only provide about 600 MW. The

number of chargers and their respective power ratings that will be required in 2025 and 2030, as seen in Appendix H, Table H-1. The sum of the total MHD charging capacity based on this forecast was calculated to be 2,900 MW and 11,600 MW by 2025 and 2030, respectively, by taking the sum-product of the number of chargers and their respective power rating.

⁸ Based on the more recent CEC AB 2127 report available at:

<https://www.energy.ca.gov/publications/2023/second-assembly-bill-ab-2127-electric-vehicle-charging-infrastructure-assessment>, to support medium- and heavy-duty plug-in electric vehicles, California will need about 109,000 depot chargers and 5,500 public chargers for 155,000 vehicles in 2030, and 256,000 depot chargers and 8,500 public chargers for 377,000 vehicles in 2035. **For 2030:** 114,500 chargers divided by 2146 days (from today) = 53 chargers a day through 2030 needed. What is the baseline of current chargers? 2000? that would bring it to fifty-two chargers a day. **For 2035:** 264500 chargers divided by 3972 days - 67 chargers a day; if we assume a baseline of 2000, then 66 a day through 2035.

chart below also illustrates the size of the need for DC charging infrastructure and the pace of installation needed.⁹ Our analysis above is the same as our February 20 letter and does include medium-duty EVs and that may justify lowering a 5 percent cap in a future rulemaking.

In addition to our recommendation for a 5% cap of prior quarter deficits on HD-FCI, we see a need to clarify the 15-day change language so that it applies only to HD FCI and not to the overall FCI program. We recommend the following: *“If estimated potential FCI credits from all approved HD-FCI FSEs exceed 5.0 ~~2.5~~ percent of deficits in the most recent quarter for which data is available, the Executive Officer will not approve additional FCI pathways for HD-FCI FSEs and will not accept additional HD-FCI applications until estimated potential FCI credits for approved HD-FCI FSEs are less than 5.0 ~~2.5~~ percent of deficits.”* The second underline is intended to remove confusion as to which category the cap applies. There may be other places where amendments are needed to distinguish between FCI and HD-FCI.

Table 27 - HEVI-LOAD Infrastructure Results for 112,000 BEVs in 2030 and 289,000 BEVs in 2035¹⁰⁵

Charger Power Level	2030			2035		
	Number Chargers (% Depot / % Public)	Charging Energy (%)	Charging Time (%)	Number Chargers (% Depot / % Public)	Charging Energy (%)	Charging Time (%)
19; 25 kW	9,509 (100 / 0)	2.74	21.69	24,638 (100 / 0)	2.29	19.94
50; 75 kW	12,174 (87 / 13)	7.56	37.45	31,529 (88 / 12)	6.46	36.38
100; 150 kW	33,558 (96 / 4)	29.15	2.42	90,599 (97 / 3)	27.34	2.85
225; 250; 300 kW	12,257 (82 / 18)	20.17	23.71	31,362 (85 / 15)	19.10	24.40
350; 450; 500 kW	9,882 (83 / 17)	18.92	9.20	25,190 (86 / 14)	18.19	10.10
750; 900; 1,000; 1,050 kW	1,112 (0 / 100)	7.77	5.46	2,499 (0 / 100)	8.88	6.25
1,200; 1,400; 1,600 kW	1,498 (0 / 100)	13.69	0.07	3,809 (0 / 100)	17.73	0.09
Total	79,990 (88 / 12)	100	100	209,626 (90 / 10)	100	100

- g. Phase in the restriction “the FSE must dispense electricity in a given quarter to generate FCI credits.” We recognize the concern that sites with no electricity dispensed for many years are poor locations, and this should be discouraged. However, the 15-day change is written not at the site level, but at the charger

⁹ https://ww2.arb.ca.gov/sites/default/files/2022-01/Draft_2022_State_SIP_Strategy.pdf

(FSE) level. We respectfully request this requirement be amended to be at the site level. Alternatively, we recommend phasing the requirement in after a grace period of at least one year to account for the fact that widespread truck deployment may lag infrastructure development, which is exactly the problem that FCI can address. The intent of the FCI program is to encourage development of DCFC ahead of the need in order to solve the chicken and egg problem, so low utilization of sites is expected in the early years of the launch of electric HDVs. As a result, the current language is too restrictive and poses operational issues for operators of fleets, shared depots and truck stops.

- h. **Allow the executive officer to grant exceptions to the 5 miles from corridor limit.** Because of the difficulty in finding sites for shared and public charging for eHDVs (see comments above), we respectfully request additional flexibility on siting locations by allowing the executive officer to grant exceptions. The commercialization of new technology is always challenging, and unforeseen circumstances should be expected as it may turn out to be hard to find sites within five miles of a corridor especially if they require 10 MW to 40 MW of power.

3. *EVCA and CalETC largely support the proposed light- and medium-duty vehicle FCI program but request a few additional changes.*

For all the reasons listed in our February 20, 2024 letter, we support the following amendments proposed in the 15-day changes:

- Increasing the MW per site limit (per address) from 1 MW to 2.5 MW
- Removing the geographic limits
- Increasing the cap of prior quarter deficits from 0.5 percent to 2.5 percent
- Allowing private access stations to qualify (e.g. robotaxis, ride sharing vehicles)
- Matching the credit life for the FCI and hydrogen refueling infrastructure (HRI) programs at 10 years rather than having different lifespans for the two programs
- Allowing stations installed after 2022 to apply
- Modifying the payment requirements
- Dropping the connector requirements
- Allowing load management technologies such as battery energy storage

Recommendations

- a. **Allow less than 24-hour access if the executive officer approves.** We believe flexibility is needed as not all situations meriting exceptions may be covered by a permitting authority. There may be good reasons in some urban areas (e.g., safety) where less than 24-hour access is warranted on a case-by-case basis. In addition, the 15-day changes appear to have made it easier for placing public-

access DCFC in cities and towns to serve EV drivers who live in apartments and condominiums and where the DCFC is placed in locations such as curbside of a street or in public, non-profit or private parking lots. Building charging at multifamily residences is a well-recognized challenge and placing level 2 chargers on site is not always attractive or in many cases even possible. CARB has an opportunity with this LD FCI program to address this problem by encouraging DCFCs at nearby locations that will work not only for residents of apartments and condominiums but also for residents of single-family homes in denser urban areas where off-street parking is limited. The 24-7 requirement for public access should, at minimum, be slightly modified so that non-profit, government and private locations with one or two DCFCs that serve the community do not run into problems with rights-of-way laws. For example, a site such as a church or a bank needs to close their parking lot for at least one day a year in order to not lose their property rights. Ideally, CARB should also accommodate, through an exception process, other times that access could be blocked for a few hours (e.g., neighborhood festivals).

- b. **Allow zero carbon intensity electricity just like the proposed HRI program for LMD FCI.** The proposed 15-day change regulation gives preferential treatment to hydrogen stations over electric vehicle charging stations when assigning the CI for capacity credits. Hydrogen stations utilizing the HCI pathway receive a CI of the “Company-wide weighted average CI for dispensed hydrogen during the quarter or 0 g/MJ, whichever is greater.” DCFC stations utilizing the FCI receive a CI of the “California average grid electricity carbon intensity” regardless of whether the EV charging company is dispensing low-CI electricity such as retiring 0 CI renewable energy credits (RECs) for generating charging (FCI) credits. We encourage CARB to harmonize the CI definition for calculating HRI and FCI credits as “Company-wide weighted average for dispensed hydrogen / electricity during the quarter or 0 g/MJ, whichever is greater.”
- c. **Allow the same formula calculating credits for FCI as for HRI.** The formula for a public LMD-HRI station includes a 50% factor and for a private LMD-HRI station a 25% factor. However, the formula for FCI is much lower: an FSE at a public LMD-FCI charging site has a 20% factor and an FSE at a private LMD-FCI charging site has a 10% factor. We recommend that CARB more fully harmonize the HRI and FCI programs by having these factors be the same for both programs or, at minimum, be more similar than proposed.
- d. **Extend the new LD FCI application deadline to 2035.** We recommend that this program’s application deadline be extended to 2035 and not sunset in 2030. We are in a challenging phase of light duty EV adoption as the market needs to capture more skeptical mainstream buyers to meet the “hockey stick” ramp inherent in the ACC II requirements. The light duty FCI remains a very elegant and desirable tool to address the chicken-and-egg problem of how to accelerate EV infrastructure and EV adoption. Without the changes we recommend to the light duty FCI the pace of DCFC build-out could dramatically slow which makes

meeting ACC II much more challenging. Now is not the time to scale back this program. CARB can take a no-regrets approach to supporting the light-duty fast charging market by adopting a 2.5% cap with no geographic restrictions. While the addition of more credits into the market can lower credit prices several factors can counter this including the new acceleration mechanism.

- e. **Clarify that that staff's intent in the 15-day package is for there to be four 2.5% caps for four categories:** (LMD-FCI combined with the current light duty FCI, HD-FCI, LMD-HRI combined with the current light duty HRI, and HD-HRI). The current language is a little confusing because the current FCI program (public light duty) and proposed LMD FCI programs run concurrently as explained in the 15-day change notice. The use of the generic term "FCI" varies throughout the proposed regulatory language sometimes referring to the legacy FCI program and other times to the new FCI programs for LMD and/or HD DC charging. We ask that the final regulation language not use the term FCI by itself to refer to the legacy program, but rather be more specific, such as using the term "light-duty FCI" to refer to the legacy (current program. For example, one way to make the language clearer, is the following: *If estimated potential FCI credits from all approved light-duty FCI and LMD-FCI FSEs exceed 2.5 percent of deficits in the most recent quarter for which data is available, the Executive Officer will not approve additional FCI pathways for LMD-FCI FSEs and will not accept additional LMD-FCI applications until estimated potential FCI credits for approved light-duty FCI and LMD-FCI FSEs are less than 2.5 percent of deficits.*
- f. **Clarify what is meant by networking requirements.** CARB proposes a networking and communication requirement we request clarification around the data to be shared and the rationale. The proposed language states "Each FSE must be networked and capable of monitoring and reporting its availability for charging." This can be read to require public reporting of availability, which would not necessarily be relevant for shared chargers such as those found in multi-fleet charging depots (e.g. robotaxis and ride share vehicles) with defined customers and reservations.
- g. **Include land costs for new sites as an eligible initial capital cost, as these stations are extremely difficult to site and new locations are often needed.** It is difficult and expensive to find suitable sites for truck charging due to scarcity of land in urban areas (owning or 10-year leases), zoning restrictions, lease restrictions and, most importantly, the challenge in finding 5-20 MW (sometimes more) of grid capacity. The Venn diagram overlap of these needs is small. Land costs for public charging locations and shared charging depots for HD FCI are very significant and should be included in Section 95486.4(b)(4)(I).

- 4. **EVCA and CalETC support the proposed carbon intensity targets in Table 1 and Table 2 (e.g., 30% in 2030 and 90% in 2045) including the 9% step-down in the first year.**


EVCA and CalETC applaud staff for aligning the proposed Tables 1 and 2 requirements with CARB's Scoping Plan vision and providing industry and stakeholders with the certainty needed for LCFS to be successful to planners, implementers, and investors.

Currently the LCFS is overperforming as the carbon intensities are too easy for the market to meet, leading to low credit prices that are undermining investment in electric cars, trucks, buses, and charging infrastructure, as well as infrastructure for other low-carbon fuels. Multiple models support increasing the stringency of the LCFS to a minimum 30 percent reduction in carbon intensity by 2030. It is essential that the stringency be increased expeditiously and be implemented as soon as possible to ensure the LCFS continues to contribute substantially to the state's clean air, climate change, and zero-emission transportation requirements and goals. The LCFS has been a highly successful program as part of a broad package of regulations and incentives to address climate change. For the LCFS program to continue to be successful, the annual compliance requirements on regulated parties should be strengthened and extended. Currently, the LCFS credit market suffers from credit oversupply issues. When the 2030 standard was adopted, the CARB Board made it clear the standard could be adjusted if market circumstances called for adjustment. CARB must expeditiously address this market supply issue; increasing the overall stringency of the LCFS regulation is one way to accomplish this.

Regarding the need for a 9 percent step down, the credit bank is currently on track to have 30 million credits or more by the end of 2024. A step down of 7% is likely to reduce the bank by approximately six million credits, which is not enough of a drawdown to stabilize the market. That is why EVCA and CalETC support a strong step down of at least nine percent, which is likely to reduce the bank by sixteen million credits. A nine percent step down is the best and most efficient way to quickly relieve this glut in credits and get the market back on track so that it can efficiently incentivize low carbon fuels and reduce emissions.

We appreciate the opportunity to comment on these important changes to the LCFS regulation. Thank you for your consideration.

Regards,

A handwritten signature in blue ink, appearing to read 'Reed Addis', on a light-colored rectangular background.

Reed Addis
Governmental Affairs
Electric Vehicle Charging Association



Laura Renger, Executive Director
California Electric Transportation Coalition

cc: Rajinder Sahota
Matthew Botill
Jordan Ramalingam



August 27, 2024

Clerk's Office
California Air Resources Board
1001 I Street
Sacramento, CA 95812

Submitted electronically via: <https://ww2.arb.ca.gov/applications/public-comments>

Re: Northern California Power Agency's Comments on 15-Day Changes to the Low Carbon Fuel Standard Regulation

The Northern California Power Agency¹ ("NCPA") respectfully submits these comments to the California Air Resources Board ("CARB") regarding the 15-day Changes to the Low Carbon Fuel Standard ("LCFS") regulation as posted on August 12, 2024.

NCPA supports the LCFS program as an essential and effective strategy for diversifying California's transportation fuels and significantly reducing greenhouse gas ("GHG") emissions from the transportation sector to further the State's climate change goals. POU's are uniquely positioned to complement the State's transportation electrification efforts by tailoring programs to the specific needs of the communities they serve. LCFS credit revenue is a critical funding source for transportation electrification incentive programs for POU's, and LCFS funds are directed back into the community.

151.1 NCPA supports CARB's proposal to eliminate the pre-2011/post-2010 delineation for Fixed Guideway System crediting, recognizing that no efficiency difference is recorded in the actual operation of newer vs. older railway systems. Systems like the Bay Area Rapid Transit (BART) provide public transit services that are essential to California's climate goals, and the proposed updates will help to ensure that transit agencies can continue to provide services.

151.2 However, NCPA urges CARB to make the following necessary modifications to the regulation in 15-day changes to ensure that utilities can continue to participate in the LCFS program and administer transportation electrification programs funded by the LCFS.

¹ NCPA was established in 1968 to construct and operate renewable and low-emitting generating facilities and assist in meeting the wholesale energy needs of its 16 members: the Cities of Alameda, Biggs, Gridley, Healdsburg, Lodi, Lompoc, Palo Alto, Redding, Roseville, Santa Clara, Shasta Lake, and Ukiah, Plumas-Sierra Rural Electric Cooperative, Port of Oakland, San Francisco Bay Area Rapid Transit District, and Truckee Donner Public Utility District – collectively serving nearly 700,000 electric consumers in Central and Northern California.

I. THIRD-PARTY VERIFICATION OF ELECTRICITY CREDITS

151.2
Cont.

The proposed order expands the applicability of Verification of Quarterly Fuel Transactions Reports in section 95000(c) to include all types of electricity credits except for base credits. While some verification of electricity credits may be warranted, the Proposed Order does not adequately recognize fundamental differences between electricity and other fuel types, and the wide variance in the number of credits generated by reporting entities. This change will disproportionately impact small fleets, non-profits, and small and rural cities.

A. Low-Volume Charging Should Be Exempt from Verification Requirements

151.3

The deferment of verification for entities generating fewer than 6,000 credits doesn't go far enough to protect entities from the high costs of verification, as even verification every three years may lead to costs that exceed the proceeds from credits generated during that period. Entities generating a low number of credits, perhaps under 2,000 credits per year, should continue to be exempt from the verification requirements to ensure that we aren't inadvertently causing barriers to entry for smaller entities. CARB should consider how many credits would be needed annually to support expected third-party verification costs and maintenance of the chargers.

Many NCPA members own and operate a small number of EV chargers within their territories as a public service for their communities and to ensure charger availability. This service is especially critical in remote areas, underserved areas, and areas with lower EV adoption, as it may not yet be profitable for larger charger companies to invest in infrastructure in such locations.

NCPA itself, as a public agency with a small fleet, has invested in charging infrastructure at its headquarters, and its participation in the LCFS allows the aggregation and sale of credits on behalf of NCPA Members. The proposed verification requirements would likely cause NCPA to drop out of the LCFS, making it more difficult for many of our utility Members to participate in the LCFS and potentially causing those utilities to drop out as well.

B. Site Visits Should Be Based on an Assessment of Risk

151.4

The specific process for third-party verification is set forth in section 95501 and is essentially unchanged by the amendments, despite the expansion to various types of electricity credits. The regulatory requirements for site visits are drafted inflexibly and do not differentiate between fuel pathways and quarterly fuel reports. For example, the regulations require the same verification steps for a hydrogen facility as a single EV charger with 1 MWh of monthly charging. EV charging stations are largely standardized pieces of equipment with existing accuracy regulations. Requiring site visits will yield very little data of value and will instead be wasteful of time and resources.

The regulation should be amended so that site visits are not required for quarterly fuel reports for electricity credits; desktop reviews should be relied on whenever possible.

C. The Less Intensive Verification Process Should Be Allowed for Entities with Deferred Verification

151.5 While the regulation does incorporate a new process allowing for “less intensive verifications” for certain entities only reporting electricity transactions, the mechanism also appears to require annual verifications, thereby undoing any good achieved by the deferment for entities under 6,000 credits. This inconsistency should be corrected by removing the word “annual” from section 95501 (h):

Eligibility for Less Intensive Verifications. Upon receiving a positive verification statement under full verification requirements, fuel reporting entities required to obtain the services of a verification body under section 95500 and only reporting electricity transactions identified in section 95500(c)(1)(E) may choose to obtain less intensive verification services for the following two ~~annual~~ verifications of their Quarterly Fuel Transactions Reports.

II. **ASSIGNMENT OF BASE CREDITS TO ORIGINAL EQUIPMENT MANUFACTURERS**

151.6 The 15-day changes include a substantial addition to the provisions regarding base credits, which have historically been allocated to electric distribution utilities (EDUs). The newly proposed amendments would instead potentially allocate up to 45% of base credits to original equipment manufacturers (OEMs) instead of the EDU fuel provider. This proposal is a significant departure from the current regulation and has not been vetted in a workshop. Base credits are a vital funding source for POU to support transportation electrification in their communities, and funding should not be diverted to OEMs at the cost of community and equity-focused programs.

If CARB determines that a mechanism is needed to allow for the allocation of base credits to OEMs, then the regulation should be clarified to ensure that utility funding for holdback programs is protected, and to provide more explicit timing for any potential OEM allocations. NCPA supports the redline edits as proposed in the joint “CA Utilities” comment letter, submitted on August 27, 2024.

A. POU Holdback Program Funding Should Not Be Impacted

The 15-day changes authorize the Executive Officer to issue base credits to OEMs if certain criteria are met, but do not provide any details or limitations on how the base credits will be redirected from the EDUs to support the OEM allocation. A potential OEM credit allocation must not impact the credit allocations for utility holdback programs.

Without clarifying language, the regulations could be interpreted as allowing a 45% reallocation from each EDU, which would represent nearly half of the base credits small POUs currently receive. Without this vital funding source, small utilities will either need to cancel transportation electrification programs, or potentially rely on ratepayer funds.

- 151.7 NCPA recommends that CARB clarifies that EDU holdback credits will not be reduced as a result of the new provisions, and that the credits allocated to the OEMs will not exceed the number of credits that would have been transferred to the Clean Fuel Reward (CFR) program according to the table in section 95483(c)(1)(A)(2).

B. A Deadline Must Be Established To Provide Certainty Regarding the Allocation of Base Credits

- 151.8 CARB must include language establishing a deadline for the Executive Officer's determination of whether to issue base credits to OEMs. Establishing a deadline for a one-time assessment will ensure that the utilities have appropriate time and information to determine whether a CFR transfer is required and whether the utilities will need to move forward with implementing the revised CFR program.

Requiring the Executive Officer's decision by March 15, 2025, will ensure that the EDUs have enough time to initiate a timely transfer of credit proceeds to the CFR program, if required. In addition, a deadline of March 15 would provide clear direction to the utilities as to whether they will need to develop and implement the proposed statewide CFR program for medium- and heavy-duty vehicles, as directed by the regulation.

C. CARB Should Ensure Oversight of OEM Base Credit Programs

The reallocation of base credits from a utility-run statewide CFR program to the OEMs should require, at the least, the same oversight from the Executive Officer and CARB. Therefore, the regulation should be amended to include a requirement for the Executive Officer to review and report to the Board on the implementation of OEM programs annually, beginning January 1, 2027, with recommendations for continuing or decreasing allocations to the OEMs.

III. REQUIREMENTS FOR UTILITY HOLDBACK CREDITS

As noted in NCPA's previous comments², the requirements for utility holdback credits must recognize that program needs will vary based on the territory and population served. The regulatory proposal, as drafted, will make it more difficult for smaller utilities to receive and distribute the funding necessary to support transportation electrification programs.

² Northern California Power Agency's Comments on the Proposed Amendments to the LCFS, submitted February 20, 2024: <https://www.arb.ca.gov/lists/com-attach/6983-lcfs2024-UT9XMIijUGIBWAJh.pdf>

A. The Equity Requirement for POUs should be set at 50%

The current regulatory proposal does not align with the posted “Appendix E: Purpose and Rationale for Low Carbon Fuel Standards Amendments;” CARB should correct this inconsistency and update section 95483 (c) to set the equity requirements for POUs at 50%. POUs represent specific and limited territories within the State, with a wide variety of populations, EV densities, and community needs. Designing and implementing effective transportation electrification programs for low-income and/or disadvantaged communities can be challenging, and the uptake and timing of projects are difficult to predict. There will be natural fluctuations in program spending year-to-year, and an annual requirement of 50% allows for better planning to maximize the impact of equity spending.

B. The LCFS should not require specific rate structures as a barrier to accessing base credits

The requirement in section 95483 (c) for EDUs to specifically provide rate options is inappropriate and will potentially negatively affect transportation electrification programs in areas with low EV adoption. The five largest utilities in the State already offer rate options to encourage off-peak charging, as do most medium-sized POUs. However, there are POUs that are either 1) unable to adopt such a rate option due to current limitations in metering infrastructure, or 2) do not yet need such a rate option.

151.9 Adopting rate options to encourage off-peak charging is an ongoing consideration for all utilities as the deployment of transportation and building electrification increases. It can take years to develop and approve new rate structures. In the meantime, such POUs can encourage off-peak charging through non-rate mechanisms. Requiring a rate option as an eligibility requirement to access base credits could potentially cause POUs to drop out of the LCFS program and, therefore, cease funding for transportation electrification programs in those territories. Therefore, NCPA recommends striking the following from 95483 (c)(1)(A) (in red):

~~(1) EDUs seeking eligibility to generate base credits must provide rate options that encourage off-peak charging and minimize adverse impacts to the electrical grid;~~

C. Caps for administrative costs for equity programs should remain at 10%

151.10 The costs associated with the development and implementation of equity programs are vital to the success of such programs, and reducing the current cap from 10% to 7% is inconsistent with the needs for administering such programs. Smaller utilities, in particular, have higher administrative costs and fewer resources to administer programs that support the adoption of EV technology and deployment of EV infrastructure in equity communities. CARB should

maintain the current cap of 10% for administrative costs and its current guidance detailing what costs are included in the calculation.

D. Additional support is needed to jumpstart transportation electrification in Small POU territories

Pursuant to section 95483(c)(1)(A), unallocated base credits are deposited into the joint Clean Fuel Reward (CFR) account but are tracked separately by the CFR program administrator. These accumulated credit proceeds could be reallocated to the State's smallest utilities to help provide the additional funding needed for the start-up costs involved in designing and launching transportation electrification programs.

NCPA recommends including the following regulatory language (in blue) that allows the CFR Steering Committee to work with the Executive Officer to design one-time transfers to qualifying small EDUs:

Proceeds from non-opt-in EDU base credits that were allocated to the Large EDUs beginning with the deposit of Q2 2019 credits through the deposit of Q2 2024 credits and then transferred to the Clean Fuel Reward program pursuant to section 95483(c)(1)(A) may be transferred by the Clean Fuel Reward Program Administrator to small EDUs opted in to the LCFS program by March 31, 2025. Any base credit proceeds reallocated in this manner must be spent by the recipient small EDU in accordance with section 95491 (e)(5). The Executive Officer must approve the Clean Fuel Reward Program Administrator's plan for distribution of previously unallocated base credit proceeds prior to any transfers.

E. The list of Holdback Programs should be reorganized and clarified

NCPA supports the California Electric Transportation Coalition's (CaETC) proposed revisions to the list of holdback programs in section 95483, as detailed in its comment letters submitted on February 20, 2024³, and August 27, 2024. The holdback program list should be combined and updated to ensure that utilities can provide the transportation electrification programs needed to address the evolving needs of their communities.

- There should be one pre-approved list of programs, rather than maintaining different program lists for equity and non-equity. Many program types may contain an equity and non-equity component, and the current reporting structure already requires documentation to account for the portion directly benefitting equity communities. Maintaining two separate lists causes confusion and delays in program design.

³ CaETC's Comments on Proposed 2024 LCFS Amendments, submitted February 20, 2024: <https://www.arb.ca.gov/lists/com-attach/6856-lcfs2024-UjFQN1Y7UGYKeFU2.pdf>

- NCPA supports including projects for medium- and heavy-duty (MHD) electrification as an “equity” projects, but believes the regulations should clarify that any such project should qualify as equity without consideration of location.
- The list of agencies that POUs may consult in creating workforce development projects should be expanded to include other pertinent entities, such as California Community Colleges, community-based organizations, and POU Governing Boards.
- Education and outreach projects pertaining to transportation electrification technologies and focused on equity communities are still essential tools for increased adoption in equity communities, and should be included on the project list.

IV. CONCLUSION

We appreciate the Board’s consideration of these comments, and we look forward to continuing our collaboration with CARB and other stakeholders on regulatory amendments to ensure the success of the LCFS program.

Respectfully submitted,



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August 27, 2024

California Air Resources Board
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RE: Comments of Vehicle Grid Integration Council on the Supplemental 15 Day Notices

The Vehicle Grid Integration Council (“VGIC”) appreciates the opportunity to provide comments on the California Air Resources Board’s (“CARB”) Proposed 15-Day Changes to the Proposed Amendments to the Low Carbon Fuel Standard (“LCFS”).

VGIC supports the modifications being proposed by staff in these amendments to strengthen the LCFS program. Given LCFS's success so far, increasing the program stringency is the right step towards furthering its goals: driving California towards the use of cleaner fuels and decarbonizing the transportation sector as a whole.

Additionally, as detailed in the below comments, VGIC supports:

1. Retaining the December 2023 update pre-approving electric distribution utility (“EDU”) holdback funds to be used for VGI initiatives.
2. Clarifying that EDU holdback funds may be used for programs supporting *both* equity and vehicle-grid integration (“VGI”).
3. Adding an option to allocate base credits to auto original equipment manufacturer (“OEM”).
4. Ensuring OEM base credit revenue can also be used for VGI programs.

About VGIC

VGIC is a 501(c)6 membership-based advocacy group committed to advancing the role of electric vehicles (“EV”) and VGI through policy development, education, outreach, and research. VGIC supports the transition to a decarbonized transportation and electric sector by ensuring the value from flexible EV charging and discharging is recognized and compensated to achieve a more reliable, affordable, and efficient electric grid.

1. VGIC supports modifications to the utility holdback programs and allowing utilities to use credits for vehicle-grid integration projects.

VGIC supports the modifications to the EDU holdback programs proposed in the original 45-day amendments as retained in the 15-day updated language. The amendments reduce the amount of base credits that California's three large investor-owned utilities ("IOUs") must spend on the California Clean Fuel Reward program to 50% and allow more funding to flow to the IOUs' utility holdback programs. It is worth noting that while the California Clean Fuel Reward program was paused several years ago due to low funding availability, significant funding has likely been amassed but not yet implemented since that pause.

CARB proposes a list of equity projects utilities can spend funds on in section 95483(c)(1)(A)5a, including investing in charging infrastructure, EV ridesharing, rebates and incentives for vehicle purchases and leases, and investments in distribution infrastructure. Of critical importance to VGIC and stakeholders working diligently to establish widespread vehicle-grid integration in California, the amendments also provide a list of potential projects in 95483(c)(1)(A)5b that utilities can spend non-equity funds on including:

- i. Investments in grid-side distribution infrastructure necessary for EV charging.
- ii. Support for vehicle-grid integration with projects such as:
 - I. Encouraging the optimization of EV charging through education in the following areas: peak demand, rate pricing, grid emergencies, potential power shutoffs, infrastructure deferral, renewable integration, and/or other signals and grid needs to provide grid and customer benefits.
 - II. Providing program incentives to encourage driver participation in monitored/managed charging, demand response, or vehicle-to-load / vehicle-to-grid applications.
 - III. Supporting the deployment and installation of bidirectional charging equipment.
 - IV. Other innovative approaches to promoting and managing EV charging and discharging that provides benefits to customers and the grid.
- iii. Hardware and software that decrease the cost of or avoid updates to infrastructure, including load management software or outlet splitting.

152.1 VGIC strongly supports utilizing utility holdback funding for all of the VGI projects and load management software outlined above. VGI can provide a wide range of benefits including the following recognized by the California Public Utilities Commission ("CPUC"):¹

¹ CPUC Decision 20-12-029.

- 152.1 Cont. • Accelerating the adoption of EVs by providing additional revenue streams that lower the total cost of vehicle ownership for individual owners and fleet operators.
- Reducing costs to electricity ratepayers by reducing congestion on existing power distribution infrastructure and costly distribution system upgrades, as well as reducing the need to invest in new fossil fuel electricity generation.
 - Supporting further decarbonization of the electric sector by avoiding curtailment of renewables and providing grid services.
 - Accelerating reduction of carbon and criteria pollutant emissions in the transportation sector.
 - Improving grid resiliency and security, including for public safety power shutoff (PSPS) events.

These are all benefits that LCFS revenues and the resulting holdback programs should support.

2. VGIC recommends modifications to clarify that utility holdback funds may be used for programs that support *both* equity and vehicle-grid integration projects.

152.2 VGIC understands that the list of equity projects provided in 95483(c)(1)(A)5a are approved for the utilities to spend equity funds on. The list in 95483(c)(1)(A)5b describes “examples of pre-approved uses for these other holdback credit proceeds.” However, VGIC strongly recommends CARB clarify that utilities *can* spend equity funds for the types of VGI projects listed in 95483(c)(1)(A)5b if they are for the benefit of equity customers. This change would inject much-needed clarity not only to the EDUs tasked with designing programs but also to the CPUC, which may otherwise inadvertently hamstring the EDUs’ ability to implement equity-focused VGI programs. Put differently, CARB should clarify that EDUs may use holdback funds on initiatives that simultaneously support the intents of 95483(c)(1)(A)5a (i.e., equity) and 95483(c)(1)(A)5b (i.e., VGI).

3. VGIC supports allowing base credits to be allocated to the auto OEMs.

As discussed above, base credits have traditionally been generated by and allocated to the EDUs to spend on the California Clean Fuel Reward program and utility holdback programs and projects. However, the California Clean Fuel Reward program has been suspended since 2022 due to low funds. CARB now proposes to pivot the program to focus on medium- and heavy-duty vehicles instead of light-duty.

At the same time, funding light-duty and other projects may remain an appropriate policy direction. VGIC supports allowing CARB to allocate up to 45% of base credits to the auto OEMs if less than 30% of model year 2024 new light-duty vehicle sales are ZEVs. Significant increases in light-duty ZEV sales are needed to reach the Advanced Clean Cars II 35% sales requirement in 2026.

Allocating base credits to the OEMs to provide additional funding for the ZEV transition will allow California to move towards its clean transportation goals.

If credits are allocated to the OEMs, VGIC supports pausing the requirement that EDUs continue to the California Clean Fuel Reward program and allowing the EDUs to focus on holdback programs. As discussed above, utility holdback projects can provide valuable incentives for EV adoption, equity goals, and VGI initiatives.

4. VGIC recommends OEM base credits be eligible for the same pre-approved project examples detailed for utilities in subsection 95483(c)(1)(A)5.

The Proposed Amendments outline the types of pre-approved projects for OEMs receiving base credits in 95483(c)(1)(D)1. These are:

- a. Additional rebates and incentives beyond existing local, federal, and state rebates and incentives for purchasing or leasing new or previously owned EVs. The Executive Officer may require that a portion of OEM base credit proceeds in a calendar year be spent on this project type.
- b. Installing EV charging infrastructure and subsidized EV charging plans.
- c. Multilingual marketing, education and outreach [...]
- d. Alternatively, OEMs may develop and implement other projects that promote transportation electrification. These alternative projects are subject to approval by the Executive Officer. [...]

152.3 VGIC recommends that this list be expanded to include the other pre-approved projects the utilities are allowed fund under 95483(c)(1)(A)5, as discussed above. These projects also achieve the goals of increasing EV adoption and further decarbonizing the transportation sector. OEMs should be allowed to fund VGI projects in particular, as these projects can unlock broader benefits to electric ratepayers and all Californians. Notably, OEMs, like EDUs, would not be required to use funds for such initiatives. Instead, with this change, OEMs and EDUs would both be pre-approved to use funds for such initiatives.

Conclusion

VGIC is overall supportive of the Proposed Amendments to LCFS and is excited to continue to work with CARB on achieving California's transportation decarbonization goals.

Sincerely,

/s/ Zach Woogen

Zach Woogen

Interim Executive Director

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August 27, 2024

Clerk of the Board
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Submitted electronically via: <https://ww2.arb.ca.gov/applications/public-comments>

**RE: POET COMMENTS ON AUGUST 12, 2024, PROPOSED LOW CARBON FUEL
STANDARD AMENDMENTS**

Dear CARB Members:

POET appreciates the opportunity to provide comments on the California Air Resources Board's ("CARB") August 12, 2024, Proposed Low Carbon Fuel Standard ("LCFS") Amendments ("Revised Proposed Amendments"). POET has participated actively in CARB's ongoing rulemaking and submitted detailed [comments](#) on its own behalf and as part of a [coalition](#) on February 20, 2024, regarding the Amendments initially proposed in December 2023 ("Original Proposed Amendments"). POET also attended the LCFS rulemaking workshop held on April 10, 2024, and submitted written [comments](#) regarding the matters discussed and presented during the workshop.

As the global leader in biofuels and California's leading bioethanol supplier, POET has embraced the LCFS, seizing the program's incentives to lower the carbon intensity ("CI") of its fuel and delivering greenhouse gas ("GHG") reductions and public health benefits to the State of California. We write to express our continuing concerns with CARB's paradigm-shifting revisions, which will stifle innovation, eliminate paths to decarbonization, and mandate large-scale changes in the bioethanol supply chain without recognizing the carbon reductions that accompany CARB's mandate. CARB's proposal also threatens the technology-neutral principles that underlie the LCFS, and interposes costly burdens on biofuel production that will almost certainly raise the price of gasoline. Because the likely and practical consequences of CARB's proposals will be to drive lower-carbon bioethanol into other markets, CARB's proposed rule also undermines the primary objectives of the LCFS and of California's Global Warming Solutions Act ("AB 32").¹

¹ California Global Warming Solutions Act, Cal. Health & Safety Code § 38500-38599.

The Revised Proposed Amendments would establish sustainability requirements applicable to biomass feedstocks, which include “all crop-based and forestry-based products used as feedstocks for finished fuel and/or process energy,” that would be phased in beginning in 2026 through 2031.² Although some waste and residue feedstocks are not subject to the sustainability requirements, most biomass wastes types fall outside of this exemption.³ Biomass subject to the sustainability requirements must “maintain continuous third-party sustainability certification under an Executive Officer approved certification system.”⁴ CARB will approve certification systems recognized by the European Commission for the European Union Renewable Energy Directive (“EURED”) 2018/2001 as of December 1, 2025, and may approve other certification systems that meet specific criteria.⁵ Certification systems must be resubmitted for approval every three years to ensure compliance with these criteria.⁶ Under the Revised Proposed Amendments, CARB may determine that existing land use change (“LUC”) values are not representative of a region, feedstock, or fuel and may assign a more conservative LUC value based on the best available empirical data.⁷

153.1

As articulated further below, POET urges CARB to refrain from adopting the sustainability requirements proposed in the August 12, 2024, revisions, and to instead address the issue of feedstock sustainability in a future rulemaking that also acknowledges and credits the carbon reductions associated with sustainable agricultural practices. POET also urges CARB to re-evaluate the treatment of proven waste feedstocks, like corn kernel fiber and corn stover, which are now excluded from the definition of “specified source feedstocks,” and therefore unnecessarily subject to the same sustainability requirements as all other biomass. When reviewing and revising LUC values, CARB should undertake a rulemaking and provide an opportunity for public comment on the proposed revisions. CARB should lower the LUC values when supported by empirical data. CARB should also revise its proposed CA-GREET 4.0 model to include scientific advancements embodied in the latest version of Argonne National Laboratory’s GREET Model, and to modify elements of the model that inadequately capture emissions in the biofuel lifecycle. Finally, CARB’s Standardized Regulatory Impact Assessment⁸ and Environmental Impact Analysis⁹ do not address the sustainability requirements and potential costs associated with requiring certification.

² CARB, *Attachment A-1.2, Proposed 15-Day Changes and 45-Day Changes Compared to the Current Regulation, Proposed Amendments to the Low Carbon Fuel Standard Regulation*, § 95488.9(g) (Aug. 12, 2024).

³ *Id.* at § 95488.8(g)(1)(A).

⁴ *Id.* at § 95488.9(g)(1).

⁵ *Id.* at § 95488.9(g)(3)(C)(1); § 95488.9(g)(5).

⁶ *Id.* at § 95488.9(g)(5)(G).

⁷ *Id.* at § 95488.3(d)(2).

⁸ CARB, *Appendix C-1 Standardized Regulatory Impact Assessment (SRIA), Proposed Amendments to the Low Carbon Fuel Standard Regulation* (Sept. 9, 2023), <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/appc-1.pdf>.

⁹ CARB, *Release of Recirculated Draft Environmental Impact Analysis for the Proposed Low Carbon Fuel Standard Regulation* (Aug. 16, 2024), https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/notice_recirc_drafteia.pdf.

I. CARB's Proposed Sustainability Requirements Eliminate Practical Paths to Decarbonization

Under the statutory mandate imposed by AB 32, CARB designed the LCFS “to achieve the maximum technologically feasible and cost-effective greenhouse gas emission reductions.”¹⁰ The LCFS program has operated to serve this statutory goal by evaluating the CI of transportation fuel on a lifecycle basis, recognizing that “greenhouse gas (GHG) emissions from all steps in the fuel’s life cycle” must be assessed to understand the actual carbon impact of fuel production and consumption.¹¹ Using a version of Argonne National Laboratory’s GREET¹² Model (the CA-GREET Model), the LCFS program has sought to measure the CI of specific fuel pathways based on the actual CI of developing fuel feedstocks, manufacturing finished fuel, transporting fuel to the marketplace, and consuming fuel on the road. Although POET has expressed and continues to hold disagreement with certain aspects of CARB’s modeling approach, the CA-GREET Model together with the LCFS regulations have worked in tandem to reward carbon-reducing innovations. Over the years, the program has provided incentives that align with POET’s long-term investments in renewable and lower carbon sources of process energy at its bioprocessing plants, carbon capture and sequestration projects, climate-smart agriculture (“CSA”) programming and procurement, and the production of fuel from waste feedstocks like corn kernel fiber.

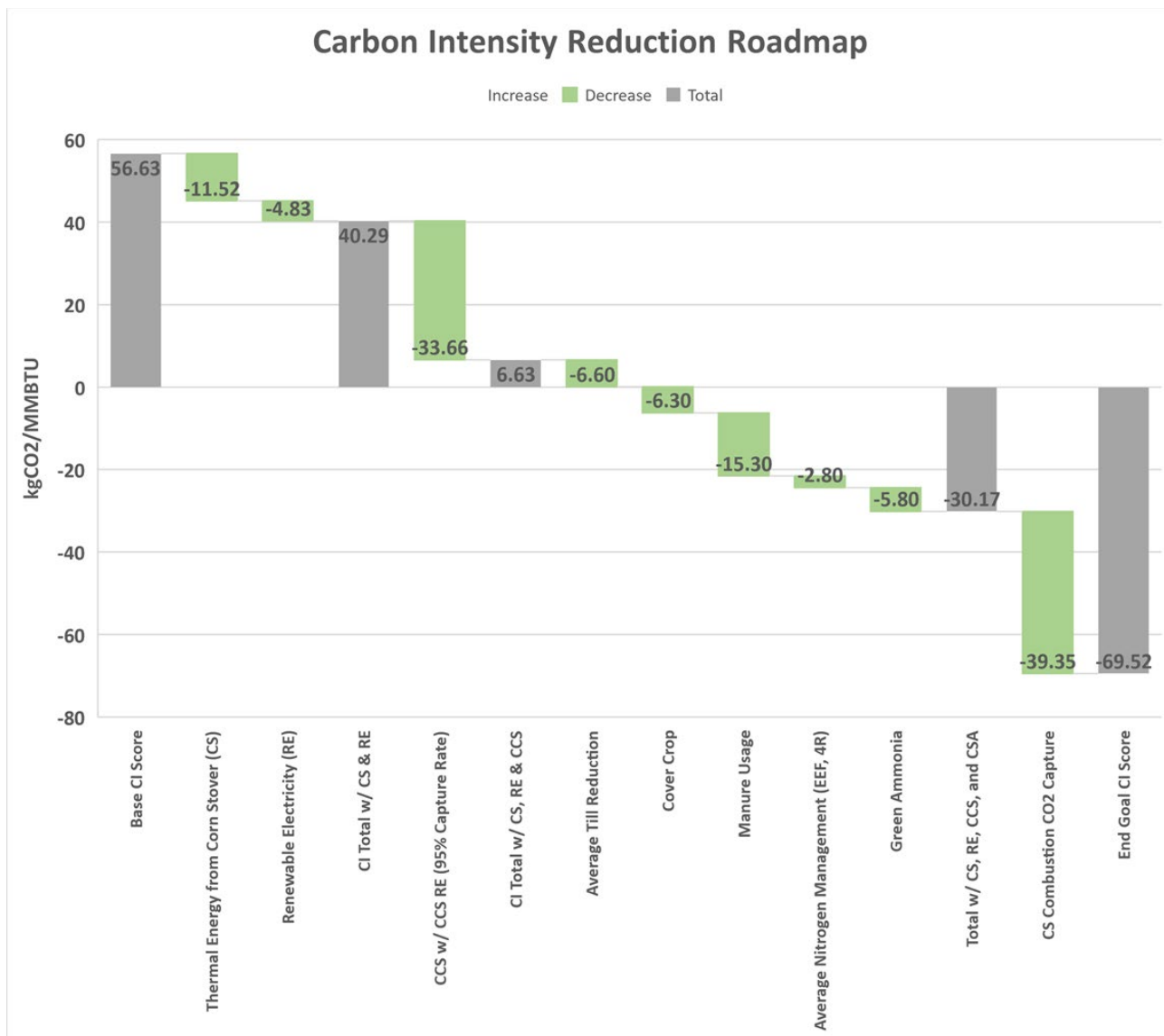
At present, and under Argonne’s most recently updated research and development model (“R&D GREET 2023”),¹³ POET sees the potential for producing deeply decarbonized liquid fuel that, if credited, would substantially advance California’s LCFS program goals. The chart below, showing the R&D GREET 2023-modeled carbon reductions associated with practices that could be adopted at POET’s bioprocessing facility in Emmetsburg, Iowa, including reductions associated with a range of CSA practices, demonstrates that POET could produce bioethanol with a *negative CI* — approximately -70kgCO₂/MMBTU.

¹⁰ *Supra* note 1 at § 38560.

¹¹ CARB, CA-GREET3.0 Supplemental Document and Table of Changes, at 4 (Aug. 13, 2018), https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/ca-greet/cagreet_supp_doc_clean.pdf?_ga=2.264272271.1059097996.1724081758-380312612.1693496480

¹² Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation GREET Model.

¹³ Argonne National Laboratory, *Energy Systems and Infrastructure Analysis. R&D GREET Model* (Apr. 30, 2024), <https://greet.anl.gov/index.php>.



Unfortunately, CARB’s proposed LCFS program revisions cut off several available paths to decarbonization demonstrated above. Indeed, other than bioethanol pathways incorporating carbon capture, which CARB has yet to approve for any biofuel producer and which remain years away from implementation for most producers, none of the practical decarbonization pathways shown above would be feasible under CARB’s proffered changes. Rather, biofuels producers would be compelled to certify the sustainability of their feedstocks without earning credit for the well-recognized carbon reductions associated with the types of sustainable farming practices likely required for certification.

Furthermore, by subjecting recognized waste feedstocks like corn kernel fiber and corn stover to sustainability requirements CARB’s proposal imposes unnecessary costs and eliminates the

economic value and incentive to harvest and convert these low-carbon wastes into fuel and process energy.

As concerns renewable electricity, it remains noteworthy that CARB's LCFS program continues to authorize indirect accounting only for hydrogen production, refusing to facilitate practical investments by biofuel and sustainable aviation fuel ("SAF") producers in additional renewable electricity sources that would drive down the CI of liquid fuel production.

POET urges CARB to reconsider and abandon these proposed program revisions, which will only operate to discourage decarbonization of biofuels and increase the cost of ethanol blended into California's transportation fuel supply.

II. CARB Should Credit Biofuels with CSA-Related CI Reductions That Can Be Verified Through the Sustainability Certification Process.

POET maintains the view, expressed in earlier [comments](#), that corn grown in the United States is a low-risk feedstock that does not present the concerns workshopped, studied and discussed as part of the 2024 LCFS rulemaking process. Indeed, the guardrails already in place in California's program, including an extremely conservative indirect land use change ("ILUC") penalty of 19.8 g/MJ, and an overlay of rigorous state and federal environmental laws addressing impacts to air, water, land use and wildlife, appropriately account for any concerns regarding the sustainability of domestic corn ethanol. CARB's revised proposal, which fails to acknowledge more recent scientific studies regarding land use change and imposes on-farm certification requirements, places unnecessary burdens on biofuel production.

To the extent that CARB moves forward with the sustainability certifications it envisions, the program should recognize agricultural-related carbon reductions that will be verified by the third-party auditor programs CARB intends to mandate. Failing to do so simply ignores real and easily quantifiable carbon reductions, and will exacerbate the economic impacts and market disruptions likely to follow from CARB's proposed rules.

As we commented in connection with CARB's April 10, 2024 workshop, California's approach is at odds with the Biden Administration's Inflation Reduction Act ("IRA"), which incentivizes sustainability on the farm by offering tax incentives that will fund changes in how crops are planted, fertilized and cultivated.¹⁴ Since April, the United States Department of Agriculture (USDA) has been working to further develop and potentially expand a program that would reward carbon reductions based on climate smart agricultural practices. POET's [comment](#) in response to

¹⁴ Department of the Treasury and IRS, *Sustainable Aviation Fuel Credit; Lifecycle Greenhouse Gas Emissions Reduction Percentage and Certification of Requirements Related to the Clean Air Act; Climate Smart Agriculture; Safe Harbors*, Notice 2024-37, at Section 4.01 (Apr. 30, 2024), <https://www.irs.gov/pub/irs-drop/n-24-37.pdf> ("Notice 2024-37").

a recent USDA Request for Information on this IRA-related program addresses in detail how USDA and Treasury could account for CSA carbon reductions using precisely the same certification schemes and GREET-model tools available to California under the LCFS.

As noted in our comments to USDA, by leveraging the GREET FD-CIC and the Century/DayCent models,¹⁵ CARB could calculate inputs including corn yield, fertilizer and chemical application rates, and agronomic practices. The FD-CIC includes a lookup table based on a version of the Century/DayCent model that quantifies the soil organic carbon impacts of agronomic practices including cover crop, manure application, and tillage. The Century/DayCent model was developed “to simulate changes in soil organic matter (“SOM”), plant productivity, nutrient availability, and other ecosystem parameters in response to changes in land management and climate.”¹⁶ Additional required model inputs include “soil texture, current and historical land use, and daily maximum and minimum temperature and precipitation data.”¹⁷

All of the underlying data necessary to compute these modeled carbon impacts could be collected and certified using the same verifications schemes, like the International Sustainability and Carbon Certification program (“ISCC”) referenced in CARB’s proposal.

III. CARB Should Exclude From its Proposed Sustainability Requirements Recognized Agricultural Wastes Like Corn Stover and Corn Kernel Fiber

CARB’s proposed revisions exclude certain wastes defined as “Specified Source Feedstocks” from the sustainability certifications otherwise imposed by proposed Section 95488.9(g).¹⁸ Corn stover and corn kernel fiber are not on that list. Although specified source feedstocks must satisfy certain chain of custody requirements under CARB’s proposal, these wastes, including used cooking oil and other fat and grease byproducts of commercial and industrial processes need not satisfy the more onerous sustainability requirements imposed for all agricultural feedstocks, including well-established and long recognized wastes. Indeed, the proposed rules make clear in proposed §§ 95488.6(a)(3) and 95488.7(a)(4) that Tier 1 and Tier 2 fuel “pathways utilizing biomass feedstocks or process energy must meet the sustainability requirements of section 95488.9(g).”¹⁹

¹⁵ *DayCent Ecosystem Model. The Daily Century Ecosystem, Soil Organic Matter, Nutrient Cycling, Nitrogen Trace Gas, and Methane Model. User Manual, Scientific Basis, and Technical Documentation*, Nat. Res. Ecology Lab’y, Colo. State Univ. (2018), https://www.nrel.colostate.edu/wp-content/uploads/2019/04/DayCent_Manual_full_05.02.108-1.pdf.

¹⁶ *Id.* at 11.

¹⁷ *Id.*

¹⁸ See CARB, *Attachment A-1: Proposed 15-Day Changes Proposed Amendments to the Low Carbon Fuel Standard Regulation*, at § 95488.8(g)(1)(A) (Aug. 12, 2024), https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_atta-1.pdf.

¹⁹ *Id.* at § 95488.6(a)(3).

This proposed treatment of agricultural wastes is unnecessary and uneven compared to the proposed handling of other types of waste feedstocks under the LCFS. Furthermore, it is unclear what policy goal is served by requiring that biomass waste that would otherwise be discarded, or in the case of corn stover, left to decompose on the field, be grown and harvested in accordance with particular standards – standards that do not apply to the industrial and commercial operations generating other waste feedstocks. As a practical matter, the rule is likely to result in adverse consequences for CARB’s LCFS program.

POET and other biofuel producers now co-process corn kernel fiber into lower-CI cellulosic bioethanol. The lower-CI crediting associated with cellulosic fuel production provides the economic incentives necessary for producers to ship that fuel type to California from midwestern bioprocessing facilities. Under the new rules, which will require producers to pay premiums for conforming feedstocks, the economics of those transactions will change significantly and will likely cause producers to seek other markets for cellulosic bioethanol.

Requiring sustainability certifications for corn stover used as process energy effectively eliminates one of the few practical options biofuel producers have for reducing the CI of their manufacturing operations. At present, POET’s Project Freedom at its facility in Emmetsburg, Iowa combusts corn stover to provide heat used in our bioethanol production process. POET works with farmers to collect otherwise unused corn stover from the field and has developed a solid fuel boiler to convert stover into steam. Combusting biomass as process energy will reduce the facility’s reliance on natural gas by up to 65%. POET is also exploring the possibility of capturing and sequestering the biogenic CO₂ associated with combusting corn stover, removing carbon that would otherwise have entered the atmosphere through decomposition. CARB should encourage and not erect barriers to prevent this innovative use of agricultural waste material to lower the CI of bioethanol production. Any concerns related to the sustainability of harvesting corn stover can be satisfied by simply requiring limits on the amount of stover removed from the field. CARB has reasonably imposed such limits in the past, approving a corn stover-related fuel pathway that allows for the collection of corn stover “not to exceed 50% by mass per harvested acre.”²⁰

Should CARB add agricultural wastes and residues to the list of Specified Source Feedstocks, CARB should also simplify the required chain of custody evidence and attestation requirements for such feedstocks, which appear to be focused primarily on the specter of fraud in markets for waste fats, oils and greases. In particular, because corn kernel fiber is co-processed with corn starch CARB should not require attestations that agricultural wastes, like corn kernel fiber, are “not mixed with any other materials that do not meet the definition of the specified source feedstock.”²¹

²⁰ See CARB Staff Summary, Application for Certification of Corn Ethanol/Dry Mill/with Residue Co-Products Credit LCFS Pathway, Dec. 30, 2015 (attached as Exhibit 1).

²¹ *Supra* note 2 at § 95488.8(g)(1)(D)(3)(e).

IV. The Revised Proposed Amendments Still Allow Foreign, Non-Governmental Entities to Place Requirements on American Fuel Producers, in Violation of California Law.

In the Revised Proposed Amendments, CARB has added language to provide at least some indication of what it believes “sustainability” means. In addition to clarifying its proposed requirement that land on which biomass is grown must have been “cleared or cultivated” prior to January 1, 2008, CARB has provided a non-exclusive list of “best environmental management practices that reduce GHG emissions or increase GHG sequestration[.]”²² CARB requires that biomass be produced according to these practices in order to avoid a CI scoring penalty starting in 2031, but also allows third party sustainability certification schemes to require that these practices be used as early as 2028.²³ These practices are:

- maintain/enhance biodiversity habitat;
- enhance soil fertility and avoid soil erosion/compaction;
- minimize fertilizer runoff and soil/water contamination; and
- reduce unsustainable water use, minimize diffuse and localized pollution from chemical residues, fertilizers, soil erosion or other sources of ground and surface water contamination.

Unfortunately, CARB does not provide any further details regarding the standards CARB will apply to measure these vague and potentially wide-reaching requirements. In the United States, entire statutory and regulatory frameworks have been established to meet these ends. For example, the Endangered Species Act and its regulations²⁴ are part of the American system to protect biodiversity, the Clean Water Act²⁵ addresses discharges of fertilizer and other pollutants to waters of the United States, and the Comprehensive Environmental Response, Compensation, and Liability Act (“CERCLA”)²⁶ and Resource Conservation and Recovery Act (“RCRA”)²⁷ are part of the American regulatory system that protects soil.²⁸

Instead of attempting to tackle the incredibly complex legal, policy, technical, and socioeconomic issues that come with creating nationally applicable requirements relating to biodiversity, soil, and water protection, CARB leaves it completely up to third-party certification systems to define and then apply these concepts. This is consequential because the requirements have significant legal and economic impacts on biofuel producers. If the requirements are not met, biofuel producers do

²² *Id.* at § 95488.9(g)(1)(B).

²³ *Id.* at § 95488.9(g)(3)(C)(3).

²⁴ Endangered Species Act, 16 U.S.C. §§1531-1544.

²⁵ Clean Water Act, 33 U.S.C. §§ 1251 *et seq.*

²⁶ Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§9601-9675.

²⁷ Resource Conservation and Recovery Act, 42 U.S.C. §§ 6901 *et seq.*

²⁸ These and other federal laws may preempt CARB’s attempts to regulate in these areas.

not receive any credit for CI reduction practices, and are treated exactly as fossil fuel producers no matter how environmentally friendly the biofuel production process.

Further, the Revised Proposed Amendments allow these certification systems to go above and beyond CARB's broad notions of sustainability. CARB does not require merely a demonstration of the sustainability requirements in its regulations in order for biofuels to avoid a CI penalty. It requires "continuous third-party sustainability certification" in addition to meeting the CARB-defined sustainability requirements.²⁹ In practice, sustainability certification systems often layer requirements on top of regulatory programs. For example, ISCC EU imposes additional ecological and social requirements that go beyond EURED. ISCC EU includes six principles, and only one of these principles covers the legal requirements under EURED.³⁰ The remaining principles go beyond EURED requirements and include compliance with safe working conditions, human and labor rights, and responsible community relations.³¹ CARB has no control over what these requirements might be. Yet biofuel producers would have to meet all of these extraneous requirements in order to sell into the California market with CIs that reflect actual emissions. CARB's phased-in approach to its sustainability requirements might in fact be completely undermined due to this regulatory feature; CARB explicitly allows for sustainability systems to apply the full sustainability requirements starting in 2028 rather than 2031.³² These concerns are underscored by the fact that CARB requires certification systems to "consider environmental, social, and economic criteria[.]"³³ but provides no contours as to what this consideration should consist of. As discussed in POET's prior comment letter, the delegation of these complex regulatory responsibilities to third parties violates the California Administrative Procedure Act, non-delegation law, and other legal principles.

CARB also forecloses the creation of new sustainability certification systems that could be tailored to meet CARB's requirements. CARB will only approve certification systems that have been recognized by other governmental bodies for at least 24 months, and meet a host of other onerous requirements.³⁴ These requirements for sustainability certification systems depart significantly from how CARB verifies all the other elements of CI, where verification systems center around the requirements established by CARB itself and the regulations allow new entities that can meet CARB's requirements to qualify as verification systems.³⁵ Under the sustainability regulations, existing, foreign sustainability certification schemes will be able to establish whatever

²⁹ *Supra* note 2 at § 95488.9(g)(1).

³⁰ ISCC, *The Six ISCC Principles*, (last visited Aug. 25, 2024) <https://www.iscc-system.org/about/sustainability/iscc-principles/>; ISCC EU 201 *System Basics* at 20 (2023), https://www.iscc-system.org/wp-content/uploads/2024/01/ISCC_EU_201_System_Basics_4.1_January2024.pdf.

³¹ ISCC EU 201 *System Basics* at 20 (2023), https://www.iscc-system.org/wp-content/uploads/2024/01/ISCC_EU_201_System_Basics_4.1_January2024.pdf.

³² *Supra* note 2 at § 95488.9(g)(3)(C)(3).

³³ *Id.* at § 95488.9(g)(5)(A)(2).

³⁴ *Id.* at § 95488.9(g)(5).

³⁵ *Id.* at § 955501 (b)-(c); *id.* at § 95502(a).

requirements they choose, and biofuel producers will have to meet these as-yet-unknown requirements in order to be able to sell into California. And these sustainability schemes will face no competition from more narrowly tailored systems.

V. If CARB Moves Forward with the Sustainability Requirements, it Must Allow for an Intra-Company Mass Balancing Approach.

The Revised Proposed Amendments require entities to maintain certificates “identifying the exact volume...of biomass” beginning in 2028.³⁶ These certificates must accompany the sustainable biomass from the Feedstock First Gathering Point to the fuel producer. The certificates must be available to verification entities and “must be reviewed along with chain-of-custody evidence for sustainable biomass.”³⁷ In tracking sustainability requirements, CARB should allow mass balancing within entities. Tracking individual kernels of corn through the supply chain is not feasible. Mass balancing would allow for the most efficient application of sustainable farming practices.

While many sustainability requirements established by ISCC may not be appropriate for the LCFS, CARB should adopt features of the ISCC’s requirements concerning mass balancing to the extent it retains sustainability certification requirements. Under the ISCC approach, a producer must maintain detailed records as to the volume of material being received along with the sustainability characteristics (*e.g.*, CI score) of that volume of material during a period of time (mass balance period). If a producer receives multiple batches of materials with variable sustainability characteristics, the mass balance framework allows a producer to calculate the allocation of sustainability characteristics applied to the producer’s total output. The mass balance framework is critical to biofuel, because it allows for batches of sustainable material with different sustainability characteristics to be mixed, while still allowing chain-of-custody verification and transparency.

The ISCC PLUS program provides for “credit transfer” options within the mass balance chain-of-custody verification. Under this system, if more sustainable material is received at the processing unit than processed into fuel and sold or transferred within a mass balance period, the surplus of sustainable material generates a credit. For biofuel processors, credits achieved within one site’s mass balance can be transferred to another site as long as the sites are within the same company, corporate group, or joint venture and the output product is the same, among other requirements. The ISCC implemented these credit transfer provisions to incentivize sustainable practices anywhere within a nation or adjoining nations and reduce additional GHG emissions by avoiding the unnecessary shipping of sustainable materials between sites. It is also effective at allowing

³⁶ *Supra* note 2 at § 95488.9(g)(3)(A)(2) & § 95488.9(g)(3)(B)(2).

³⁷ *Id.* § 95501(b)(4)(F).

greater farmer participation in the program, especially in areas that may not be in the immediate proximity of a biofuel production facility.

A credit transfer model within the same parent entity could operate similarly in the LCFS. In the case of the LCFS program, a surplus would occur when the ratio of certified to uncertified biomass exceeds the ratio of unpenalized fuel being shipped to California to other fuel being produced at a biofuel facility. Such an approach would allow a company to transfer sustainability certifications associated with low-carbon farming practices from one entity within an organization to another. Such an approach would allow the company to continue to optimize supply chains while still providing nationwide incentives for sustainable farming practices wherever they are most efficiently implemented. By adopting a traceability system of mass-balance accounting, unnecessary emissions from transportation and shipping are negated, further reducing GHG emissions and allowing sustainable farming practices to be implemented in the geographies best suited to such practices.

VI. CARB May Not Revise LUC Values for Corn Ethanol Without Notice-And-Comment Rulemaking.

The Revised Proposed Amendments would allow the Executive Officer to “determine that no [LUC] value in Table 6 is conservatively representative of a particular region/feedstock/fuel combination and assign a more conservative LUC value.”³⁸ This determination must be based on “the best available empirical data, including but not limited to satellite-based remote sensing data for land cover monitoring, crop yields, and emission factors from the AEZ-EF model or carbon stock datasets.”³⁹ Additionally, the Revised Proposed Amendments state that for “feedstocks not listed in Table 6, the Executive Officer may determine and assign an appropriate LUC value based on empirical land cover data, crop yields, and emission factors.”⁴⁰ To the extent CARB modifies or adopts new LUC values, CARB should undertake a rulemaking to solicit the best available data and determine the appropriate LUC value. If supported by the best available empirical data, CARB should lower LUC values.

CARB’s modification of existing or establishment of new LUC values are regulations under the California APA, and CARB should hold a 45-day comment period when undertaking these actions. Under the California APA, state agencies may not issue or enforce “a regulation without complying with public comment and hearing requirements.”⁴¹ The California Supreme Court interpreted “regulation” under the APA to include agency actions “intend[ed]...to apply generally[.]”⁴² LUC

³⁸ *Supra* note 2 at § 95488.3(d)(2).

³⁹ *Id.*

⁴⁰ *Id.*

⁴¹ Cal. Gov’t Code § 11340.5(a), § 11346.8(a).

⁴² *Alvarado v. Dart Container Corp. of California*, 411 P.3d 528, 534-35 (Cal. 2018) (holding that an agency manual was a regulation because it was intended to influence present and future employers’ behavior and was void

values for specific feedstocks apply generally to all pathway holders producing fuel from that feedstock, affecting that fuel's CI score. As required under the APA for generally applicable standards, CARB should undertake a rulemaking when modifying or establishing LUC values to provide the public an opportunity to comment on the proposed changes.

VII. LUC Values Assigned to Feedstocks Are Duplicative in Light of Sustainability Requirements.

The proposed sustainability requirements render the LUC values duplicative. The Revised Proposed Amendments require biomass to be “sourced on land that was cleared or cultivated prior to January 1, 2008, and actively managed or fallow, and non-forested since January 1, 2008.”⁴³ It also requires the best environmental management practices described above, and whatever additional requirements are imposed by certification systems. If CARB requires biomass to meet these sustainability requirements, CARB should no longer assign a LUC value because LUC concerns will be addressed through these other mechanisms. As discussed in POET's prior comment letter, this is the approach taken by the EU, where uncertainty in LUC values led the EU to establish alternative sustainability requirements.

VIII. The EIA and SRIA Still do not Adequately Analyze the Impacts of the Sustainability Standard.

CARB issued a revised Environmental Impact Analysis (“Revised EIA”) as part of the Revised Proposed Amendments.⁴⁴ However, this Revised EIA does not address impacts associated with the sustainability requirements. CARB must analyze these impacts. Complying with sustainability certification requirements would impose a significant cost on biofuel producers, as described in POET's prior comment letter. Based on POET's experience with ISCC Plus and ISCC EU, farmers require significant premiums to comply with sustainability requirements. If biofuel producers provide a premium to farmers to comply with sustainability criteria without receiving CI benefits from emissions reductions associated with sustainable farming practices, this cost will likely be passed down to the consumer resulting in increased gasoline prices. Alternatively, the added costs would lead to an increase in ethanol price, which could decrease the amount of ethanol used in California. This would in turn increase particulate matter and other forms of pollution in the state, as detailed in POET's prior letter. The Revised EIA does not attempt to address any of these issues, meaning that it continues to be fundamentally flawed.

because it was not adopted in accordance with the APA) citing *Tidewater Marine W., Inc. v. Bradshaw*, 927 P.2d 296, 304-305 (Cal. 1996)).

⁴³ *Supra* note 2 at § 95488.9(g)(1)(A).

⁴⁴ CARB, *Release of Recirculated Draft Environmental Impact Analysis for the Proposed Low Carbon Fuel Standard* (Aug. 16, 2024), https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/notice_recirc_drafteia.pdf.

CARB did revise the value assigned to ethanol if it fails to meet the sustainability requirements. In the Revised Proposed Amendments, ethanol would receive the CARBOB (100.60) value instead of the ULSD value (105.76) if it fails to meet the certification requirements.⁴⁵ This modification does not impact the inadequacy of the EIA, because ethanol would still be given a high penalty that is not reflective of the fuel's actual CI score and could result in less ethanol sold into California and blended into California gasoline. As a result, emissions of criteria and toxic air pollutants in California could still increase, and the EIA must address this potential outcome.

CARB has also not updated its Standardized Regulatory Impact Assessment from September 2023.⁴⁶ As POET noted in its previous comment, CARB's SRIA does not address significant costs associated with the proposed sustainability requirements at a time when fuel prices are at record highs. CARB must examine the costs associated with the Revised Proposed Amendments' sustainability requirements in an updated SRIA.

IX. CARB Should Embrace Research Advancements Reflected in Argonne's Most Recent Model and Should Revise Outdated Features in CA-GREET.

CARB's proposed CA-GREET 4.0 Model does not take advantage of a number of advancements in research and modeling that have been incorporated into Argonne's R&D GREET 2023 Model and embraced by federal policymakers implementing biofuels policies under the IRA. This is a missed opportunity to adopt the most recent scientific research and advancements in transportation fuel modeling, and places biofuel producers at a continued disadvantage as older research and modeling has often poorly captured elements related to the carbon intensity of the biofuel lifecycle. POET also recommends changes that would allow the CA-GREET model to better capture several variables in the biofuel production process.

A. CARB Should Adopt R&D GREET 2023 as the Base Model for CA-GREET 4.0.

CARB's proposed CA-GREET 4.0 Model is based upon an outdated 2022 version of Argonne's GREET model which has been superseded by [R&D GREET 2023](#). As noted above, this latest version of the GREET model, which includes forty-five pages of updates, is equipped to measure and credit carbon reductions associated with CSA practices and reflects the best current scientific research and data regarding transportation fuel emissions. Among other things, R&D GREET 2023 includes updates to the modeled well-to-gate GHG emissions of ammonia production (Section 2.3.6), and corn transport payload (Section 3.9). The model also updates corn farming assumptions not previously updated since 2021.

⁴⁵ *Supra* note 2 at § 95488.9(g)(1).

⁴⁶ CARB, *Appendix C-1 Standardized Regulatory Impact Assessment (SRIA), Proposed Amendments to the Low Carbon Fuel Standard Regulation* (Sept. 9, 2023), <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/appc-1.pdf>.

B. CARB Should Adopt Global Warming Potential Values from the IPCC AR5 Report.

POET recommends that CARB adopt Global Warming Potential (“GPW”) values from the Intergovernmental Panel on Climate Change (“IPCC”)’s Fifth Assessment Report (“AR5”)⁴⁷ CARB is currently using GPW values from the IPCC Fourth Assessment Report (“AR4”)⁴⁸ which was published in 2007. The GPW values in AR4 are now outdated. Other agencies, like the U.S. Environmental Protection Agency and United States Department of the Treasury in its IRA implementation are moving to AR5. Additionally, the United Nations Framework on Climate Change now requires parties to use GPW values from AR5.⁴⁹ CARB should adopt AR5 to ensure the LCFS program uses the most up-to-date science to accurately calculate emissions.

C. CARB Should Reevaluate Denaturant CI Values.

POET urges CARB to reevaluate the value for denaturant in the Proposed Calculator. Emissions calculations are incorrectly allocated on a denatured basis instead of an undenatured basis as done with the Current Calculator. This approach ultimately results in over calculating the final fuel’s carbon intensity. For the final version of the Proposed Calculator, CARB should allocate emissions on an undenatured basis consistent with the Current Calculator. Additionally, POET recommends CARB allow user-defined inputs for the denaturant emission factor. Currently, CARB assumed CARBOB reformulated gasoline blend stock is used for denaturant, when in practice a mixture of hydrocarbons extracted from natural gas known as natural gasoline or pentanes plus⁵⁰ is used by most of the bioethanol industry. Natural gasoline has a carbon intensity of approximately 86 g/MJ compared to the 100.82 g/MJ CARBOB assumption in the proposed calculator. Furthermore, renewable naphtha produced at renewable diesel and sustainably aviation fuel facilities can also be used as a denaturant. However, the use of a renewable denaturant such as renewable naphtha would require a Tier 2 pathway application. User- defined denaturant inputs in the Proposed Calculator would allow for the use of renewable denaturant in Tier 1 pathways, reducing the number of Tier 2 applications CARB receives and incentivizing the use of renewable fuel as a denaturant.

⁴⁷ *Climate Change 2014: Synthesis Report*, IPCC (2014), <https://archive.ipcc.ch/report/ar5/syr/>.

⁴⁸ *Climate Change 2007: Synthesis Report*, IPCC (2007) <https://www.ipcc.ch/assessment-report/ar4/>.

⁴⁹ See *Framework Convention on Climate Change, Decision on Common Metrics*, UNITED NATIONS (2022), https://unfccc.int/sites/default/files/resource/cp2022_10a01_adv.pdf.

⁵⁰ “Natural gasoline: A commodity product commonly traded in NGL markets that comprises liquid hydrocarbons (mostly pentanes and hexanes) and generally remains liquid at ambient temperatures and atmospheric pressure. Natural gasoline is equivalent to pentanes plus.” *U.S. Energy Information Administration, Glossary* (last visited Aug. 26, 2023), https://www.eia.gov/tools/glossary/index.php?id=N#nat_gasoline.

D. CARB Should Allow User-Defined Process Chemical Usage for Ethanol Pathways.

CARB should modify the Proposed Calculator's treatment of process chemicals used in bioethanol pathways. The Proposed Calculator does not allow the pathway applicant to specify use of low-CI process chemicals, which distorts the CI value of POET's bioethanol. Specifically, POET's patented BPX process uses a less carbon-intensive group of chemicals than most bioethanol producers. A simple change to the Proposed Calculator to allow user-defined process chemical usage could cure this inaccuracy. This modification would be consistent with the calculator's accommodation of a variety of other user-defined inputs from denaturant to feedstock transportation distance. As with all CI inputs, verification requirements would apply to user-defined process chemical usage, allowing the verifier and CARB to ensure claimed CI reductions are accurate.

If CARB elects not to allow user-defined process chemical usage, CARB should at least revisit the current chemicals emission factor of 2.02 g/MJ. This value is grossly overestimated and is based on industry data over a decade old that did not represent the group of chemicals utilized in POET's patented BPX process. POET would welcome the opportunity to work with CARB to update the chemicals emission factor.

E. CARB's Proposed Calculator Should Include Syrup in its Wet DG Pathway Allocation

The Proposed Calculator's Wet DG Pathway allocation includes quantities of wet, modified, and dry DG. Syrup production is excluded from this allocation and is only included to quantify total co-product production for the co-product credit calculations. However, both syrup and wet DG completely bypass the drying system. From an emissions standpoint, the two products are identical. Therefore, syrup should be included in the Wet DG Pathway allocation.

X. Miscellaneous Issues

POET provides the comments on the below additional topics in the Revised Proposed Amendments.

A. POET Supports the Proposed Credit True-Up that Would Apply to Temporary Pathways.

Beginning in 2025, CARB will allow credit true ups after annual verification for fuel pathways, including temporary pathways that subsequently receive fuel pathway certification, that have

lower verified operational CIs than the CI listed in the fuel pathway or temporary pathway.⁵¹ CARB will calculate the number of LCFS credits representing the difference between the reported CI and the verified operational CI from annual Fuel Pathway Reports and place those credits in the reporting entity's account after August 31st for the prior compliance year. POET is supportive of this credit true up mechanism. Including temporary pathways in credit true ups promotes innovation by allowing pathway holders to realize the full credit value of operational CI scores.

B. CARB Must Correct Typographical Errors in the Sustainability Certification Regulatory Provisions.

CARB should review § 95488.9 for typographical and other inadvertent errors. For example, § 95488.9(g)(1) refers to a subsection (C) that does not appear to exist. CARB should clarify or fix this error. Additionally, in proposed § 95488.9(g)(4)(B), subsections (3) and (4) are misnumbered and should be (1) and (2).

C. CARB's Credit Cap on Soybean Oil and Canola Oil Based Biodiesel Departs from the LCFS Program's Longstanding Market-Based Approach.

In its Revised Proposed Amendments, CARB now proposes limits to the total volume of biodiesel eligible to generate credits within the LCFS program.⁵² The rule caps credit-eligible biodiesel for each biodiesel producer at twenty percent of the company's total annual production volume, and assigns to reported quantities of biodiesel in excess of the twenty percent cap a CI equivalent to diesel fuel – regardless of that fuel's actual CI as measured on a lifecycle basis. This rule establishes an unfortunate precedent for administration of the LCFS, which is founded on a market-based, technology-neutral approach to reducing the carbon-intensity of California's transportation fuel supply. CARB should allow the market to establish its own cap on biodiesel supply based on price signals from LCFS credit values.

D. POET Supports the Proposed Revisions to the Compliance Reporting Rules.

CARB has amended § 95491(b)(1)(2) to bring the rules regarding the timeliness of compliance reporting under this section into alignment with CARB's approach to enforcement of other elements of the LCFS program's reporting requirements. POET supports CARB's proposed approach, which interposes more proportionate penalties in place of complete credit forfeiture as a consequence for untimely submissions.

⁵¹ *Supra* note 2 § 95488.10(b).

⁵² *Id.*, § 95482(i).

E. CARB Should Approve E15.

POET again urges CARB to expedite its approval of E15, which has been thoroughly studied in California for years, and which offers material climate and health benefits relative to E10. As noted in previous comments submitted to CARB and the California Energy Commission, E15 will provide immediate economic relief from historically high gas prices while cutting 1.8 million metric tons of GHG emissions annually, equivalent to removing more than 411,000 cars off the road.

CONCLUSION

POET appreciates the opportunity to comment and looks forward to working with CARB to make the LCFS a continued success for California. If you have any questions, please contact me at Josh.Wilson@POET.com or (202) 756-5612.

Sincerely,

A handwritten signature in black ink, appearing to read 'JPW', followed by a horizontal line.

Joshua P. Wilson
Senior Regulatory Counsel

EXHIBIT 1

STAFF SUMMARY
Application for Certification of
Corn Ethanol / Dry Mill/ with Residue Co-Products Credit LCFS Pathway
Trestle Energy LLC
Mason City, Iowa
(ETHC116)

Date Deemed Complete: December 7, 2015
Date Posted: December 18, 2015
Date Certified: December 30, 2015

Pathway Summary

Located in La Jolla, CA, Trestle Energy LLC, a development firm committed to developing low carbon production systems, proposes a corn ethanol pathway with residue co-products (CERC) of less than 50% of available agricultural residues. Trestle has applied for one Method 2B pathway under the California Low Carbon Fuel Standard (LCFS). System expansion accounting methods are applied for the emissions consequences of CERC for emissions credits. In the proposed feedstock supply system, the utilization of corn stover agricultural residues reduces biofuel carbon intensity by removing biomass from farm fields and processing it into biofuel co-products used at power plants to generate electricity. The proposed CERC pathway incorporates co-products to directly reduce biogenic emissions and displace fossil fuel combustion at power plants. Trestle has worked with Golden Grain Energy – a dry mill corn ethanol plant located in Mason city, Iowa - to demonstrate a carbon intensity reduction by utilizing the proprietary residue co-product supply system. The CI impact of the CERC pathway is added to Golden Grain Energy's existing ethanol pathway CI in order to obtain the overall CI of the combined systems. This practice could be applied to other corn ethanol plants provided that Trestle can establish supply chain traceability for stover used for electricity generation, and subject to the operating conditions and limits described in this Summary.

Carbon Intensity (CI) Impact of the Trestle Pathway

The applicant requests one CERC pathway that requires changes to biofuel feedstock supply chain, including additional use of farm equipment for stover removal, additional chemical inputs to offset nutrients removed with the stover, and additional use of transport equipment to haul stover away from feedstock-producing fields. Other changes outside of the agricultural sector involve processing of agricultural residues into solid fuel co-products, delivery of solid fuel co-products, and co-product utilization to directly displace fossil fuel consumption. For the CI impact calculation, the applicant introduced several user-defined parameters and provided some parameters that are not available in the CA-GREET1.8b model, including both pre- and post- processing residue

transport distances, residue utilization rate, energy use from residue collection and processing, and efficiency penalty for residue utilized at power plants. Using the parameters included in the LCA report, the applicant modified the CA-GREET model and calculated a CI of -18.01 gCO₂e/MJ for the proposed CERC pathway.

The proposed CI impact result has been evaluated against the carbon intensity constraint suggested by ARB staff that the CI reduction (credit) achieved by the CERC system should be not greater than the reduction that would be achieved by using the solid fuel co-product to meet thermal energy requirements of the Golden Grain Energy ethanol production facility. Using Golden Grain Energy facility energy use data (Confidential Business Information), staff determined that the proposed CERC pathway is consistent with the proposed CI reduction limit. The production and utilization of residue co-products reduces the total CI to 70.65 gCO₂e/MJ for the Golden Grain Energy pathway (ETHC083), with 100 percent Dry DGS.

Currently, the Golden Grain Energy facility has four corn-ethanol pathways. This pathway with residue co-products will be an additional pathway available only to volumes of ethanol which are otherwise eligible for registration under pathway code ETHC083 (subject to any applicable constraints of ETHC083).

Proposed Lookup Table Entries

Fuel	Pathway Identifier	Pathway Description	Carbon Intensity Values (gCO ₂ e/MJ)		
			Direct Emissions	Land Use and Other Indirect Effects	Total
Ethanol from Corn	ETHC116	2B Application*: Midwest; Dry Mill; Dry DGS; NG. Using corn residue co-products to generate credit for displaced fossil fuel.	40.65	30	70.65

*Specific Conditions Apply

Applicable Operating Conditions

Operations at the plant will be subject to the following operating conditions designed to ensure that the CI of the corn ethanol produced at the Golden Grain Energy plant will remain at or below the values appearing in the above table.

- The CERC pathway will be subject to periodic assessments of agricultural residue markets to detect whether agricultural residue use within the CERC pathway is competing with residue use as a cellulosic biofuel feedstock, and the

emission accounting for agricultural residue co-products within the CERC pathway may be revised if such competition is detected.

- Other residue processing methods (processed into pellets, cubes or briquettes) and types of process energy (diesel or electricity or the combination) may be used as long as the proposed CI impact reported in the above table is not exceeded.
- Average baled residue transport distance and post processed residue transport distance will not exceed the values specified in the application.
- Contracts establishing supply chain traceability are required for verification of corn stover utilization for electricity generation.
- The CERC pathway will be restricted to the corn ethanol plant only. No other biofuels will be considered.
- The stover utilization should not exceed 50% by mass per harvested acre.

Staff Analysis and Recommendations

Staff has reviewed the Trestle Method 2B application and finds the following:

- Staff has replicated, using the CA-GREET spreadsheet, the carbon intensity reduction value calculated by the applicant;
- Staff has concluded that the CI reduction limitation with the Golden Grain Energy plant's actual thermal energy consumption is not likely to exceed the proposed CI reduction specified in Trestle Method 2B application.

On the basis of these findings, ARB staff recommends that Trestle application for the above Method 2B LCFS pathway with Golden Grain Energy Facility energy use data be approved for certification as a prospective pathway.

Fuels with prospective CIs are not eligible to claim credits under the LCFS under the readopted LCFS regulation, effective January 1, 2016. To claim provisional credits the applicant must provide one quarter of operational data once commercial production has commenced. ARB will then complete an updated lifecycle analysis and make necessary adjustments to the originally certified prospective CI if warranted and approve a provisional CI for each of the pathways being considered in this application. To confirm compliance with updated operating conditions, the Executive Officer may reevaluate any aspect of the review at any time and revise the certification to reflect new information. At any time after certification, the Executive Officer may increase the

CI values upon a determination that the provisional CIs underestimate fuel life carbon intensity. (Cal. Code Regs. tit. 17, § 95486, subd. (e)(3)(K) (original LCFS); Cal. Code Regs. tit. 17, § 95488, subd. (c)(5)(L) (beginning January 1, 2016).)

August 27, 2024

Chair Liane Randolph
California Air Resources Board
1001 I Street
Sacramento, CA 65814

Via Electronic Submission

Re: Advanced Biofuels Association Comments on the 15-Day Notice of Revisions to the 2024 Proposed Amendments to the Low Carbon Fuel Standard

Dear Ms. Randolph and Members of the Board,

The Advanced Biofuels Association appreciates the opportunity to comment on the California Air Resource Board's (CARB) 15-Day Notice (published on August 12, 2024) of revisions to the proposed amendments to the California Low Carbon Fuel Standard (LCFS). ABFA thanks CARB for continuing to strengthen their already successful Low Carbon Fuel Standard Program with the implementation of more stringent carbon reduction targets.

The LCFS program has contributed to the investment in facilities in the United States, and arguably in other parts of the world, to produce low carbon intensity biomass based transportation fuels, including biodiesel and renewable diesel (RD), and attract that production into the state of California. The success of the LCFS program in displacing fossil fuel diesel, in particular, is evident from CARB's own data. According to the LCFS Data Dashboard, biodiesel and RD accounted for 61 percent of in-state diesel demand in 2023 and nearly 73 percent in the latest data for Q1 2024.¹

In these comments, ABFA notes its strong disagreement with CARB's Modifications to Section 95482, Item 4 as described on Page 4 of the Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information and detailed on Page 37 Item (i) of Attachment A-1 for the reasons described below.

In addition, ABFA notes below its concerns with the sustainability certification and land use change provisions that are proposed for the broad array of crop-based and forestry-based biofuels.

The market should dictate feedstock choice.

154.1 ABFA believes that federal and state carbon intensity (CI) targets allow the feedstock and biofuels market to function efficiently. As carbon intensity targets increase, the demand for feedstock producing low carbon intensity biofuels will increase driven by currently available federal and state tax credits. Most notably, the expiring CI-agnostic federal blenders tax credit (BTC) will be replaced in 2025 with the Inflation Reduction Act's (IRA) CI-dependent 45Z Clean Fuel Production Credit (CFPC) rewarding the use of low carbon intensity feedstocks with higher credit value.

In conjunction with CARB reducing its CI targets by 9 percentage points in 2025, ABFA feels that no further restriction on feedstock use is necessary; the market will determine the most economic path forward to produce the low carbon intensity biofuels required on a federal and state level.

¹ <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>

The market is already working.

In its own words, the CARB feedstock proposal states “Biomass-based diesel produced from soybean oil and canola oil is eligible for LCFS credits for up to twenty percent combined of total biomass-based diesel annual production reporting, by company.” In addition, the regulation is based on “reported...quantities for 2023 LCFS reporting...”

According to the Energy Information Administration (EIA) Monthly Biofuels Capacity and Feedstocks Update Report, Tables 2b and 2c for calendar year 2023, canola oil accounted for 10.5% and soybean oil accounted for 40.5% of the feedstocks consumed for the production of biofuels.² According to the CARB LCFS Data Dashboard Figure 6 Volume Tab, on an aggregate biodiesel and RD generated volume basis, canola accounted for 2.5% and soybean oil accounted for 17.0%, for a total of 19.5% of the volume. If one were to separate the biodiesel feedstock production volumes from the RD volumes, one would calculate that canola and soybean oil accounted for 25.6% of the biodiesel volumes and 18.6% of the RD volumes.³

Given that on a national level, canola oil and soybean oil represented over 50% of the feedstock consumption but less than 20% of the CARB biomass based diesel volumes in 2023, it is ABFA’s position that the market is already working to direct low carbon intensity feedstock production to California. In fact, by inserting itself into the market by imposing feedstock limitations, CARB’s actions could depress the price of canola and soybean oil making them more economically attractive than other, lower carbon intensity feedstocks such that the producer currently under the 20% threshold decides to increase canola and soybean oil processing up to the 20% threshold

CARB’s proposal may not treat all biodiesel and RD industries consistently.

154.2

While CARB’s proposal might seem reasonable on an aggregate basis, this might not be true on a specific individual facility basis. On an aggregate basis, in 2023, canola and soybean oil accounted for 19.5% of the volume, which is under the 20% threshold cited in the proposed rule. Based on CARB’s own data cited above, bifurcating the biodiesel industry from the RD industry illustrates this in-equality. In aggregate, because the biodiesel industry exceeded the 20% threshold in 2023, the regulatory provision would take effect January 1, 2028. On the other hand, the RD industry was below the 20% threshold in 2023. As a result, the regulatory provision could disproportionately affect certain market participants because it would take effect upon implementation of the proposed rule.

CARB’s proposal does not treat all facilities equally.

As written, the proposal for eligible credits is based on the percentage of biomass based diesel produced from soybean oil or canola oil for 2023 LCFS reporting. ABFA interprets the rule for companies with a biomass-based diesel pathway certified prior to the effective date of the regulation as follows: If the percentage was over 20%, the provision takes effect January 1, 2028. If the percentage was less than 20%, the provision takes effect in accordance with the effective date of the amended regulation. ABFA believes that this amended regulation should have effect with the 2025 reporting year.

² <https://www.eia.gov/biofuels/update/>

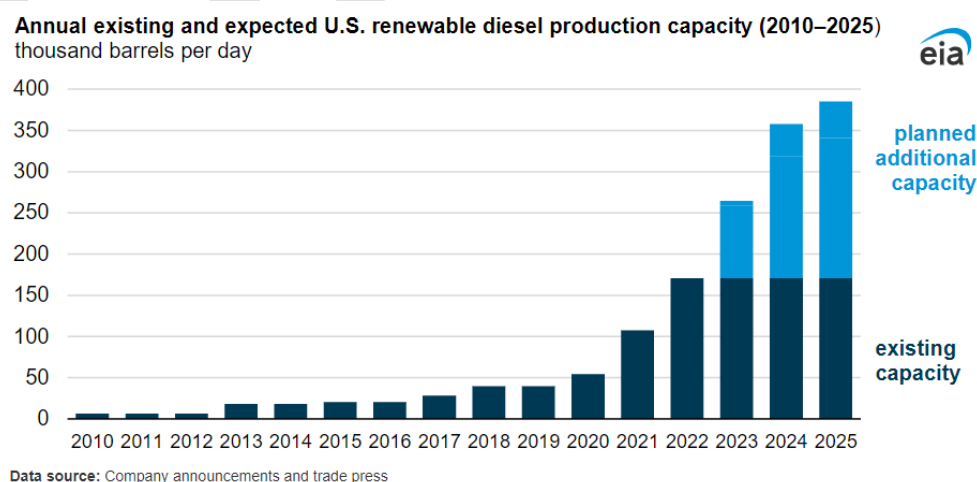
³ <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>; ABFA notes that CARB has a mistake in its formula on Line 28 on each tab of Figure 6). The formula does not include the RD ‘other feedstocks’. In other words, for 2023, the formula should replace N25 with N24

The proposed rule does not consider the different production volume capacities of these facilities, the rule only considers feedstock mix and the relevant percentage (and it does not provide clarity on how production delivered to destinations outside California would be treated). ABFA contends that this rule may confuse and disrupt the current supply dynamics. An unintended consequence may be that CARB is inadvertently choosing winners and losers. ABFA presents the following scenarios to illustrate inequities among different facilities.

- Example 1: Company A, with a 100 million gallon per year production capacity reported a 21% percentage for 2023 LCFS while Company B with the same production capacity reported a 19% percentage for 2023 LCFS. In this case, Company A could produce biomass based diesel up to a 100% percentage through compliance year 2027, while Company B is limited to 20%.
- Example 2: Company C, with a 30 million gallon per year biodiesel production capacity reported a 19% percentage for 2023 LCFS while Company D with a 300 million gallon per year RD production capacity reported a 21% percentage for 2023 LCFS. In this case, Company D with its larger capacity now has far more feedstock flexibility than Company C to react to changes in market conditions.
- Example 3: Company E, with a 300 million gallon per year production capacity in operation for over 3 years processing predominantly low carbon intensity feedstocks reports a 10% percentage for 2023 LCFS. Meanwhile, Company F starts up a brand new 300 million gallon per year facility in late 2023 and supplies the California market with 10 million gallons of biomass based diesel produced from soybean oil in 2023. Company F, on a relatively small volume reports 100% production from soybean oil, the proposed regulation assures Company F significant feedstock flexibility compared to Company E.
- Example 4: Company X, with a 30 million gallon per year production capacity reported a 35% percentage for 2023 LCFS. Company X then acquires five new locations in 2025 with an aggregate capacity of 150 million gallons, each of which reported a percentage less than 20%. Is Company X governed by the provision taking affect January 1, 2028 by virtue of its original capacity filing? A similar question could be asked if Company X simply expanded its original site.

RD capacity is expanding.

According to the EIA in February 2023, RD capacity was estimated at 2.6 billion gallons per year at the end of 2022 growing to an estimated 5.9 billion gallons per year by the end of 2025.



Source: EIA, “Domestic renewable diesel capacity could more than double through 2025”, February 2023

These facilities have been constructed to meet the growing demand for low carbon intensity fuels on both a federal, as well as state level, including increasing demand from California as well as new demand from recent legislation passed in Oregon and Washington. Based on the EPA EMTS Reporting system, we note there has also been increasing demand for RD exports.

154.3 *The CARB feedstock proposal places new facilities at a feedstock flexibility disadvantage.*

- Example 5: Company H, with a capacity of 200 million gallons, starts operations in 2024. Company H reports no production volume to CARB for 2023 LCFS. Company H is then limited to only 20% of its soybean oil and canola oil volume being eligible for credits. Company H is disadvantaged compared to other facilities who reported volumes to CARB for 2023 LCFS that exceeded the 20% threshold.

154.4 *The company-wide definition requires clarification.*

According to the proposed rule, “Any reported quantities of biomass-based diesel produced from soybean oil or canola oil in excess of twenty percent on a company-wide basis will be assigned a carbon intensity equivalent to the carbon intensity benchmark shown in Table 2 in Section 95484(e) for the applicable data reporting year, or the certified carbon intensity for the associated fuel pathway – whichever is greater.”

ABFA believes the term ‘company-wide’ needs to be specifically defined as an “LCFS-registered company”, with no additional tracking required. Realistically, CARB should base this on what gets reported by producers in CARB’s system which is set by registered companies. The next two examples illustrate the point:

- Example 6: Company A owns a facility in its name. Company B owns a different facility in its name. Company A and Company B own a third facility as a Joint Venture under a separate legal entity name. Is this a case of three companies, or is the joint venture interest divided appropriately between Company A and Company B to determine the percentage reporting?
- Example 7: Company A owns one facility in one legal name and owns a second facility in a different legal entity name.

154.5 *CARB should clarify effective dates of certain provisions.*

Deliverability Amendment (95488.8(i)(2)(B)(1))

- It is understood that the amendments made in 95488.8(i)(2)(B)(1) on the deliverability requirements would only affect projects which break ground after December 31, 2029.

Avoided Methane Period (95488.9(f)(3)(A))

- Production facilities were financed and constructed based off a three consecutive 10- year avoided methane crediting period. Reducing this to a two consecutive 10- year period significantly impacts the affordability of these assets, and therefore ABFA suggests grandfathering in existing dairy/swine facilities.

CARB should consider certain supply considerations post-January 1, 2028.

According to Page 4 of its Notice of Public Availability CARB states “...this provision would take effect starting January 1, 2028, to provide time to adjust feedstock supply contracts as needed.”

154.6 ABFA believes that California could lose some biomass based diesel supply. It is not a certainty that facilities currently supplying the California market can easily switch from canola and soybean oil

feedstocks to lower CI feedstock such as tallow and used cooking oil without substantial capital improvements for feedstock pre-treatment. It is possible that some smaller production facilities shut while larger facilities make up for any shortfall.

Some facilities may decide to continue with their current feedstock slate and divert their production volumes away from California to other markets, namely Oregon, Washington, Canada, or the European Union as new low carbon fuel regulations come into effect overseas.

Given the disparate geographic locations of the bio-mass based diesel production facilities, replacing locally, readily available sourced feedstocks with lower carbon intensity feedstocks from far away locations may simply not be logistically or economically viable.

Upon being ineligible for an LCFS credit, sales into the California market are on a par with sales to other locations in the United States with respect to RIN values. After determining other cost factors such as transportation and logistics, a company may well find it in their interest to divert production into states that do not have an LCFS program.

154.7 *The proposed 20% cap is legally flawed.*

As further explained in the Attachment, the manner in which CARB issued the proposal violates the California Administrative Procedure Act by failing to give fair notice. The proposal also fails to comply with CEQA requirements in its Environmental Impact Analysis which is silent on the potential impacts of the 20% cap. Additionally, under AB32, CARB cannot undertake regulatory activities that interfere with air quality, but modeling suggests that limiting biomass based diesel may do just that. Finally, the proposed rule exceeds CARB's authority by stepping beyond its role in setting "technology neutral" standards to reduce the carbon intensity of California's transportation fuels.

154.8 *CARB should clarify that pending biomass-based diesel applications are grandfathered..*

The proposed regulation states: "For companies with biomass-based diesel pathways certified prior to the effective date of the regulation..." partly setting a condition upon which the new regulatory provision will take place. This sentence fails to recognize that once an application is made to CARB for the certification of a fuel pathway, the certification date is out of the hands of the applicant and up to CARB for a decision. Theoretically, CARB could decide to approve no new pathways until after the effective date of the new regulation.

ABFA believes that any new pathway applications currently pending approval and then approved by CARB that have been filed before the effective date of the new regulation are grandfathered. Likewise, ABFA believes that any revised pathway applications that are dated before the effective date of the new regulation, once approved, are also grandfathered.

154.9 *CARB should reconsider the sustainability certification and indirect land use change provisions.*

CARB has proposed sustainability certification provisions for all biofuels using crop-based and forestry-based feedstocks. Among the provisions in the 15-Day Notice proposal is a requirement that "Biomass must be produced according to best environmental management practices that reduce GHG emissions or increase GHG sequestration" (see page 172 of the Attachment A-1). The updated Section 95488.9(g)(1) biomass sustainability requirements then include four general criteria for such "best environmental management practices," including maintaining/enhancing biodiversity, enhancing soil fertility and avoiding erosion/compaction, fertilizer management that minimizes runoff, and limiting "unsustainable" water use.

Some members of ABFA believe that Rather than spelling out specific requirements for meeting those criteria that might be of relevance to CARB's authority under the LCFS, CARB defers the interpretation of these criteria to third-party certification schemes developed in the European Union, without detailing how those certification schemes might be applied in practice and deferring to them almost entirely. Such an approach creates tremendous regulatory uncertainty and is likely to result in disparate results across producers and feedstocks. In addition, the criteria and certification approach unfairly burden producers with additional costs that do not appear to have been fully assessed by CARB and without conversely recognizing the GHG reductions being achieved by the farming practices that would be covered by the sustainability certification requirements. As it stands, producers will not be able to realize the additional value for these lower CI feedstocks. CARB must account for these new farming practices in CI calculations in general, but certainly before making the sustainability certification process covering them mandatory. As a guidepost, CARB could consider the optional approach the federal government is taking for crediting climate-smart agriculture practices that reduce or otherwise sequester carbon in the crediting system being developed under Section 45Z of the IRA.

Regardless, ABFA encourages CARB to use universally accepted standards for environmental and social responsibility, from well-recognized certification schemes (e.g., ISCC, RSB). Biofuel producers would like to avoid "doubling up" on multiple certification standards which can be onerous.

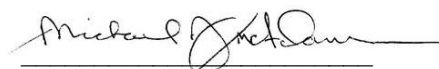
Furthermore, via Section 95488.3(d) and associated Table 6, CARB has given itself the authority to assign a "more conservative" indirect land use change (iLUC) value when it feels that Table 6 "does not accurately reflect" the iLUC of a region/feedstock/fuel. It may also add new feedstocks/fuels to Table 6. Unilateral increases to iLUC values in the table for existing feedstocks like corn ethanol, soy and canola BBD, and new and innovative feedstocks would reduce predictability and be detrimental to the continued development of the market. This change should include a clearer definition of methodology and process that would be used to make these determinations. Furthermore, ABFA suggests CARB's methodology should include flexibility to lower an iLUC value rather than only adjusting iLUC upwards. ABFA recognizes that CARB will be consistently taking a conservative approach to iLUC values but cannot discern a sufficient rationale for CARB to only move iLUC values in one direction.

As with the 20% cap, the Sustainability Certification proposal was introduced in a manner contrary to the Administrative Procedures Act, a point which is also explained in detail in the attachment.

Lastly, ABFA appreciates CARB's specific recognition of sustainable aviation fuel (SAF) within the LCFS framework. CARB's support of bio-based SAF not only provides a clear market signal but also encourages continued investment and innovation in this sector.

Thank you again for the opportunity to submit comments.

Sincerely,



Michael McAdams
President

DRAFT

Attachment: Legal commentary on 2024 Proposed Amendments to the Low Carbon Fuel Standard

1. The Proposed 20% Cap on Credits for Biomass-Based Diesel from Soybean and Canola Oil Is Legally Flawed

154.10

a. The Proposed 20% Cap Violates the California Administrative Procedure Act (APA)

Central to the California APA is the principle of fair notice. Fair notice is intended to give the regulated community the opportunity to meaningfully participate in the rulemaking process.⁴ As part of its commitment to affording regulated parties fair notice, the California APA requires an agency to publish a 45-day notice similar to the original notice of the proposed action if a change to the initial proposal is “substantial” and not “sufficiently related” to the original text.⁵ The 20% cap on LCFS credits for biomass-based diesel (BBD) in Section 95482 of the Proposed 15-Day Changes of the Proposed Amendments (15-Day Changes) is both a substantial change and one that is not sufficiently related to the original text. Offering stakeholders only a 15-day comment period to address this significant new limitation on low carbon intensity fuels eligible to generate credits under the LCFS is contrary to the California APA.⁶

Here, there was no clear indication in CARB’s original rulemaking documents that it was contemplating eliminating substantial volumes of renewable fuels from eligibility for credit generation. In particular, the Staff Report of the Initial Statement of Reasons (“ISOR”) addresses the issue of crop-based biofuels sustainability criteria in detail, explaining that “[t]o reduce the risk that rapid expansion of biofuel production and biofuel feedstock demand could result in deforestation or adverse land use change, CARB staff are proposing additional guardrails on the use of crop-based feedstocks for biofuel production.” CARB then enumerated specific “guardrails.” These enumerated “guardrails” did not include a cap or a limit on LCFS credits for biomass-based diesel.⁷ CARB appears to have carefully considered the issue of potential land use changes associated with biofuel feedstock as part of the initial proposal and elected *not* to include a cap or limit as a way to address those concerns.

In fact, CARB considered and rejected a Comprehensive Environmental Justice Scenario in the ISOR, which would have included a cap on the use of crop-based fuels at 2020 levels, pending an updated risk assessment to determine the phaseout timelines for high-risk, crop-based feedstocks. We understand CARB may have received comments recommending a cap on credits for BBD, that is not sufficient to put regulated parties on notice of such a dramatic regulatory change. Further, CARB must itself provide adequate notice—it “cannot bootstrap notice from a comment.”⁸ We encourage CARB to cure the APA deficiency by extending the 15-day comment period to 45 days to allow stakeholders adequate time to address this regulatory proposal with potentially wide-ranging market and environmental consequences.

⁴ Morning Star Co. v. State Bd. of Equalization, 38 Cal. 4th 324, 333 (2006) (explaining the APA works “to ensure that those persons or entities whom a regulation will affect have a voice in its creation, as well as notice of the law’s requirements so that they can conform their conduct accordingly”).

⁵ Cal. Gov. Code § 11346.8(c) (“No state agency may adopt, amend, or repeal a regulation which has been changed from that which was originally made available to the public pursuant to Section 11346.5, unless the change is (1) nonsubstantial or solely grammatical in nature, or (2) sufficiently related to the original text that the public was adequately placed on notice that the change could result from the originally proposed regulatory action.”).

⁶ *See, e.g., Wendz v. Cal. Dep’t of Educ.*, 93 Cal. App. 5th 607, 647 (2023) (finding a violation of fair notice under the California APA when the initial rule did not “on its face” address the changed provision and where the notice of proposed rulemaking provided “no specific indication” that the agency intended to make that change.).

⁷ Public Hearing to Consider the Proposed Amendments to the LCFS, Staff Report: Initial Statement of Reasons (“ISOR”) (Dec. 19, 2023) at 32.

⁸ Wendz, 93 Cal. App. 5th at 648 (citing Fertilizer Inst. v. U.S. EPA, 935 F.2d 1303, 1312 (D.D.C. 1991)).

b. *The Recirculated Draft Environmental Impact Analysis Covering the Proposed 20% Cap Does Not Comply with CEQA*

CEQA requires agencies to consider the environmental consequences of their actions before approving plans and policies or committing to a course of action on a process. Specifically, agencies must inform decision-makers and the public about the potential environmental impacts of proposed projects (including rulemakings) and reduce adverse environmental impacts to the extent feasible.⁹ CEQA requires that a draft Environmental Impact Analysis (“EIA”) discuss and consider adverse or beneficial environmental impacts.¹⁰

The 20% credit cap on certain biofuels in the 15-Day Changes and the accompanying Recirculated Draft EIA fail to comply with CEQA. Nowhere does the Recirculated Draft EIA discuss or consider the potential environmental impacts of capping LCFS credits for certain types of BBD. For example, the language in the Draft EIA and the Recirculated Draft EIA is nearly identical with respect to potential land use changes associated with the Proposed Amendments. Without any additional analysis, CARB concludes that “given that volumes in excess of 20 percent . . . will not be eligible for crediting,” “the proposed regulation is not expected to result in significant increases in soy and canola feedstock utilization for biomass-based diesel.”¹¹ Notably absent is any consideration of the potentially detrimental environmental impacts of *excluding* substantial volumes of BBD, including the negative impacts for greenhouse gas (GHG) emissions and other pollutants. It is not clear that CARB has carefully analyze which fuels will increase as a result of these new restrictions and what emissions impacts could be expected across criteria pollutants as well as GHGs. CEQA necessitates evaluation of such potentially consequential adverse environmental impacts of the BBD cap.

In addition, the Recirculated Draft EIA does not square the proposed cap with the fact that CARB’s own analysis shows that the likelihood that increased demands on biofuel crops could contribute to direct and indirect land use change “is at least partially (and potentially fully) accounted for by the LUC scores added to crop-derived pathways.”¹² If that is indeed the case, it is unclear what purpose the BBD cap serves.

c. *The Proposed 20% Cap Is Contrary to AB32*

Under AB32, CARB cannot undertake regulatory activities to reduce GHG emissions that interfere with “efforts to achieve and maintain federal and state ambient air quality standards and to reduce toxic air contaminant emissions.”¹³ The BBD limit is contrary to AB32 in that it could drive increased use of fossil fuels in lieu of renewable fuels with more beneficial air quality emissions profiles.

This concern is borne out in CARB’s modeling and evaluation in its ISOR for the Proposed Changes. Specifically, the ISOR’s assessment of the Comprehensive Environmental Justice Scenario (which included a cap on crop-based fuels) was projected to produce *fewer* GHG emissions reductions and have worse health outcomes.¹⁴ It results in lower GHG reductions “primarily due to lower amounts of biofuels

⁹ *Ctr. for Biological Diversity v. Dep’t of Fish & Wildlife*, 62 Cal. 4th 204, 228 (2015), as modified on denial of reh’g (Feb. 17, 2016) (finding that failure to comply with CEQA “deprive[s] decision makers and the public of substantial relevant information about the project’s likely impacts”).

¹⁰ 17 C.C.R. § 60004.2.

¹¹ Recirculated Draft Environmental Impact Analysis for the Proposed LCFS Regulation (“Recirculated Draft EIA”) (Aug. 16, 2024) at 35.

¹² *Id.*

¹³ Cal. Health & Safety Code § 38562(b)(4).

¹⁴ ISOR at 124.

entering the market; PM2.5 increases are due to fossil diesel being used instead of renewable diesel.”¹⁵ As CARB explained, this is due, in part, to “limitations on lipid biofuels.”¹⁶

In sum, the 20% cap is inconsistent with CARB’s mandate to protect air quality while achieving cost-effective GHG emissions reductions. We encourage CARB to thoroughly evaluate the air quality impacts of such a drastic change to the LCFS program as required by Section 38562(b)(4) of the California Health and Safety Code.

d. The Proposed 20% Cap Exceeds CARB’s Authority

CARB is responsible for “monitoring and regulating the sources of emissions of greenhouse gasses” to further AB32’s goal of “achiev[ing] the maximum technologically feasible and cost-effective greenhouse gas emission reductions.”¹⁷ One way that CARB does this is through implementation of the LCFS, which is explicitly aimed at “reduc[ing] the carbon intensity of California’s transportation fuels.”¹⁸

The LCFS is a “technology neutral” standard that relies on life-cycle analyses to estimate the carbon intensity of transportation fuels. This “technology neutral” standard complies with AB32, which requires that CARB consider costs to employ technology-neutral and cost-effective approaches to reducing GHG emissions.¹⁹ It exceeds CARB’s authority to exclude specific types of biofuels that can cost-effectively achieve the GHG reductions established under the program.²⁰ Therefore, the cap should be removed from the final regulation.

154.12

2. The Sustainability Certification Proposal Is Contrary to the California APA

As explained above, the California APA “is intended to advance ‘meaningful public participation in the rulemaking process’ and create ‘an administrative record assuring effective judicial review.’”²¹ As such, CARB must provide the regulated community notice and opportunity to comment on aspects of the core components of the regulatory framework, including the certification system, which may allow for the exclusion of the majority of fuels currently generating LCFS credits.

The 15-Day Changes revise the sustainability certification system but still constitute a broad delegation of authority to third parties operating outside the regulatory process without notice or opportunity to comment by biofuels producers. Critical aspects of the sustainability certification framework such as “environmental, social and economic criteria” and the requirement that biomass be produced “according to the best environmental management practices that reduce GHG emissions or increase GHG sequestration” remain undefined in the proposed regulations.²² Such certification programs could be unduly burdensome and potentially unlawful, but stakeholders are afforded no opportunity to voice such concerns prior to CARB requiring their implementation.

We encourage CARB to allow the opportunity for public engagement on such core elements of the LCFS regulations consistent with the California APA.

¹⁵ *Id.* at 118.

¹⁶ *Id.* at 116.

¹⁷ Cal. Health & Safety Code §§ 38510, 36569.

¹⁸ Cal. Exec. Order S-01-07 (Jan. 18, 2007).

¹⁹ Cal. Health & Safety Code § 38562.

²⁰ *Water Replenishment Dist. of Southern California v. City of Cerritos*, 202 Cal. App. 4th 1063, 1072 (2012).

²¹ *Voss v. Superior Ct.*, 46 Cal. App. 4th 900, 908 (1996).

²² *Id.* § 95488.9(g)(1)(B).

DRAFT

Par Pacific's Comments on the 15-Day Package

August 27, 2024

Mr. Matt Botill
Chief, Industrial Strategies Division
California Air Resources Board
1001 I Street Sacramento, California 95812

Ms. Rajinder Sahota
Deputy Executive Officer
Climate Change & Research
California Air Resources Board
1001 I Street Sacramento, California 95812

Dear Mr. Botill and Ms. Sahota,

We appreciate the opportunity to provide comments on the proposed modifications to the text of the LCFS amendment issued August 12, 2024 (the "15-Day Changes").

Par Pacific Holdings, Inc. (NYSE: PARR), headquartered in Houston, Texas, is a growing energy company providing both renewable and conventional fuels to the western United States. Par Pacific owns and operates 219,000 bpd of combined refining capacity across four locations in Hawaii, the Pacific Northwest and the Rockies, and an extensive energy infrastructure network, including 13 million barrels of storage, and marine, rail, rack, and pipeline assets. In addition, Par Pacific operates the Hele retail brand in Hawaii and the "nomnom" convenience store chain in the Pacific Northwest. Par Pacific also owns 46% of Laramie Energy, LLC, a natural gas production company with operations and assets concentrated in Western Colorado. More information is available at www.parpacific.com.

Par Pacific has announced a \$90 million investment at its Kapolei, Hawaii refinery to convert an existing distillate hydrotreater unit to produce renewable fuels. The 61 million gallon per year project is expected to produce renewable diesel, sustainable aviation fuel, renewable naphtha, and renewable light-end products. The project is expected to be completed during the second half of 2025.

The 2025 Step-Down and Auto-Adjustment Mechanism (AAM)

We support the increase in the step-down from 5% to 9% in 2025. We also support the inclusion of the AAM but are concerned that its first potential triggering remains, as in the 45-day package, with 2028 being the first year for which it can amend CI reduction targets. Instead, we recommend that 2025 performance should be able to trigger the AAM, which would then be able to impact CI targets in 2027.

In short, the AAM should be allowed to trigger as early as possible, to guard against the case where the step down is not sufficient to address the current credit bank oversupply. This is especially the case since CARB did not include the more aggressive step-down in 2025 as recommended by ICF and as advocated for by many stakeholders in comments on the 45-day package.

The Cap on Credits on Biomass-Based Diesel ("BBD") from Soy and Canola Feedstocks

We were surprised and disappointed that CARB included major changes from the current regulation and the 45-day package in the 15-Day Changes related to caps on credits for soy and canola. We do not believe that it is appropriate to include impactful revisions without the supporting science and an adequate public process.

155.2

Caps on credits for BBD pathways with soybean oil and canola feedstocks were added in the 15-Day Changes despite these matters not being workshopped, and being contrary to CARB's position as expressed in its April 10, 2024 workshop (the "Workshop"), including as set forth in staff's presentation for it.

CARB has only provided stakeholders 15 days to submit comments on these major changes, however they include provisions that may cause some biofuels producers to go out of business and leave stranded assets. This potential outcome is inconsistent with CARB's guiding principles for the LCFS and may result in reduced renewable diesel and biodiesel in the California fuel pool.

155.2
Cont.

In short, to include such drastic changes at this juncture is bad public policy and is unfair to stakeholders, including those living in disadvantaged communities

1. The 20% cap on credits for BBD from soy and canola feedstocks is unnecessary and will result in higher GHG emissions and tailpipe emissions for Californians, especially those in disadvantaged communities.
 - a. As CARB made clear in the Workshop, soybean oil BBD will become deficit generating by 2033 at the latest and perhaps 2030 if the AAM mechanism is triggered twice. The use of soybean oil as a feedstock will then phase out, rendering the cap unnecessary.
 - b. Furthermore, as CARB explained in the Workshop, the science does not exist to justify a cap on crop-based biofuels at this time.
 - c. CARB also made clear in the Workshop, the LCFS already contains guardrails that disincentivize the use of crop-based feedstocks through the inclusion of an indirect land use change ("iLUC") Carbon Intensity ("CI") penalty and sustainability requirements. The amended LCFS will contain stringent sustainability requirements including certification by an internationally recognized body and third-party verification.
 - d. As the 2022 Scoping Plan sets forth, and CARB has reiterated in the amendment proceeding, including in the Workshop, internal combustion engines will be on California roads for years to come and the heavy-duty fleet is expected to transition slowly. Heavy-duty trucking is extremely difficult to electrify, and it is projected that there will not be enough hydrogen production or refueling infrastructure in the foreseeable future.

As the Scoping Plan noted, the answer in the transition period is the use of low carbon liquid fuels like BBD for the heavy-duty trucking sector.

The LCFS incentivizes the use of waste-based feedstocks to make BBD due to the iLUC penalty on crop-based feedstocks, however there are clear signs that there will not be

enough of these feedstock streams by 2030 to supply the market. This will be especially true as renewable diesel production continues to grow.

The EPA recently announced that it is investigating at least two biofuel producers amid concerns they are using virgin palm oil disguised as used cooking oil (“UCO”) as feedstocks to generate RINs. The EU is also investigating the same issue. Without valid Chinese UCO, there will not be sufficient feedstocks for the necessary RD production unless producers can generate LCFS credits on the crop-based RD they produce. In addition, we expect the unintended consequence of more Chinese UCO being imported into the US to meet the CARB requirements and further incentive to blend virgin palm oil into the UCO pool, running counter to CARB’s intentions.

- 155.3 2. **The possible end of BBD fuel pathways.** We were also surprised by the inclusion of a provision in the 15-Day Changes allowing for the possibility of CARB not accepting fuel pathway applications for BBD starting on January 1, 2031. This provision was not workshopped or discussed before the 15-Day Changes.

If CARB insists on this provision, the triggering mechanism should be limited to the number of ZEV or near-ZEV classes 7 & 8 vehicles, i.e., the heavy-duty trucking categories, since these are the vehicles that are difficult to electrify.

3. **The 15-Day Changes reflect out-of-date databases to determine iLUC**

On p. 10 of the Notice, CARB describes its proposed changes to Table 6, Land Use Change Values for Use in CI Determination as follows:

- 155.4 In section 95488.3(d), Table 6, staff proposes to add specification of the geographic region to Table 6, identifying where land use change (LUC) carbon intensity was modeled for specific feedstock/fuel combinations. **Table 6 LUC values were estimated through the GTAP and AEZ-EF modeling framework developed by CARB with input from an expert working group in 2010 and were updated during CARB’s re-adoption of the LCFS program in 2015.** [Emphasis added.]

It was at this time that CARB assessed the iLUC for soy BBD at its current value of 29.1. However, as Dr. Farzad Taheripour et al explain in their June 2023 report entitled *Biodiesel induced land use changes: An assessment using GTAP-BIO 2014 data base*, CARB’s assessments of LUC value were made using an earlier version of the GTAP-BIO model than is used today, as well as a 2004 database. However, the 2004 database has been updated twice since then, once in 2011 and again in 2014. In addition to updating the database, the Purdue GTAP team has also greatly improved the GTAP-BIO model to take into account intensification due to multiple cropping and/or conversion of idled land to crop production.

Therefore, the 2004 data base and model CARB has been using was out-of-date, and CARB will be compounding the issue in the upcoming amendment by continuing to use them. The Scoping Plan requires CARB to use “the best available science” when computing emissions from crop-based feedstocks. Therefore, we request that CARB use the current GTAP-BIO model and 2014 database to calculate iLUC for such feedstocks.

155.4 Cont. Furthermore, we request that CARB continue to accord an equivalent iLUC value to Argentine soybean oil as the iLUC value for US soybean oil-based BBD. In addition to the same iLUC value, we also request that CARB continue to accord Argentine soy farming emissions an equivalent value to those of US soy.

4. **Eliminating fossil jet fuel as a deficit generator.** In the 45-day text, fossil jet from in-state jet fueling was added as a deficit generator. Again, without prior discussion, CARB removed the provision from the 15-Day Changes.

In closing, we note that there is sufficient time before the November Board meeting for CARB to issue a second 15-day package. We urge CARB to do so.



California Council for Environmental and Economic Balance

369 Pine Street, Suite 720, San Francisco, CA 94104

(415) 512-7890 | cceeb.org

August 27, 2024

The Honorable Liane Randolph
Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95864

Re: 15-day Changes to the Proposed Low Carbon Fuel Standard Regulation

Chair Randolph,

On behalf of the California Council for Environmental & Economic Balance (CCEEB), we write to provide comments on the 15-day changes to the proposed Low Carbon Fuel Standard (LCFS) Program. CCEEB is a coalition of business, labor, and public leaders that works together to advance strategies to achieve a sound economy and a healthy environment. Founded in 1973, CCEEB is a non-profit and non-partisan organization.

CCEEB strongly supports the California Air Resources Board's (CARB) efforts to maintain and strengthen the LCFS as a technology-neutral performance standard. A technology-neutral performance standard is essential for creating a flexible and dynamic market for credits, which is vital for the success of the program. As with the state's cap-and-trade program, the design of the LCFS credit marketplace is crucial to achieving its goals. Our members represent companies that produce and/or supply fuels covered throughout the program and uniformly we are concerned about expansive nature of these amendments which extend beyond the scope of the 45-day package and into broader energy policy for fuels that has not been workshopped or contemplated publicly by CARB.

- 156.1 The proposed 15-day changes represent a radical shift in the LCFS's approach, undermining the program's credibility by dismantling its foundational principles and favoring certain technologies over others. It is imperative that CARB defends the technology-neutral design of the LCFS and allows the Carbon Intensity (CI) standards to determine which fuels will receive credits or deficits within the program. By taking actions such as, sunseting crediting for avoided methane in biogas, eliminating fossil-based hydrogen in 2030, treating all RECs as if they are unbundled, and imposing arbitrary restrictions on crop-based fuels, among other examples, CARB is straying from critical technology-neutral, market-based principles that have lifted the LCFS as a program that provides a path to reduce emissions through innovative technologies.
- 156.2 CARB's proposed changes are being made without any evidence of a problem with the program's current technology-neutral design. No scientific evidence has been presented to justify these adjustments or to demonstrate that they reflect the true carbon reduction potential of the affected fuels. For example, CARB's rationale seems to be more about directing biogas to other sectors rather than questioning the validity of methane reductions. Adding arbitrary restrictions regarding fuel and feedstock types allowed in the LCFS will drive costs higher, which goes against one of the state objectives to maintain affordable

156.2 Cont. fuel costs as per SB X1-2. Moreover, the declining reduction from the carbon intensity curve already acts as a science-based cap, rendering these arbitrary limits unnecessary and inappropriate. Furthermore, these proposed changes are significant policy shifts that extend beyond the scope of the 45-day package and have not been publicly vetted or workshopped by CARB.

The proposed changes represent a political shift, rather than a scientific or economically justified one, which is inappropriate for a program like the LCFS. CCEEB believes that CARB must maintain a technology-neutral and carbon-focused program that is driven by market decisions. These market decisions will naturally be influenced by California's broader suite of clean air and climate policies, eliminating the need to politicize the LCFS. Carbon intensity should remain the primary driver of the LCFS, without imposing undue constraints on feedstocks and production pathways. Such constraints would only limit the program's ability to deliver emissions reductions at the lowest possible cost.

156.3 CCEEB recognizes the significant environmental and economic benefits that the LCFS can bring to California. We urge CARB to correct the course swiftly and ensure these benefits are fully realized. To this end, CCEEB recommends an additional 15-day comment period to address these concerns before the adoption hearing in November. CARB has proposed these changes without adequate public engagement and has not fully considered their potential impacts. In contrast, other provisions in the 45-day LCFS proposal underwent extensive public review.

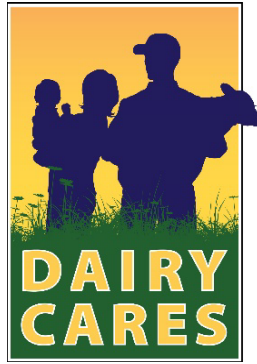
Additionally, companies have made substantial long-term investments and negotiated contracts based on the use of virgin feedstocks. CARB has not fully accounted for the adverse economic impacts that an arbitrary cap on the use of crop-based feedstocks — introduced at the last minute — could have on California businesses. We urge CARB to drop the proposed changes in the 15-day package and simply address the technical elements from the 45-day package if the goal is to conclude this regulation with a vote on November 8, 2024. The LCFS should allow for innovation and investment, and not dictate singular outcomes decided without a public process.

Thank you for your consideration of our comments. Please contact me or Mikhael Skvarla, CCEEB's governmental relations representative, at CA Lobby at (916) 203-0443 should you have any questions or comments.

Sincerely,



Tim Carmichael
President/CEO



Dairy Cares Comments on the Proposed Low Carbon Fuel Standard Amendments (15-Day Changes)

August 27, 2024

Dairy Cares¹ appreciates the opportunity to provide these comments on the 15-day Changes to the California Air Resources Board's ("CARB") proposed Low Carbon Fuel Standard ("LCFS") amendments ("Amendments"). Dairy Cares represents the California dairy sector, including dairy producer organizations, leading cooperatives, and major dairy processors. We appreciate CARB's efforts to lead a robust stakeholder process and its efforts to prepare a voluminous record in support of the proposed revisions to the LCFS. These comments focus on the biomethane crediting provisions. As explained below, CARB should not modify Section 95488.9 to reduce the avoided methane emission crediting periods. CARB should revise these requirements and retain discretion to align implementation of crediting pathways under the LCFS with its statutory obligations under Senate Bill ("SB") 1383.

DISCUSSION

1. Ongoing Crediting for Anaerobic Digester Projects Is Necessary to Meet the Statutory Requirements of SB 1383.

157.1 The 15-Day Changes to Title 17, California Code of Regulations (CCR), Section 95488.9(f)(3)(A) would limit crediting for avoided methane projects to two 10-year periods. As noted in our 45-day language comments, anaerobic digester projects are necessary to meet the statutory requirements of SB 1383 for reducing short-lived climate pollutants ("SLCPs"). Dairy digester projects also help improve baseline environmental conditions. We do not repeat those comments here, other than to note the success of digesters in facilitating SB 1383 targets is well supported by the record and reducing the total number of crediting periods could undermine these efforts. There is an ongoing need for additional investments in the dairy sector, which may extend past the timeframes contemplated for the two crediting periods. The LCFS Regulation should enable the Executive Officer to make case-by-case determinations to extend crediting periods when they are necessary for the continued implementation of SB 1383. As explained below, this longer-term option may be necessary, especially for smaller, in-state dairies.

¹ For more information about Dairy Cares, please visit www.dairycares.com.

2. Two Crediting Periods Are Not Necessarily Sufficient to Justify Investments in Smaller Dairy Digester Projects.

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The notice explaining the changes to 17 CCR § 95488.9(f)(3)(A) concludes that two crediting periods would provide “sufficient return on investment.”² However, the notice does not indicate that CARB considered the needs of smaller, in-state dairies that tend to have longer payback periods than larger in-state facilities (e.g., dairy clusters) and out-of-state facilities. The record does not indicate that CARB considered payback for investments in associated cleaning, upgrading and pipeline interconnection facilities or other investments that must be made in dairies, such as double-lining lagoons. Moreover, neither the 15-Day Notice nor the Initial Statement of Reasons identifies what exactly the long-term tool will be once the crediting periods end.

We are concerned that in the absence of an ongoing, long-term financial signal, there could be project failure, which would risk increasing SLCP emissions. Smaller projects that naturally have longer payback periods (i.e., due to economies of scale in digester development), may not be undertaken at all. This is possible, particularly in light of the fact that in the period of 2025-2030, out-of-state dairy projects will enjoy a permanent exemption from the new deliverability requirements, so long as the developer breaks ground before 2030. We are concerned that project developers will focus their efforts on locking in incentives for out-of-state projects, while smaller in-state projects are overlooked and face relatively short financial payback periods.

CARB should supplement the record and address how it will ensure that in-state dairies have access to the financial capital needed to make long-term investments. CARB should qualify the uniform application of the proposed crediting periods for biomethane pathways. The pathway application process should provide an opportunity to address unique circumstances, particularly those of smaller dairies that may require longer crediting periods to attract financing. Dairy Cares urges CARB to take a more nuanced approach and allow projects that will reduce the emissions sources covered by SB 1383 to request an extension to the phase-out timelines through an application process.

CONCLUSION

Dairy Cares appreciates the opportunity to comment on this rulemaking and looks forward to continuing to partner with CARB and other stakeholders on the implementation of the Amendments and the successful achievement of the State’s climate goals.

² 15-Day Notice at p. 12, available at: https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_notice.pdf.



Governor Gavin Newsom

State of California
Governor's Office of Planning and Research
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info@opr.ca.gov | opr.ca.gov



Director Sam Assefa

August 27, 2024

Liane Randolph
Chair, California Air Resources Board

California Air Resources Board
1001 I Street
Sacramento, CA 95814

CC: Matthew Botill, Industrial Strategies Division Chief
Natalie Lee, Industrial Strategies Division Assistant Chief

Subject: OPR's comments on the Proposed 15-Day Changes to the Low Carbon Fuel Standard Regulation

Dear Lianne,

Thank you for the opportunity to comment on the 15-day proposed regulatory amendments to the Low Carbon Fuel Standard (LCFS) Program. The Governor's Office of Planning and Research (OPR) is a member of the Wildfire and Forest Resilience Task Force's Executive Committee and has been tasked with leading the state's efforts to develop a sustainable wood products market. Under the direction of the Wildfire and Forest Resilience Action Plan (Key Action 3.10), OPR launch the Woody Feedstock Aggregation pilot program to investigate how to build the institutional capacity at the local level to unlock the biomass supply chain bottleneck and establish reliable access to biomass sourced from California's forested lands.

At OPR, we are encouraged by the direction of the proposed changes such as the cap on crop-based fuels and sustainability guidelines for biomass feedstocks. However, we have significant concerns regarding the treatment of forest biomass waste and where forest biomass can and cannot be sourced. We believe that these amendments risk undermining the state's ongoing efforts to meet its ambitious wildfire prevention, forest resilience and climate goals. With this letter, we provide comments on the definition of forest biomass waste and the treatment of forest biomass waste as a specified source feedstock within the proposed Low Carbon Fuel Standard amendments.

Background

The 2022 Scoping Plan identified the need for an expansion in woody biomass residue utilization, particularly from forest and agricultural residues, as necessary for achieving carbon neutrality by 2045. This is because biomass conversion into products, such as clean hydrogen with carbon capture and

sequestration, can provide carbon removal needed to compensate for residual emissions remaining in the economy beyond mid-century. Non-combustion technologies (i.e. gasification, pyrolysis) can also provide clean, non-fossil fuels for decarbonizing aviation, shipping and other hard-to-abate industries.^{1,2} Additionally, state-sponsored research has identified biomass conversion to liquid and gaseous transportation fuels as a key option for addressing the forest health and wildfire crisis.³

A robust and innovative wood products market is needed to increase forest management and restoration in California and drive biomass residue utilization at the scale necessary for meeting the state's ambitious wildfire prevention and climate goals.⁴ The state has developed a number of biomass utilization market and technology development programs, including the Department of Conservation's forest biomass to carbon-negative biofuels [pilot program](#), the Infrastructure and Economic Development Bank's [Climate Catalyst Fund](#), and the Department of Forestry and Fire Protection's wood products and bioenergy [grant program](#).

As a matter of practice, however, biomass utilization projects have been difficult to get off the ground. A key barrier to achieving this vision, that we have learned as part of implementing the pilot program at OPR, is a lack of a recurring revenue incentive for prospective project developers. The Low Carbon Fuel Standard is a policy tool which has the potential to support the development of woody biomass residue utilization projects as this program can provide recurring incentives for these earlier stage projects.

Definition of "forest biomass waste"

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CARB is proposing to define "forest biomass waste" as small-diameter, non-merchantable residues, limited to forest understory vegetation, ladder fuels, limbs, branches, and logs that do not meet regional minimum marketable standards for processing into wood products. This definition effectively excludes all forest biomass waste as eligible under the LCFS as all small diameter, non-merchantable residues can be converted into "wood products" such as wood pellets. We recommend amending the definition of forest biomass waste in a manner that is consistent with Section 95488.8(g)(1)(A)(3). The definition could be amended as follows:

"Forest Biomass Waste" means small-diameter, non-merchantable residues that are removed for wildfire mitigation, forest restoration projects, or the protection of public safety.

Eligibility of Carbon Capture and Sequestration

OPR supports the use of CCS to reduce carbon intensities and generate carbon negative emissions where possible. The proposed amendments, however, limit sequestration to geologic storage and limit the use of captured carbon to fuels production. These restrictions exclude the use of biochar, which can be a co-

¹ Lawrence Livermore National Laboratory. 2020. Getting to Neutral: Options for Negative Carbon Emissions in California. https://gs.llnl.gov/sites/gs/files/2021-08/getting_to_neutral.pdf

² Lawrence Livermore National Laboratory. 2023. Roads to Removal: Options for Carbon Dioxide Removal in the United States. <https://roads2removal.org/>

³ Joint Institute for Wood Products Innovation. 2020. Literature review and evaluation of research gaps to support wood products innovation. https://bof.fire.ca.gov/media/9688/full-12-a-jiwpi_formattedv12_3_05_2020.pdf

⁴ Joint Institute for Wood Products Innovation. 2020. Joint Institute Recommendations to Expand Wood and Biomass Utilization in California. https://bof.fire.ca.gov/media/31nfixsv/final-board-approved-joint-institute-wood-and-biomass-utilization-recommendations-11-4-20_ada.pdf

⁵ Climate Action Reserve. 2024. US & Canada Biochar Protocol. [US & Canada Biochar Protocol - Climate Action Reserve : Climate Action Reserve](#)

158.2

product of hydrogen, electricity or biofuels production from waste biomass. The scientific literature supports the conclusion that biochar can be used for carbon sequestration in soil or to reduce emissions from enteric fermentation, livestock manure management and compost.⁵ Biochar can also be used in the production of concrete, pavement, and other products to sequester carbon. Excluding the use of biochar will harm the economic viability of forest waste projects and contradicts the recommendations in the 2022 Climate Change Scoping Plan to increase the use of bioenergy with CCS (BECCS).

OPR recommends to CARB to revise the definition of CCS in section 95490(a) as follows:

(a)(1) Alternative fuel producers, petroleum refineries, and oil producers that capture CO₂ on-site, including at the location of the production of hydrogen used as an intermediate input, and geologically-sequester CO₂ geologically or in the form of biochar, either on-site or off-site.

OPR recommends to CARB to revise the definition of CCS on page 8 as follows:

“Carbon capture and sequestration (CCS) project” means either (1) a project that captures CO₂ by an eligible entity specified in section 95490(a) of this subarticle, transports the captured CO₂ to an injection site, and injects and permanently sequesters the captured CO₂ pursuant to the Carbon Capture and Sequestration Protocol and as specified by section 95490 of this subarticle; or (2) a project that captures carbon in the form of biochar during the conversion of waste biomass to fuels and that biochar is used in a manner that sequesters carbon as specified in the US & Canada Biochar Protocol.

Forest biomass waste as a specified source feedstock

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CARB is proposing to include forest biomass waste from non-industrial forestland removed for the purpose of wildfire fuel reduction or forest restoration as a specified source feedstock under the LCFS Program. We find this troubling as this amendment would significantly restrict the amount of material available for biomass utilization projects. Industrial forestland owners are currently the only entities in the State capable of offering reliable, long-term forest feedstock supply agreements. At OPR, our staff has been working with state, federal and local government partners to enhance the biomass mobilization and processing capacity of rural economies throughout Northern California.

Since 2022, OPR has awarded \$7 million to six projects that cover 18 counties in the Central Sierra, Lake Tahoe Basin, Northeast California, North Coast, Lake County and Marin County. The OPR biomass pilots have been designed to rebuild the bioeconomy in forest communities, attract private capital and leverage public investments to restore the infrastructure and workforce capacity needed to mobilize forest biomass, develop biomass markets and improve landscape resilience to wildfire. Each pilot is working to develop biomass management plans to improve feedstock supply chain logistics within each target region through the deployment of a new public entity with the authority and resources to aggregate biomass at scale and facilitate long-term feedstock contracts between industrial, non-industrial forest landowners and biomass off-takers.

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Nearly 60% of California’s forested lands are currently excluded from applying for biofuels credits as biomass sourced from federal lands is excluded by federal rules. This amendment would exclude an additional 14% of California’s forestlands. Allowing industrial forestlands to offer qualified biomass to

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Cont.

biofuels projects is needed to kick-start a robust biomass utilization market in California. We recommend the following amendment:

Forest biomass waste ~~from non-industrial forestlands~~ removed for the purpose of wildfire fuel reduction or forest stand improvement, to reduce the risk to public safety or infrastructure, to create defensible space, or for forest restoration; and from a treatment in which no-clear cutting occurred and that was performed in compliance with all local, State, and federal rules and permits.”

Conclusion

In closing, we respectfully urge our state partners at CARB to reconsider the proposed amendment to the definition of forest biomass waste, to reconsider the definition of CCS to include biochar, and address the treatment of forest biomass waste as a specified feedstock source within the Low Carbon Fuel Standard regulation. We believe that changes to the proposed definitions are needed to continue progress towards achieving the state’s wildfire and forest resilience targets, and advancing a sustainable bioeconomy in California. We appreciate your careful consideration of our comments and look forward to continued collaboration between our agencies.

Sincerely,



Samuel Assefa
Director, Governor’s Office of Planning and Research



August 27, 2024

Liane Randolph
Chair
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812
Via electronic submission

Chair Randolph:

The Indiana Ethanol Producers Association represents six of Indiana's bioethanol producers. Our members have approved Tier 2 pathways for participation in the Low Carbon Fuel Standard (LCFS). We are proud to be partners in the California Air Resources Board's efforts to lower greenhouse gas emissions in the state and look forward to continuing to do so.

Aside from the proposed LCFS amendments, CARB can help immediately lower GHG emissions in the state by approving E15 for sale. E15 is a fuel that contains up to 15% bioethanol compared to most gasoline sold in California that has 10%. It can be used in nearly every gas-powered car in the state and does not require any modification for those cars to do so. We strongly encourage CARB to approve E15 so that the millions of gas-powered vehicles that will remain on the road for several decades can contribute to GHG reductions.

Sustainability Certification Requirements

With respect to the proposed amendments to the LCFS, the proposed sustainability certification provisions will make participation in California's fuel market and carbon reduction efforts more difficult for bioethanol producers, more costly for California drivers, and could result in an increase in GHG emissions as less bioethanol is blended into California's gasoline supply.

159.1 We have a series of concerns with respect to the sustainability certification proposal:

- Worries about land use change concerning corn starch ethanol are without merit. Corn acreage has remained steady for nearly a century. Improved yields are responsible for the increase in our corn crop, not an expansion of acres farmed or harvested.
- Additionally, this concern, unfounded as it is, has been addressed by CARB. Corn starch ethanol's carbon intensity score is given a 19.8-point penalty. Adding a sustainability requirement effectively becomes a second penalty on a non-existent problem that is already addressed.

- 159.2
- While the proposed sustainability certification would add onerous obligations for biofuel producers and feedstock production requirements for farmers, it omits the potential on-farm climate-smart practices when calculating the carbon intensity (CI) score. If specific

- 159.2 Cont. carbon reduction practices are being mandated for biofuels producers and corn growers, those practices should also be eligible for carbon reduction crediting in the LCFS.
- Certain elements highlighted in the audit aren't pertinent to a carbon-reduction agenda. Factors like farm labor practices or a farm's profitability have no influence on a feedstock's CI score.
 - Moreover, these new audit conditions unrelated to CI would only impact crop-based feedstocks, leaving other fuel sources free from similar scrutiny.

Classify Corn Stover and Corn Kernel Fiber as a Specified Source Feedstock


- 159.3 Biofuel producers are continuously innovating to maximize the use of every part of the corn crop. We appreciate CARB's acknowledgment of utilizing various "waste, residue, by-product or similar material in a fuel pathway," especially the inclusion of distiller's corn oil as a recognized feedstock. Although corn stover and corn kernel fiber were once considered waste, they are increasingly being utilized as feedstocks for bioethanol production. Given their role as byproducts of corn bioethanol production, we strongly urge CARB to recognize and add corn stover and corn kernel fiber to the list of approved feedstocks.

Expand Low Carbon Intensity Power Sourcing

- 159.4 In terms of Low-Carbon Intensity (Low-CI) power sourcing, the current proposal overlooks its significant potential to reduce carbon emissions in biofuel production. At present, this mechanism is restricted to hydrogen used as a transportation fuel, Direct Air Capture initiatives, and electricity employed for transportation. This limitation contradicts the LCFS's primary objective of decreasing the carbon intensity of transportation fuels within California. Permitting bioethanol producers to obtain newly contracted Low-CI power through power purchase agreements, which are not part of a utility's resource plan, does not affect overall electricity demand. Additionally, because the vast majority of biofuel production occurs outside California, excluding biofuels from this provision prevents the state from encouraging other regions to enhance their Low-CI power generation capabilities.

We respectfully request CARB reconsider the inclusion of these provisions in the 2024 rulemaking, as it is unnecessary relative to corn starch ethanol and is likely to exacerbate fuel prices for California consumers while failing to deliver the ultimate goal of carbon emissions reductions.

We thank you for your time in review our comments and your commitment to California's GHG reduction efforts.

Sincerely,

Tim Phelps
Indiana Ethanol Producers Association



August 27, 2024

Clerk's Office
California Air Resources Board
1001 I Street
Sacramento, CA 95814

**RE: Public Comment on Proposed Amendments to the
Low Carbon Fuel Standards – 15 Day Public Notice**

Dear Dr. Cliff:

The California Biomass Energy Alliance (CBEA) is writing to provide comments in response to the 15-day public notice for the proposed amendments to the Low Carbon Fuel Standards (LCFS). We appreciate the opportunity to offer our perspective on these amendments, particularly as they pertain to the treatment of biomass and forest biomass as feedstocks for low carbon fuels as provided in Title 17, CCR **Sections 95488.8 and 95488.9**, respectively. We have significant concerns regarding the proposed definitions and exclusions to the existing regulatory language.

Changes to Definition of “forest biomass waste” Sections 95488.8(g)

- 160.1 The changes to the definition of “forest biomass waste” under “Specified source feedstocks” creates a much too narrow definition and is not in alignment with California and the federal government’s forest fuel reduction goals. Forest fuel reduction treatments are one of the primary tools that can be employed to reduce the risks of destructive wildfires in California’s forests. The need for fuels reduction in the state’s forests is not limited to who owns the land or for what the land is used. We understand that the intention of the proposed changes is to avoid deforestation and land conversion, but this is not the way to do it, and will cause the forests more harm than good. The lands excluded by these amendments are primarily “timberland” (Ref. PRC section 4527) and are governed by the California Forest Practice Act and Rules. This regulatory framework is the most environmentally stringent in the country and ensures that timberlands cannot be deforested, as they must be restocked or meet stringent stocking standards following commercial activities or treatments. Ignoring these existing environmental regulations and excluding these lands from the scope of the LCFS program overlooks their potential contribution to low carbon fuel production while maintaining environmental sustainability in the state’s forests.
- 160.2 This proposed definition also ignores the fact that material removed in any forest activity generates hundreds of tons of wood waste – tops, limbs, non-merchantable timber, and underbrush. This material needs to go somewhere, and a beneficial use project like producing transportation fuel is the most environmentally favorable outcome for the waste.

The proposed changes to the definition would prohibit many or even most wildfire mitigation and forest restoration projects in California. That is because wildfire mitigation treatments, forest restoration, and fuel removal treatments to address bark beetle or other forest health issues generally produce some amount of merchantable residues. Indeed, if some of the material can be routed to higher-valued uses than energy production that can improve the economics of the forest treatment operations and increase the acreage of treatments that can be performed on an annual basis.

160.3 CBEA urges CARB accept the following edits to the definition to ensure that LCFS eligible forest biomass waste is produced on an environmentally sustainable basis and protects forest health:

“Forest Biomass Waste” means **residues that are 1) removed for wildfire mitigation, forest restoration projects, or the protection of public safety, or 2) small-diameter, non-merchantable residues, limited to forest understory vegetation, ladder fuels, limbs, branches, and logs that do not meet regional minimum marketable standards for processing into wood products.”**

Changes to agricultural and forest biomass in Section 95488.9(g)

CBEA believes the changes made to the definitions in section 95488.9(g) are inappropriate for biomass waste. While we appreciate the need to ensure the sustainability of crop-based fuels, those same rules cannot be applied to biomass waste or residues that were generated from some other activity.

Agricultural waste material used for electricity generation, for example, is mostly generated by orchard removals – when an orchard has reached its end-of-life or drought forces growers to replace the trees – of tree and vine trimmings and food processing waste like pits and shells. This waste material was generated by decisions that are made having absolutely nothing to do with the biomass waste and residues and their beneficial reuse markets. We know this from decades of experience. California’s existing fleet of bioenergy facilities have been operating in California since the mid-1980s. When the waste dries up for some reason or is diverted to other, higher-valued beneficial uses or simply becomes too expensive, the bioenergy facility historically reduces operations or closes. In other words, there is no economic imperative to push an activity just to generate waste to fuel a bioenergy facility.

160.4 The requirements in this section are entirely appropriate for purpose grown crops. However, applying the same standards to agricultural or forest residues as to purpose grown crops does not make sense, and will effectively close the door to fuels that can be produced from agricultural and forest residues, without substantial environmental benefits to the state.

CBEA urges the following corrections to the proposed text for section (g):

(g) Sustainability Requirements for Biomass **Purpose Grown Crops.**

(A) Biomass **Purpose Grown Crops** used in fuel pathways must only be sourced on land that was cleared or cultivated prior to January 1, 2008, and actively managed or fallow, and non-forested since January 1, 2008. Biomass **Purpose Grown Crops** may not be sourced from land that is

covered under international or national law or by the relevant competent authority for nature protection purposes.

(B) Biomass **Purpose Grown Crops** must be produced according to best environmental management practices that reduce GHG emissions or increase GHG sequestration, including but not limited to: ...

We appreciate the consideration of these comments and look forward to working with the California Air Resources Board on developing an LCFS program that will assist in ameliorating the air quality, wildfire, and forest health issues within California.

Sincerely,
California Biomass Energy Alliance

A handwritten signature in black ink, reading "Julee Malinowski-Ball". The signature is fluid and cursive, with the first name "Julee" being more prominent.

Julee Malinowski-Ball, Executive Director



VIA ELECTRONIC FILING

August 27, 2024

Matthew Botill
California Air Resources Board
1001 I Street
Sacramento, California 95814

RE: BTR's Comments on Low Carbon Fuel Standard 15-Day Amendments

Dear Mr. Botill,

Bridge to Renewables, Inc. ("BTR") is pleased to provide the following comments on potential changes to California's Low Carbon Fuel Standard ("LCFS") program. We appreciate the opportunity to engage with California Air Resources Board ("CARB") staff during this process.

Under CARB's leadership, California's LCFS program has been an important driver of the State's greenhouse gas emissions ("GHG") emissions reductions. It has not only provided a model for similar programs in other states, but also proved just how successful such programs can be.

BTR strongly supports many of the changes made in CARB's "Proposed Low Carbon Fuel Standard Amendments" released August 12th, 2024.

The changes to the program's carbon intensity ("CI") targets, specifically the CI "Step-Down" of 9% in 2025, will set the program's ambitions more in line with its performance and advance the goal of balancing the market. More can still be done to achieve CARB's objectives, but we applaud staff for responding to market indicators and working to align the amendments with the most ambitious, achievable CI targets.

Additionally, changes to CARB's treatment of base credit generation for residential charging of light-duty electric vehicles ("LD EVs") are extremely encouraging and well-designed. Accelerating LD EV adoption is crucial for the state to achieve its GHG emissions reduction goals. Recognizing LD EV adoption may be slowing, CARB has now proposed to give its Executive Officer discretion to better leverage the LCFS to support LD EV sales by providing a portion of base credits for residential EV charging to LD EV automakers ("OEMs").

This creative approach demonstrates CARB's determination to ensure the LCFS generally is as effective as it can be in advancing all of California's climate objectives. Like the Auto Acceleration Mechanism, it also enables faster adjustments to the LCFS as the market evolves.

We are thankful for the dedication of CARB staff throughout this process and, with the changes described in the following comments, we urge CARB to finalize these amendments at the scheduled hearing in November.

I. Carbon Intensity Targets

We commend CARB for proposing to implement a 9% CI target Step-Down in 2025. We believe this change is a significant improvement over prior proposals and will help achieve CARB's stated objective of "balancing the market in the near-term".

161.1 However, we do not believe the CI targets as proposed, even with the 9% CI target Step-Down, are sufficient to drive a price response like what CARB has forecasted in Attachment C. In the 2016-2021 market cycle credit prices did not begin increasing significantly until the credit bank began declining towards the equivalent of between 2 and 3 quarters of deficits (the "Bank/Deficit Ratio"). While the 9% Step-Down in 2025 will put the market into deficit, BTR's internal modeling and consulting firm ICF's publicly available modeling indicate that the current proposal will not bring the Bank/Deficit Ratio down to this level.

The market's reaction to CARB's recent proposal is indicative: prices increased only modestly from approximately \$48 per credit on the day of the proposal to approximately \$54 per credit two weeks later. This reaction is incompatible with CARB's expectations of prices returning to more than \$130 per credit in 2025.

As such, if CARB's objective is to support greater investment in and deployment of low carbon fuels, electric vehicles, and electric vehicle infrastructure by increasing credit prices as forecasted in Attachment C, CARB should make several final adjustments to CI targets before finalizing the amendments.

Recommendations:

- Adjust the magnitude of the Step-Down from the proposed 9% to 10.5% below the current 2025 target.
- Allow 2025 market performance to trigger the Auto Acceleration Mechanism, impacting 2027 CI targets.

II. Residential LD EV Charging Credits

BTR is extremely encouraged by CARB's novel and well-designed proposal to change its treatment of base credit generation for residential EV charging under the LCFS. CARB has recognized that EV OEMs are essential partners in advancing LD EV adoption. OEMs enjoy comparatively strong relationships with consumers and act as primary distributors of information regarding the consumer and environmental benefits of LD EVs. OEMs also guide consumer preferences by providing compelling LD EV products.

Simply put, EV OEMs know best how to get more LD EVs on the road, and CARB's proposal to award a portion of base credits generated for residential EV charging to EV OEMs will make the LCFS even more effective.

CARB is also right to provide the Executive Officer with discretion to determine what portion of base credits to award to OEMs based on CARB's assessment of market conditions. This creative approach once again demonstrates CARB's leadership in ensuring that the programs it manages are highly effective. This proposal will allow CARB to adjust its strategy as necessary and, like the Auto Acceleration Mechanism, will ensure that the LCFS is helping achieve the State's goals.

Given this, we are highly supportive of CARB's proposal and suggest only several final adjustments and clarifications to credit generation – both base and incremental – for residential EV charging.

First, CARB's proposal suggests that EV OEMs, unlike EDUs, may be required to register directly with CARB, rather than through a designated credit generator, to qualify to generate base credits for residential EV charging. BTR has acted as the designated credit generator for many EV OEMs since 2019. We have registered hundreds of thousands of vehicles with CARB and have consistently worked collaboratively with CARB staff to identify ways to ensure accuracy in reporting and to provide CARB with helpful information regarding EV charging.

161.2 While manageable, creating new LRT accounts, de-registering and re-registering vehicles, and reporting through a new process will introduce unnecessary administrative burden for CARB and jeopardizes the successful launch of a new program. In fact, many EV OEMs may be unable to generate incremental credits for residential EV charging for two quarters to work through this process.

We do not understand what advantage this new process would provide nor why EV OEMs and EDUs would be treated differently.

Additionally, while we support CARB's proposal to provide discretion to the Executive Officer to determine what portion of base credits to award to OEMs, base credit awards should be as stable and consistent as possible. OEMs make business plans years in advance, and many programs and initiatives continue for years after launch. Planning and executing LD EV programs using expected base credit proceeds will be made extremely difficult if EV OEMs could receive 45% of base credits for residential EV charging one year but 0% the next year.

BTR believes this could be addressed by establishing a minimum base credit award to EV OEMs and by CARB making efforts to keep any changes to the award to EV OEMs as gradual as possible. CARB should also provide EV OEMs with as much advance notice regarding base credit awards as possible.

EV OEMs should also be eligible to generate incremental credits for non-metered residential EV charging. To award base credits to EV OEMs, CARB has proposed assigning a non-metered quantity of residential EV charging to each EV OEM. This process introduces the ability for CARB to allow EV OEMs to generate incremental credits for non-metered residential EV charging when metered data from the EVs is not available. This would result in better use of the non-metered residential EV charging pathway generally.

CARB should ensure EV OEMs are still incentivized to provide metered data for residential EV charging whenever possible and can accomplish this by making the adjustments recommended below.

Finally, and consistent with the changes described above, EV OEMs or their designees should be established as the first priority credit generator for all incremental credits for residential EV charging. EV OEMs have been the primary credit generators for incremental credits for residential EV charging. This adjustment would recognize that reality and reduce the unnecessary complexity of the registration process.

161.3

Recommendations:

- Allow EV OEMs to select a designee to act as the credit generator for base credits, just as EDU's are allowed to select a designee as described at 95483(c)1(A): "[t]he EDU or its designee is the credit generator for base credits for the portion of residential EV charging assigned to that EDU by the Executive Officer."
- Establish a minimum base credit award for EV OEMs.
- Provide a guidance document after finalizing the amendments to clarify a process for determining and announcing the portion of base credits to be awarded to EV OEMs and ensure that the process provides for consistency and only gradual changes year-over-year.
- Allow EV OEMs to generate incremental credits for non-metered residential EV charging by changing 95483(c)(1)(E)(3) to "For non-metered residential EV charging, the EV OEM is eligible to generate incremental credits for supplying low-CI electricity, so long as that EV OEM also provides metered residential EV charging data to generate incremental credits whenever it is possible to do so."
- Clarify that EV OEMs or their designees are the first priority incremental credit generator for metered residential EV charging by changing 95483(c)(1)(E)(2) to "Multiple claims for incremental credits for metered residential EV charging associated with a single FSE ID will be resolved pursuant to the following order of preference: a. The EV OEM of the EV associated with the FSE ID or its designee has first priority to generate credits. b. The Load Serving Entity (LSE) supplying electricity to the EV associated with the FSE ID has second priority; and, c. Any other entity has third priority."

III. Third-Party Verification Requirements

CARB has proposed to introduce third-party verification requirements for additional electricity credit pathways. As currently proposed, electricity credit generators would require third-party verification of credits generated for non-residential EV charging and metered residential EV charging despite the significant concerns with the feasibility of verification.

We urge CARB to either eliminate such verification requirements or clarify its proposal to ensure that the requirements are appropriate for these credit generators and account for real-world implementation concerns.

Third-party verification of non-residential charging by desktop review should suffice; existing regulations govern EV charger accuracy, and it is unrealistic that third-party verifiers would conduct tens of thousands of site visits to test each EV charger (BTR notes there are more than 53,000 EV chargers registered in the program).

If site visitation remains a priority for CARB, we recommend establishing a sampling approach and/or authorizing third-party verifiers to exercise discretion in determining when a site visit is warranted.

Metered residential charging should be entirely exempt from site visit requirements. Site visits to hundreds of thousands of residential locations would be highly impractical, raise privacy concerns, and introduce significant unnecessary costs for little-to-no value. Just as it should for non-residential charging, third-party verification of metered residential charging by desktop review should suffice. Third-party verifiers can test data provided by the credit generator for a sample of FSEs to ensure the time and date of the charging reported aligns with the reporting quarter and that the geofencing methodology was applied appropriately.

Recommendations

- CARB should clarify that third-party verification for both non-residential and metered residential EV charging does *not* require any site visits and that a desktop review of sample data will suffice.

IV. Adjustments to the Requirements for Low-CI Electricity

The supply of RECs eligible for demonstrating low-carbon intensity (low-CI) electricity generation for incremental book-and-claim crediting under the LCFS program is limited relative to other state clean fuel standard programs in the WECC due to CARB's deliverability restrictions on low-CI electricity. This supply limitation jeopardizes the economic viability of incremental credit generation for EV charging generally.

Recommendations:

- Amend the deliverability requirement such that low-CI electricity from generating units registered in WREGIS and located in *any* state in the WECC may be used for

incremental crediting, even if such low-CI electricity is not scheduled into a California balancing authority.

V. Other Programmatic Changes

Geofencing Radius for Residential EV Charging

CARB should consider reducing the current “conservative” Geofencing Radius (GFR) of 220 meters to a smaller and more precise GFR, as described in LCFS Guidance 19-03, Appendix A “Rationale for Minimum and Maximum Geofencing Radius.” The GFR is used to “disaggregate the quantity of electricity used for residential and non-residential EV charging” and should be as precise as possible.

161.4 We are concerned that, as non-residential charging stations proliferate, an increasing amount of residential EV charging will be erroneously categorized as non-residential and therefore ineligible to generate credits. This will be particularly acute in densely populated urban areas of a mixed-use commercial/residential nature.

We believe that geolocation data (latitude, longitude) provided by non-residential reporting entities, as well as the precision of on-vehicle telematic systems, supports a higher precision GFR. We note that the Washington State Department of Ecology uses a “conservative estimate of 110 meters or less for the maximum GFR to geofence a residential charging location.”¹

Lookup Table Fuel Pathways for Small Biogas-Derived Electricity Generators

CARB should endeavor to ensure that small biogas-derived electricity generators are able to participate in and benefit from the LCFS program. Current Tier 2 pathway development and verification requirements are prohibitive for small generators, especially given CCARB review and approval can take as long as two years. Additionally, in some cases, the cost of verification is greater than the value of all credits generated by these generators in a year.

This dynamic poses a challenge in that only larger producers – larger farms – can take on this burden and participate in the LCFS, and even those producers are deterred by the approval process.

CARB has now reviewed and approved a significant number of Tier 2 pathways for biogas-derived electricity generators. CARB could draw on this experience to introduce a negative-CI Lookup Table pathway for the smallest biogas-derived electricity generators (generators below a certain size threshold) to use on a permanent basis. CCARB could also introduce a temporary pathway for all other biogas-derived electricity generators to use while seeking approval from CARB for a Tier 2 pathway.

¹ <https://apps.ecology.wa.gov/publications/SummaryPages/2314029.html>

161.4 Introducing such pathways would better enable all farms, and specifically smaller farms, to participate in the LCFS, thereby encouraging them to reduce methane emissions and supply low-CI electricity to the transportation sector, consistent with CARB's goals for EV adoption.

Recommendations:

- Reduce the GFR described in LCFS Guidance 19-03 to 110 meters.
- Create a negative-CI Lookup Table pathway for biogas-derived electricity generators below a certain size threshold.
- Create a temporary pathway for biogas-derived electricity generators of any size to use while seeking approval for a Tier 2 pathway.

VI. Conclusion

We encourage CARB to continue to pursue aggressive policies that support California's climate goals. As the transportation sector is the largest sector contributing to GHG emissions, reducing those emissions is critical to achieving carbon neutrality. The LCFS has been extremely successful because of CARB's leadership in setting creative and effective policy. Finalizing the proposed amendments and the changes described in these comments will ensure that success continues.

We thank you again for the opportunity to engage with CARB staff through this process. If we can provide additional information or further support your efforts, please contact the BTR team.

Sincerely,



John (Jack) Barrow
Chief Executive Officer
Bridge to Renewables



California Air Resources Board
1001 I Street
Sacramento, CA 95814
Attn: Clerks' Office

27 August 2024

SUBMITTED ELECTRONICALLY <https://ww2.arb.ca.gov/applications/public-comments>

Subject: Low Carbon Fuel Standard (LCFS), 15-day Notice Comments

Audi of America (Audi) welcomes the opportunity to submit comments to CARB on the most recently proposed changes to California's Low Carbon Fuel Standard (LCFS).

Audi of America

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As we have noted previously, the LCFS program is a vital tool that uniquely leverages market incentives to drive reductions in Greenhouse Gas (GHG) emissions. Entities within the primary LCFS value chains have demonstrated the ability to react to the market signal when it is sufficiently strong. Thus, the LCFS holds great potential to serve as a key mechanism in accelerating the transition to zero emissions technologies, particularly electric vehicles (EVs).

Audi views the continued evolution of this fuels policy as vital to supporting our company's goal of aggressively transforming our vehicle portfolio to plug-in battery electric vehicles (BEVs) over the next decade. California's LCFS program can support this transition, particularly in the light-duty segment which dominates the state's roadways. Recent market trends reveal some emergent headwinds in consumer uptake of BEVs and the clear consensus is that purchase incentives are increasingly important as automakers seek to move mainstream car buyers into plug-in electric vehicles.

162.1

It is indeed automakers that are unambiguously best positioned to design and administer purchase incentives and other programs to boost consumer EV uptake in California. These activities are core to our business. The proposed changes to the LCFS program recognize this intrinsic product-consumer relationship that we curate and leverages LCFS credit value to bolster EV adoption.



The proposed changes to CARB's LCFS program will improve outcomes

162.2 As summarized in our submitted comments to the earlier LCFS proposed amendments¹, base credit generation from EV charging is unique in its ability to incentivize the *utilization* of zero-emission battery electric vehicles (i.e., more eVMT and more GHG reductions) and not just the initial sale of those vehicles.

Thus, CARB's proposed changes including automakers as LCFS base credit generators, alongside electric utilities, provide that needed direct incentive to drive further technology innovation, new consumer-facing programs, and further strengthen the market pull for deploying more BEVs, and more utilization of those BEVs, in the state of California.

We encourage CARB to look for further opportunities to find program efficiencies (leveraging existing data sources and administrative structures) so as to focus LCFS participants (and their resources) on deploying zero-emissions technologies into the California market.

162.3 Audi supports the comments submitted by the Alliance for Automotive Innovation (AAI) that detail further areas for program refinement, context for the proposed changes, and how to best support a successful future implementation of consumer-facing EV investments, and light-duty EV rebates, in particular.

Thank you again for the opportunity to comment on this latest round of proposed program revisions.

Sincerely,

W. Spencer Reeder
Director, Government Affairs & Sustainability
Audi of America

¹ See: Audi comment submittal to CARB on Proposed Amendments to the Low Carbon Fuel Standard as outlined in the Staff Report: Initial Statement of Reasons (ISOR), March 21, 2024



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August 27, 2024

California Air Resources Board
1001 I Street
Sacramento, CA 95814
VIA ONLINE SUBMISSION

RE: Low Carbon Fuel Standard 15-Day Language

The Western Propane Gas Association (WPGA) is pleased to submit its comments in response to the Low Carbon Fuel Standard (LCFS) 15-day language. Aligned with our previous letter dated May 10, 2024, the focus of this letter is on the value of renewable propane as an eligible fuel for LCFS, to reiterate key points, and additionally, discourage newer aggressive compliance targets.

163.1 **AGGRESSIVE COMPLIANCE TARGETS DISRUPTIVE TO CONSUMERS**

In the 15-day language, the compliance targets between 2025 and 2030 are adjusted to create a larger drop in Carbon Intensity (CI) reduction than previously proposed. For 2025 alone, the new language would drop target reduction from 13.75% to 22.75%; an additional 9% drop. This 9% drop would move the 2030 CI reduction target would move from 30% to 39%. More aggressive short-term compliance targets are above and beyond any staff suggestions from the 45-day language and are not projected to be feasible considering the state's current inability to reach target CI reduction. In 2024, the CI target set by LCFS was missed by 5%; more aggressive compliance curves would only exacerbate the impacts to end-users attempting to procure sufficient quantities of compliant fuel. If current targets cannot be achieved, it is unreasonable to set more stringent targets for the following year.

Additionally, these newer aggressive compliance targets would create disruptions in existing fuels market and make it more difficult for suppliers to procure adequate renewable fuels to address existing market demands. As stated in previous letters, renewable fuels with ultra-low CI scores like that of renewable propane, are prime for meeting the CI targets set by LCFS. That being said, existing markets would be pressured to make extra jumps in reduction they were not prepared for. The ripple effect of the proposed increased targets would negatively impact procurement achievability.

STILL INCORRECT CI FOR CONVENTIONAL PROPANE IN GREET MODEL

163.2 Despite repeated entreaties, CARB's GREET4.0 model still incorrectly calculates the baseline CI of conventional. See our letter dated April 29, 2023¹ for detailed CI calculations. With the consideration of more aggressive compliance targets under the 15-day language, this miscalculation would create further undue burden on compliance entities and end-users.

¹ WPGA, Comment Letter, RE: GREET4.0 – Propane Carbon Intensity Calculation, Submitted to CARB April 29, 2023

163.2
Cont.

WPGA again proposes that CARB update its modelling of the CI for conventional propane within the lookup table to result in **80.06 gCO₂eq/MJ** due to corrections on:

- Upstream combustion emissions – from a CI of 64.84 to 64.58 (determined by existing GREET 2021 model updates for school buses),
- Assumptions regarding refining source – from 75% oil/25% natural gas mixture for conventional propane to 59.5% oil/40.5% natural gas within California per Argonne National Laboratory reporting², and
- Transport distance for delivery – fewer than 100 miles traveled for final delivery, based upon industry reporting and best practices.

Despite numerous letters to CARB on the subject, staff have refused to acknowledge the miscalculation.

EXEMPTING AVIATION FUEL CREATES UNCERTAINTY IN OTHER FUELS

While CARB staff included an exemption for all aviation fuels under the 15-day package, there are real concerns about the unintended consequences to other fuels remaining under compliance. The lack of time to evaluate and comment on such a lasting, significant, and costly change to LCFS is not aligned with CARB's historic commitment to working with regulated entities and stakeholders on the potential impacts of their rulemakings.

Sustainable Aviation Fuel, or SAF, is one of the primary refining sources for renewable propane that complies with LCFS. Renewable propane is a significant byproduct of the SAF process and creates fuel that is available for propane used in transportation, particularly in Southern California. By exempting aviation fuel and reducing the credits available for SAF, it could have the unintended consequence of drastically reducing production of SAF and thereby one of the most available sources of renewable propane – driving up costs for end-users by an unknown amount. Likewise, it could drive production of these fuels further out of state and reduce the accessibility of SAF and renewable propane for the markets that are obligated to use those fuels.

163.3

CONCLUSION

With approximately 15% of all propane used in transportation being renewable today, the industry has a goal of reaching 100% renewable propane across California's propane transportation market by 2035 or sooner. Compliance targets need to be reasonable for an industry shift to meet set targets. WPGA appreciates the opportunity to submit feedback on the LCFS 15-day language.

Sincerely,



Krysta Wanner
Director of Government Affairs, WPGA
krysta@westernpga.org

² Backes, S. E., Beath, J., Sebastian, B., & Hawkins, T. R. (2020, September). Sources of Propane Consumed in California. Chicago; Argonne National Laboratory.



August 27, 2024

Cheryl Laskowski
California Air Resources Board
1001 I Street
Sacramento, California 95814

Re: NRDC Response to 15-Day Changes to Proposed Regulation Order for Updates to the Low Carbon Fuel Standard

NRDC appreciates the opportunity to provide comments on the proposed 15-day changes. In this letter, we limit our comments to issues around the book-and-claim electricity accounting for electrolytic hydrogen production and to the electric transportation provisions.

I. Book-And-Claim Accounting For Low-Carbon Electricity Used In Electrolytic Hydrogen Production Must Use Hourly Matching

As described in our previous letter to the Air Resources Board dated June 14th 2023, electrolytic hydrogen must use the three pillars of incrementality, geographic deliverability and hourly temporal matching for any book-and-claim accounting of low-carbon electricity. Without these three pillars, electrolytic hydrogen will not fully account for its impact on emissions from the grid.

164.1 The change made to § 95488.8.(i)(1)(C) moves the LCFS methodology further away from hourly matching by changing the matching period from quarterly to three quarters of a year. Robust research has shown that hourly matching (together with incrementality and deliverability) is needed to account for the long-run emissions impacts, as well as consumer price impacts, of electrolytic hydrogen production.¹

II. Continue and Enhance the Electric Transportation Provisions in the LCFS

¹ Ricks, W., Xu, Q., & Jenkins, J. D. (2023). Minimizing emissions from grid-based hydrogen production in the United States. *Environmental Research Letters*, 18(1), 014025. <https://doi.org/10.1088/1748-9326/acacb5>

164.2 Stringency: We support the LCFS 15-day change provisions that increase the stringency of the program, as reflected in Tables 1 and 2. These changes will reduce the size of the credit bank and help improve the LCFS regulatory signal.

EDU Credit Generation and Automakers:

The current structure of credit generation, whereby electric distribution utilities earn credits for residential charging, owners of the charging equipment earn the nonresidential credits, and various parties can earn incremental credits, is appropriate and should remain unchanged.²

164.3 Regarding allowing the Executive Office to give residential base credits to automakers (OEMs), we oppose this change given existing OEM requirements under the Advanced Clean Cars (ACC) II program and the uncertainty whether LCFS credits would really be driving additional OEM actions beyond what is already required for compliance under ACC II. In addition, the shift in credit generation would reduce, or eliminate, the feasibility of a Clean Fuels Reward program for electric medium- and heavy-duty vehicles (eMHDV) Clean Fuel Reward.

If CARB determines it will keep these new OEM credit generation provisions, we recommend that additional requirements and safeguards be included. First, if the OEMs become LCFS credit generators, the acceptance of those credits should also have equity requirements associated to them like utilities currently have. To help ensure that proceeds from LCFS credits are used for additional actions, we recommend those actions be limited to providing charging incentives, while disallowing marketing, education and outreach or vehicle rebates that should normally be part of normal advertising and marketing budgets. Further, we recommend that these OEM provisions not go on in perpetuity and sunset after a few years. Also, CARB should ensure that credits going to small and medium sized utility holdback programs are not reduced if the executive officer creates this OEM program. Finally, we ask that the number of credits be limited to no more than 25% of base residential credits (instead of 45%), so that the eMHDV Clean Fuel Reward can be created.

Administrative Cost Cap:

164.4 The proposed five percent cap on administrative costs on the Clean Fuel Rewards program for electric medium- and heavy-duty vehicles and the seven percent cap on administrative costs for utility holdback programs is premature, particularly for programs focused on outreach to under-served communities. For consistency and real-world experience, CARB should instead look to CPUC definitions and percentages. The current ten percent cap for Clean Fuel Rewards and holdback programs should continue, absent a showing this would not harm outreach efforts, with the regulatory amendments instead allowing the Executive Officer to

² Examples of non-residential credits include charging of light-duty, medium-duty, heavy duty and non-road vehicles away from home, fixed guideway electrification, and fleet charging of vehicles, marine vessels, material handling equipment, aircraft and similar non-road equipment.

164.4 Cont. lower it after workshops to examine the details (e.g., impact on small vs large EDUs, impact of credit prices, fixed vs variable costs, role of marketing, education and outreach on programs).

Medium and Heavy-Duty Fast Charge Infrastructure Program

164.5 We support many of the 15-day change provisions in the proposed HD Fast Charge Infrastructure (FCI) program (e.g., extending the location of sites to five miles from a corridor instead of one mile, extending the program to 2035, removing restrictions on sites) and appreciate staff’s efforts to incorporate many of the recommendations from NRDC and stakeholders on this issue. However, we continue to recommend the FCI program increase its cap to five percent of the prior quarter deficits based on the California Energy Commission’s analysis.³ We also request that the formula for HD FCI program include the same favorable formula as the HD hydrogen refueling program in order to treat the two programs equally. Absent these slight modifications, the program rules are inadequate to maximize the potential business case for HD fast charge infrastructure, including for near-term use cases such as drayage, short-haul and delivery trucks.

Light-Duty Fast Charge Infrastructure Program

164.6 We support many of the 15-day change provisions in the proposed LD Fast Charge Infrastructure (FCI) program (e.g., increasing the cap of prior quarter deficits to 2.5 percent, removing several restrictions on sites) and appreciate that many of the recommendations from NRDC and other stakeholders were accepted. To further improve the provisions, we ask that the LD FCI program be extended to 2035 instead of 2030 and that the formula for the LMD FCI program include the favorable formula for the hydrogen refueling program to treat the two programs more equally.

Including Other Categories of Electric Transportation

164.7 Finally, CARB should allow more types of electric transportation technologies to earn credits in the LCFS. Currently other fuels can earn credits for most end-use applications, but many types of electric vessels, aircraft, and off-road equipment cannot because they lack an approved Energy Economy Ratio (“EER”). Companies investing in emerging electric technologies, many of whom are start-ups, do not have the expertise and funds to go through the detailed application to CARB for an EER. The solution is for CARB to establish conservative default EERs (e.g., 3.0) in LCFS Table 1 that can be used by these emerging electric transportation technologies. This default set of EERs would incentivize electrification in hard-to-reach electric transportation applications such as mining equipment, agricultural equipment, forest equipment, boats, marine vessels, ferries, aircraft, locomotives, tow-tractors, sweepers and other off-road equipment. In addition, because a 3.0 EER is not optimal, some industries would

³ According to the CEC’s AB 2127 analysis, the state will need about 11,600 MW of MHD charging by 2030. See <https://efiling.energy.ca.gov/GetDocument.aspx?tn=247323> for November 2022 CEC workshop for more detail. We believe the proposed MHD FC program will deliver less than 1/10th of that need.

164.7 Cont. still be motivated to submit an application to CARB in order to establish a higher, more favorable EER over time. We are also supportive of excluding from this default EER certain end-uses such as golf carts and indoor sweeper/scrubbers that are already electric. Supporting the development of clean, electric transportation technologies is essential to meeting California's climate goals while reducing air pollution and health harm to vulnerable communities.

Formula for Fixed Guideways:

We appreciate CARB accepting our comment to improve the formula for fixed guideways so that pre-2010 systems receive the same credit as post-2010 systems. These changes will support continued existing use of fixed guideway and help prevent deterioration in service And Ridership Levels.

We appreciate CARB's time and consideration of our recommendations.

Sincerely,

Simon Mui, Ph.D.

Managing Director, Transportation
Climate & Energy

Pete Budden, Ph.D.

Hydrogen Advocate
Climate & Energy



August 27, 2024

California Air Resources Board
1001 I Street
Sacramento, CA 95814

The Honorable Liane Randolph
Chair, California Air Resources Board

Steve Cliff
Executive Officer, CARB

RE: UNICA's Comments on Proposed 15-day Changes to LCFS

The Brazilian Sugarcane and Bioenergy Industry Association (UNICA) appreciates the opportunity to provide additional feedback on the recent amendments proposed to the Low Carbon Fuel Standard before the vote to reform the program later this year. UNICA directly represents more than half of the ethanol production in Brazil, including its largest producers and is deeply committed to our partnership with California, to the success of the LCFS market, and the stability of this policy which will influence many other markets. UNICA is pleased to support the recent proposed amendments, which will accelerate low-CI fuel adoptions while strengthening the credit market, phase in proven sustainability criteria, and elevate the standards of the global biofuels market. With the exception of a few concerns highlighted below, we look forward to aligning with CARB's guidance in supplying this energy transition.

Above all, UNICA would like to emphasize three general themes. First, we appreciate that key elements of the policy are phased in to allow for conformity and implementation efforts to play out, and that discretion is granted to the Executive Officer to intervene when there is overwhelming data or evidence to support a shift in course or a corrective decision. Second, we encourage CARB to continue its leadership on the international stage and prioritize alignment with international biofuels standards and reporting schemes where possible. As an international producer in an increasingly global commodity market, duplicative, contradictory, and unnecessary requirements are a constant concern. Lastly, we applaud CARB for its history in maintaining a tech-neutral approach within the LCFS. Innovation is not exclusive to zero-emission fuels, it is constantly occurring in the biofuels sector and this should be reflected in updated CI and ILUC scoring.

Updates to ILUC Scores at Executive Officer's Determination

The proposed amendment to §95488.3(d)(2) introduces a process to assign a more conservative indirect land use change (iLUC) when empirical data is convincing,

including satellite-based monitoring and crop yields, to determine appropriate iLUC values. To ensure scientific rigor and fairness, it's crucial that CARB establishes a clear public process and expectations for these determinations. This should include early communication with stakeholders, transparency in methodologies, and a public consultation process for discussing new or altered iLUC values. CARB should also consider lowering iLUC values when necessary, rather than only considering adjustments that could negatively impact certain feedstocks and fuels.

Brazilian second-crop corn illustrates the need for such a thorough and transparent approach. Not all corn is equal in carbon intensity, which varies considerably based on farming practices, use of byproducts, industry energy source, etc. and encourages CARB to analyze these important differences. The current global default value for corn does not account for the low-risk and low-CI characteristics of this specific feedstock that are objective and relatively simple to audit. We urge CARB to recognize Brazilian farming and industrial practices, particularly the double-cropping of soy and corn, and the role of renewable biomass in establishing Brazilian second-crop corn as a low-CI and low-iLUC feedstock. Key factors include improved agricultural practices, available soybean land for corn expansion without additional land use, and documented negative iLUC for Brazilian corn ethanol. For example, CORSIA and ISCC have recognized zero or negative iLUC values for secondary and sequential crops, including Brazilian corn ethanol, classifying it as Low LUC risk. These factors warrant a thorough review by CARB.

On that note, we argue there is not substantial evidence that direct land use changes are occurring in production of Brazilian ethanol, as more recent data than that being used by CARB shows increased production through higher yields rather than expanded acreage. The proposed amendments fail to recognize significant carbon intensity (CI) improvements achieved by Brazilian mills, including advancements in sugarcane ethanol production that align with the proposed sustainability criteria, expanded use of multi-cropping, and utilization of waste-based feedstocks like 2G ethanol from bagasse. These innovations, unique to Brazil, are not reflected in CARB's current CI calculators, creating disadvantages both in the scoring of the production process and pathways factors in bringing the feedstock to consumers. For example, UNICA producers utilize less than 1% of Brazilian land, and have enhanced productivity through investments such as nearly ubiquitous mechanized harvesting (~99%) despite modeling accounting for only 80%. Despite these efforts, CARB applies outdated and overestimated iLUC penalties based on data from 2013-2015, ignoring more recent studies¹ that demonstrate reduced or even negative land use change emissions. Furthermore, CARB's models overlook sustainable practices like pasture recovery and second-crop harvesting prevalent in Brazil. Recent research² confirms that sugarcane has expanded over existing agricultural lands without causing deforestation, and Brazil's sugarcane can greatly expand production sustainably.

Sustainability Criteria and Third-party Certification

UNICA is proud of its members' strong international standing in sustainability

¹ Guarengi, M.M.; Garofalo, D.F.T.; Seabra, J.E.A.; Moreira, M.M.R.; Novaes, R.M.L.; Ramos, N.P.; Nogueira, S.F.; de Andrade, C.A. *Land Use Change Net Removals Associated with Sugarcane in Brazil*. *Land* 2023, 12, 584. <https://doi.org/10.3390/land12030584>

² <https://www.mdpi.com/2073-445X/12/3/584>

certifications. Brazil's leadership is evident, with 1.6 million hectares (84.2%) of the global Bonsucro-certified area and producing 96 million tons (80%) of certified sugarcane, with 89 of the world's 165 Bonsucro-certified mills (54%) held by Brazilian ethanol producers. Many UNICA members, particularly exporters, also hold ISCC (International Sustainability & Carbon Certification), with some already certified for or in the process of obtaining ISCC CORSIA certification, essential for the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). Domestically, 121 of the 127 UNICA member mills are accredited by RenovaBio, representing approximately 75% of Brazil's ethanol production. Those without active accreditation are deactivated mills. In São Paulo, the Greener Ethanol Protocol certifies 129 ethanol plants and 13 supplier associations as of 2023. All exporting UNICA members hold at least one ISCC or Bonsucro certification, meeting internationally recognized standards like European Union Renewable Energy Directive (EU RED) and CORSIA. In particular, we are encouraged by the proposed amendment's recognition of EU RED as an approved certification system.

Given the foreseeable complexity and costs of altering these established accreditation programs by 2031, UNICA urges CARB to plan to utilize established certification schemes to avoid duplicating efforts and imposing unnecessary burdens. We advocate for a regional approach to standards and certifications, accommodating local variables to the sustainability criteria, and appreciate the intent to afford time to seek additional feedback to better align the policy with regional nuances and existing certifications. We support sustainability criteria if they are transparent, affordable, and aligned with existing certification schemes like ISCC, Bonsucro, and RSB. While confident in Brazilian producers meeting established standards, we are concerned that the proposed amendments could introduce vague and costly compliance challenges by delegating final authority over qualification determinations to external parties.

New Restrictions on Use of Biomass

165.3

UNICA expresses concerns about the proposed lengthy addition of policy in §95488.9(g), which pertains to new sustainability criteria for fuel pathways derived from biomass, which for Brazilian ethanol producers includes extensive and efficient utilization of straw, residues, and other byproducts. Due to the complexity of these issues, UNICA contends that more time would be needed to ensure these new concepts can be properly implemented and does not lead to unintended consequences. We support rigorous life cycle assessment methods that accurately measure biofuel emissions and reward lower-carbon feedstocks, however this well-intended effort to improve CI assessment accuracy may unfairly penalize biofuel CI scores or exclude certain feedstock sources entirely. We recommend a more deliberate, balanced approach that allows CI scores and program eligibility to reflect actual environmental performance, positively or negatively.

More specifically, if not delayed, we suggest that CARB establish clear and more detailed requirements and definitions for the life cycle analysis of renewable biomass. This includes clarifying the limits and more granular details of definitions for important stages such as "chain-of-custody evidence", "land cultivation", "point of origin", "first gathering point", "processing unit", and "wastes/residues" to ensure consistency. Further, UNICA encourages more accurate measurement of carbon footprints and environmental impacts for biomass combustion that provides clear guidance on the impact on a producer's economics.

165.4

UNICA is encouraged by CARB's move to tighten the CI benchmarks for fuels beyond its previous goals, and the secondary market effects that will inspire. With California's climate policy influencing beyond its borders, it's crucial that CARB's evaluation of biofuels remains consistent and up-to-date, reflecting modern scientific evidence. We urge a reevaluation of the efficiencies in Brazilian sugarcane production, as well as ensuring consideration of innovations in second generation ethanol production, regenerative agricultural practices, and accurate mill-level data which will further delineate ethanol from certain biofuels which feature concerning supply chains and lifecycle emissions. The benefits of low-CI ethanol will be enhanced with the adoption of higher blends such as E15, greater utilization of E85 and flex-fuel vehicle technology, and incentivizing capital investments in sustainable aviation fuels (SAFs) and maritime biofuels.

UNICA members are proudly supplying the US's SAF supply chain and see this as a crucial market for growth and a natural transition for the biofuels industry. We understand that CARB wants to take a measured approach to including aviation and other tough to electrify sectors into the LCFS, but encourage steps to spur the market and drive investments as this program has done for more than a decade. We encourage stronger steps once this market matures and stabilizes and expresses our commitment to improving the US's ability to meet feedstock demand.

165.5

Lastly, we want to emphasize the potential for ethanol to contribute to energy affordability efforts while also encouraging more sustainable choices by California consumers. For that reason, we support the proposed 9% step down, the effort to bolster the credit prices in the market to drive targeted investments, and further cuts by 2045. Ethanol remains essential for equity and affordability in the LCFS, offering significant savings, especially with higher blends like E85, which is priced significantly lower than gasoline. Expanding ethanol blends could further enhance affordability and reduce emissions, benefiting consumers and the environment alike.

Conclusion

We appreciate the opportunity to provide this feedback and look forward to engaging with CARB staff on the critical need to achieve a balanced approach with these proposed amendments. CARB's policy guidance and incentives have driven substantial improvements in ethanol production, and we remain dedicated to advancing these efforts within our industry. While we support CARB's reasoning and thoughtful work to implement sustainability criteria, including third-party accreditation, feedstock sourcing tracking, and resource management, we urge careful consideration of the potential for unintended consequences. It is essential that the policy reflects local context and acknowledges existing certifications that already deliver significant economic, social, and environmental benefits.

Thank you for your consideration.

Sincerely,



Austin Heyworth
UNICA, North American Representative



August 27, 2024

Chair Liane Randolph & Members of the Board
California Air Resources Board
1091 I Street
Sacramento, CA 95814

Via electronic submission

Re: Proposed 15-Day Changes to the Proposed Regulation Order

Dear Chair Randolph and Members of the California Air Resources Board,
On behalf of the Indiana Soybean Alliance (ISA), thank you for the opportunity to comment on the proposed 15-day changes (15-Day Changes) to the Low Carbon Fuel Standard (LCFS) program. ISA represents soybean farmers across Indiana on public policy issues important to the soybean industry. Growers across Indiana have long been committed to producing the world's food, feed, fuel, fiber, and thousands of bioproducts in an environmentally and economically sustainable way.

CARB's 15-Day Changes to revise the LCFS was quite surprising, as the final package diverged significantly from what was included in the Initial Statement of Reasons (ISOR) and the April 10 public workshop. Of top concern for farmers across our state and the rest of the nation is a proposal that would cap the use of soybean oil and canola oil as feedstocks for biofuels at 20 percent by company.

166.1 Placing an artificial limit on the market, combined with the inclusion of sustainability guardrails, as proposed will fail to reduce emissions and will only increase costs. Indiana farmers remain frustrated that CARB insists on using data and methods that are over two decades old to set carbon intensity (CI) scores for soy, while refusing to consider new economic data and failing to consider the potential indirect emission impacts their expanding preference for waste is having.

ISA opposes the proposed discretionary authority provided to the Executive Officer to stop accepting new pathways for biomass-based diesel. In addition to discriminating against the lipid-based fuel platform, we are concerned this could have unintended impacts for non-lipid pathways which could produce biomass-based diesel as a co-product. We are also concerned that the aggressive step-down of CI benchmarks, which partially result from the removal the proposed regulation of fossil jet fuel, combined with other changes, will reward importers of waste feedstocks while penalizing farmers across Indiana and the broader United States.

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166.1
Cont.

As CARB seeks to finalize updates to the LCFS program in the coming months, we strongly encourage the agency to ensure these updates are based on science as required by AB-32. The determination to make such drastic changes to previous CARB proposals so late in the game was shocking to the soybean and biofuels industries. For CARB to move from arguing that, based on the modeling, a vegetable oil feedstock cap was detrimental to the goals of the LCFS at the April public workshop, to now recommending a wildly stringent cap on those feedstocks without data or science, is quite difficult to comprehend. CARB's own April 10th analysis showed that a feedstock cap would increase greenhouse gas (GHG) emissions in California, which is contrary to requirements in AB-32.

Vegetable Oil Feedstock Cap

166.2

The inclusion of a virgin vegetable oil feedstock cap in the 15-Day Changes was alarming to farmers and the entire biofuels value chain, as reflected in market activity. You may understand our surprise based on the April 10 workshop in which CARB noted that liquid fuels would continue to be needed in the transportation sector in California for at least the next decade. In that same workshop, CARB also argued that the imposition of a virgin vegetable oil feedstock cap would increase the utilization of petroleum diesel in the transportation sector. In the staff's own presentation on April 10, staff noted that nearly eighty percent of vehicles on the road in California to still use combustion engines by 2030. Further, they noted that such a stringent cap on virgin vegetable oils may result in 2.8 billion gallons of fossil diesel utilization in 2030, versus 1.9 billion gallons using a scenario that does not impose the cap proposed by the Environmental Justice Advisory Committee.

166.2
Cont.

In a full reversal of staff's prior analysis, which is only four months ago, staff is now essentially recommending to the board that more fossil diesel be sold into the market in 2030. This recommendation appears to not only go against the goals of AB-32, but also science. This recommendation seems to flatly disagree with the Intergovernmental Panel on Climate Change, which notes in its sixth assessment report that using existing low carbon technologies is a crucial component to avoiding catastrophic temperature increases, stating that "biodiesel and renewable diesel fuels...could offer important near-term reductions" for several technologies, including buses, rail, and long-haul trucking.¹

¹ Jaramillo, P., S. Kahn Ribeiro, P. Newman, S. Dhar, O.E. Diemuodeke, T. Kajino, D.S. Lee, S.B. Nugroho, X. Ou, A. Hammer Strømman, J. Whitehead, 2022: Transport. In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_Chapter10.pdf



In our current interpretation, the cap may lock out of the market producers of the lowest cost, lowest carbon intensity soybean oil-based biofuel (soy methyl esters). Most soy methyl esters are produced at biodiesel plants adjacent to soybean processing plants. Often, the companies which own operate these soybean processing are not involved in the procurement and processing of non-crop-based oils, such as UCO and tallow. They exclusively make biofuels out of soy oil or canola oil. The current language limits crediting of soy and canola to 20 percent of reported gallons. This leaves integrated agriprocessing/biofuel producers two choices: 1) exit the market entirely, or 2) be denied a government benefit on 80 percent of their fuel. If this is the current interpretation of the proposed provision, it would significantly and arbitrarily disadvantage the sustainable oilseed biodiesel community.

We echo the concern of the American Soybean Association that new requirement appears to contradict the statutory guidance laid out in AB-32 to minimize costs.

Sustainability Guardrails

ISA was surprised to find that not only was a feedstock cap in the 15-Day Changes, but the sustainability guardrails were also retained. The cap, sustainability guardrails and Indirect Land Use Change score all additively, and redundantly, address land use change. This has the equivalent effect of giving soy and canola a much higher CI score increasing the compliance cost associated with delivering the product, despite the lack of direct evidence.

- 166.3 Broadly we are concerned that the requirement proposed by CARB is unneeded given the longstanding, excessively high ILUC figure (relative to more recent modeling efforts). Furthermore, we are extremely disheartened that CARB has not followed the example of governments across North America, where farmers who submit data for compliance are also given the opportunity to be incentivized for conservation efforts. This additional cost without benefit contradicts language authorizing the LCFS. Section 38562 (b)(7) of AB-32 directs CARB to, "Minimize the administrative burden of implementing and complying with these regulations." Adding supply chain traceability to a bulk delivery system adds significant administrative burden without changing the GHG emissions of the pathway.

CARB's efforts could be improved and enhanced by outreach to U.S. Department of Agriculture (USDA) personnel who have engaged in activity regarding climate-smart farming practices. USDA recently closed a comment period on its Request for Information on Procedures for Quantification, Reporting, and Verification of Greenhouse



Gas Emissions Associated with the Production of Domestic Agricultural Commodities Used as Biofuel Feedstocks. With the information received, USDA seeks to quantify and qualify the benefits of climate smart agriculture practices for biofuel programs at the state, national, and international level. Communication between CARB and USDA could be enlightening regarding ongoing agricultural sustainability practices.

166.4 Through the current sustainable aviation fuel (SAF) federal tax credit (40B), the CI of soy-based biofuels can improve through no-till and cover cropping on the field that the soybeans were produced. Other farming practices like low-till, nutrient management, enhanced efficiency fertilizers, buffers, wetland and grassland management, tree planting on working lands, planting for higher carbon sequestration, and soil amendments all can and should be accounted to assign a lower CI score to an agricultural feedstock. USDA already tracks all these practices through several of their managed conservation programs. In addition, there are a variety of other practices that scientifically lower the CI score of soybean feedstocks for biofuels, and USDA is actively working to develop mechanisms to account for those.

Given the work being undertaken by USDA and EPA as part of the implementation of the Inflation Reduction Act, ISA urges CARB to reconsider its proposed sustainability requirements to allow soybean growers the opportunity to participate in the California biofuels market through innovative and climate smart agriculture practices.

Outdated Scoring

For the last several years, state soybean associations, national associations, and biofuel producers have urged CARB to consider updating its scoring methodology for crop-based biofuels. CARB has refused to even consider the request.

166.5 We remain deeply concerned that without a comprehensive update to the Global Trade Analysis Project model for biofuels (GTAP-BIO) that CARB utilizes, soy-based feedstocks will be phased out of the LCFS even without the additional limitations being proposed in the 15-Day Changes. Current data indicates a much lower CI score for soybeans, as growers continue to improve soil practices, limit water use, lower on-farm emissions and more. On the one hand, CARB is recommending stringent sustainability guardrails for U.S. soy, but on the other hand is still on track to likely phase-out soy-based biofuels from credit generation by approximately 2035 or sooner.

CARB has indicated plans to update all major models for lifecycle emissions calculations except for GTAP-BIO in the updated LCFS rulemaking. The soy industry has made vast improvements in sustainability and efficiency over the past two decades,



166.5
Cont.

with even greater improvement goals ahead. At the same time, CARB continues to rely on a 2014 model that uses data from 2004. The ILUC score accounts for half or more of the CI score for soy-based biofuels. CARB's current modeling assigns soy biomass-based diesel with an ILUC impact of 29.1g CO₂e/MJ whereas updated results from the model used to calculate ILUC scores indicate a value of between 9 and 10 gCO₂e/MJ for soybeans². The recently released 40BSAF-GREET 2024 model has an ILUC score of 12.2 for soy-based sustainable aviation fuel in federal programs.

The benefits of the LCFS can only be achieved if CI values are accurately captured. If land use change concerns are large enough to justify sustainability guardrails and capping virgin vegetable oil feedstocks, then the modeling should also be updated to reflect current land use change data.

Entities Eligible to Apply for Fuel Pathways

166.6

We are concerned about CARB's 15-Day Changes to give the Executive Officer discretion to stop accepting new pathways for biomass-based diesel starting in 2031. We do not understand what provision of AB-32 statute is served, or justifies, this arbitrary and highly selective change. CARB must under statute minimize costs and maximize GHG reductions. It is unclear how this is served by rejecting new pathways. In fact, the requirements of current law are met by allowing the most available pathways. If these pathways cannot achieve cost-effective GHG savings, they will not be utilized by the market in the LCFS. In essence, an increase in pathways can only serve to improve GHG benefits in California. Singling out a single fuel for prejudicial treatment is baffling given the goals of the LCFS and the authority that establishes it. Executive Order S-01-07 establishing the LCFS specifically cites diversity of fuels as a motivation for the program, and this proposal contradicts one of the stated purposes of the program. In addition, this provision if implemented could also significantly disadvantage other biofuel production processes which may produce biomass-based diesel as a co-product, for example in system where SAF is a main product.

Conclusion

ISA is encouraged by the continued successes of programs that support the development of cleaner, low-carbon fuels. However, it is critical that CARB finalizes updates in a way that does not arbitrarily exclude agricultural feedstocks through policies that are not science-based and run afoul of CARB's mandate, including capping

² Taheripour, F., Karmai, O., and Sajedinia, E. (2023). *Biodiesel Induced Land Use Changes: An Assessment Using GTAP-BIO 2014 Data Base*. Purdue University



vegetable oil feedstocks and applying onerous sustainability guardrails that add cost without rewarding farming practices that lower CI.

166.7

CARB's 15-Day Changes, released in August 2024, is deeply concerning. CARB has singled out soybean and canola oil for adverse, prejudicial treatment. No scientific evidence is ever given for this treatment. In fact, CARB has refused to update the science as required by law for these feedstocks. This alone calls into question the integrity of a performance-based LCFS. On top of this, CARB is now proposing feedstock caps, traceability requirements and authority to reject applications for these fuels produced from them. Again, CARB has not shown any scientific justification. In fact, the LCFS is already over penalizing soy for any land use change requirements.

Farmers across Indiana remain eager to continue working with CARB to support the role of agriculture in diversifying the fuel supply while reducing GHGs and increasing clean air in California and beyond. On behalf of Indiana soybean farmers, we appreciate the opportunity to comment and look forward to collaborating with CARB and other relevant stakeholders on implementation of policies that expand the use of soy-based biofuels and market opportunities for soybean farmers.

Sincerely,

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VIA ELECTRONIC FILING

August 27, 2024

Matthew Botill
California Air Resources Board
1001 I Street
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Re: RNG Coalition's Comments on Low Carbon Fuel Standard 15-Day Amendments

Dear Mr. Botill:

The Coalition for Renewable Natural Gas (RNG Coalition) is a California-based nonprofit organization representing and providing public policy advocacy and education for the Renewable Natural Gas (RNG) industry.¹ RNG Coalition respectfully submits these comments to the California Air Resources Board (CARB) in response to the August 12, 2024 Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information for the Proposed Low Carbon Fuel Standard (LCFS) Amendments (15-Day Package).

We thank CARB staff for increasing the ambition of the LCFS programmatic targets in the 15-Day Package. Because of the LCFS, California has access to a robust portfolio of low carbon fuels that have collectively delivered far greater greenhouse gas reductions than initially targeted. CARB is correct to build on this success and strengthen the ambition of the program in the 15-Day Package to achieve even greater emission reductions.

We also support the 15-Day Package's full "credit true up" that properly recognizes the true greenhouse gas benefits of all low carbon fuels. This true up helps address the under crediting currently experienced by RNG projects as they await pathway approval.

Unfortunately, other specifics of the 15-Day Package still increase uncertainty about RNG investment. Phasing out RNG avoided methane crediting without a replacement strategy to ensure methane emissions reductions from various organic waste streams are achieved should be revisited.

Sincerely,

/s/

Sam Wade
Director of Public Policy
Coalition for Renewable Natural Gas

¹ For more information see: <http://www.rngcoalition.com/>

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1 Increased Program Ambition is Critical for Continued Methane Reduction and Growth in All Low Carbon Fuels

1.1 We Support the 15-Day Package Increase in Ambition for 2025 but Market Response Has Been Muted Thus Far

The LCFS program's targets remain the most critical topic addressed in this rulemaking. Throughout the public process on this rule, RNG Coalition and a diverse group of clean fuel voices contracted with the consulting firm ICF to independently prepare and submit an analysis of what program targets are feasible. We are pleased to see that, while CARB did not set the near-term step-down target in 2025 at the threshold recommended by ICF's findings (10.5% to 11.5% step down), the 9% step down proposed in the 15-Day Package is much improved relative to prior proposals.

Attachment C to the 15-day package suggests that CARB's goal in increasing the near-term step-down in CI stringency in 2025 is "to balance the market in the near-term". We recommend that CARB further expand on this rationale to explain what level of credit bank the proposal is designed to target. For example, the ICF work implies that the goal should be more correctly stated as "reduce the existing credit bank to the equivalent of 2-2.5 quarters worth of deficits." We do not believe that a 9% step down fully achieves this objective.

ICF's work continues to show significantly different outcomes than CARB's analysis, especially with respect to the rate of drawdown of the credit bank and associated price trends. We believe that ICF's outlook is better informed by the true near-term supply outlook across all low carbon fuels, deeper analysis of clean fuel production costs, and a better understanding of the potential other areas of public policy support (e.g., federal biofuel and clean vehicle policy). We continue to support more ambitious 2025 targets, in line with ICF's analysis, which we understand ICF will be updating in response to the new constraints proposed in the 15-Day Package.

Further, observable (actual) LCFS credit prices have increased in response to the 15-Day Package, but only modestly relative to what CARB's analysis in Attachment C to the 15-Day Package suggests. We do not understand why CARB staff continue to believe that, in all scenarios analyzed, 2025 market prices will return to >\$130 per credit. If the current price is on the order of \$54 per credit, a swift return to >\$130 in 2025 implies a huge arbitrage opportunity that market actors are not recognizing.

Simply put, we believe that a price recovery in line with Attachment C scenarios is unlikely to occur at the 9% step down. Should CARB retain that level of 2025 target change, near-term RNG project economics will remain challenging and SB 1383 goals for methane reduction will still face significant risk. If CARB publishes a second 15-Day Package, we recommend additional ambition be added to achieve the maximum technologically feasible and cost-effective greenhouse gas reductions from all clean transportation fuels.

1.2 A 2030 Target of Greater than 30% can be Achieved

The ICF work continues to show that a CI reduction of >40% by 2030 is feasible, which would achieve greater GHG emission reductions than the 15-Day Package and be more in-line with economy wide goals for GHG reduction. We continue to recommend that CARB target at least a 35% CI reduction by 2030 and adjust their medium-term forecasting to better reflect ICF's input.

1.3 The Auto Acceleration Mechanism Should Be Able to Trigger Earlier

167.1 We are disappointed to see that the 15-Day Package continues the proposed timeline for implementing the Auto Acceleration Mechanism (AAM), such that 2028 remains the first year in which the AAM can amend the CI reduction targets. 2025's performance should be able to trigger the AAM to avoid further near-term market disruption. A 2025 data-year triggering would be able to impact CI targets in 2027. Simply put, the AAM should be allowed to trigger as early as possible, to guard against the case where the step down is not sufficient to address the current oversupply.

1.4 Removal of Fossil Jet Deficits Necessitates More Ambitious Percentage Numbers to Achieve the Same Demand for Low Carbon Fuels

167.2 Aviation is a long run end use sector that is likely to need renewable molecules and RNG is well suited to serve as an input to Sustainable Aviation Fuel (SAF) production. For this reason, we were disappointed by the 15-Day Package walks back the ISOR proposal to impose intrastate fossil jet deficit generation. At a minimum, if this change is maintained, it necessitates a more ambitious target (all else equal relative to the ISOR proposal) to achieve the same amount of greenhouse gas reduction from low carbon fuels, because a significant quantity of deficits has been removed from the system.

2 15-Day Package RNG-Related Changes Are Helpful, but More is Needed to Improve RNG Investor Confidence and Increase the Pace of Methane Emissions Abatement by 2030

167.3 Despite CARB staff's stated support for RNG throughout the rulemaking process, investors remain concerned about how the Proposed Rule shifts the LCFS's RNG crediting framework. The simple fact is that many anaerobic digestion (AD) RNG projects in planning and construction across North America currently rely on LCFS revenues to be built and operated.

It took an almost decade-long history of LCFS credit being awarded to RNG projects, clear recognition of the methane reduction benefits across a variety of feedstocks, and consistent positive statements from CARB leaders before investors begin to seriously rely on this program to construct RNG projects.

If CARB truly wants methane abatement from sources such as agricultural wastes to continue, and for new sources of RNG activity such as organic waste diversion from the municipal waste stream to develop, they must reconvince the clean fuel investment community that RNG will remain a viable and important contributor to the LCFS framework.

2.1 The Proposed Full True-Up Helps RNG Project Economics but is Not a Full Substitute for Continuing Avoided Methane Crediting.

We support the 15-Day Package's inclusion of a full credit "true up". Using a full true up to verified actual CI performance for all pathways (Temporary, Provisional, and Fully Certified) is simply smart policy.

RNG Coalition strongly supports the 15-Day Package modification to the true up to include the temporary period. The 15-Day change will help streamline the application review process, alleviate or mitigate any business impacts associated with a delay in pathway certification, and allow for the recognition for the full of climate benefits of a fuel.

However, fuel pathway holders should not have to wait until after verification—which occurs in the year after they get their provisional scores—to receive their first true up. Rather the first true up should be from the Temporary to the Provisional CI upon awarding of credits for the first quarter in which the Provisional CI score is approved for use.

Finally, while we support the true up concept improvements, the true up should not be viewed by CARB as a substitute for making rational choices on avoided methane crediting, as discussed below.

2.2 4-to-1 Penalty Should be Eliminated

It is disappointing to see the 15-Day Package retains a “4-to-1” penalty for the case where a verified CI is higher than the certified CI. The ISOR Proposed Rule required that the quantity of deficits generated by CI exceedance be assessed as four times the difference between the verified operational fuel pathway CI and the reported CI (multiplied by the quantity of fuel reported using that fuel pathway during the applicable year).² Therefore, if over crediting occurs by one ton, the pathway holder must “pay back” four tons of credits.

This is overly punitive and unsymmetrical. We continue to recommend that, if the verified CI is higher than the certified CI, the project should simply repay CARB for any excess credits claimed, and not be subject to any further enforcement liability (unless there is malfeasance or other such separate cause).

We are also concerned with a change in the 15-Day Package³ that implies that the 4-to-1 penalty may be applicable during the temporary period, when a project cannot (currently) add a conservative margin of safety (MOS). Eliminating the 4-to-1 penalty would eliminate any potential conceptual conflict during that period. Alternatively, CARB could allow adjustments to the margin of safety a pathway may apply as needed throughout the year, as operational data becomes available, and at a minimum quarterly. This will allow a pathway to adjust the CI of the pathway to ensure a pathway holder can correct CI exceedance proactively.⁴

2.3 Avoided Methane Crediting Makes Many RNG Projects Possible, Incentivizes Maximum Greenhouse Gas Capture During RNG Production

The 15-Day Package would reduce the total number of crediting periods for avoided methane emissions for some subset of projects breaking grand before January 1, 2030, from three to two. This is an extremely problematic change as both agricultural and organic waste diversion projects are heavily dependent on LCFS revenue for profitability, driven by the avoided methane components of their CI scores.

The Notice for the 15-Day Package incorrectly states that the proposed modifications to the credit true-up concept (discussed above) ensure sufficient return on investment for fuel pathways reporting using Temporary fuel pathways during the pathway certification process. During the informal workshop period of this rulemaking, many of our members have, on a confidential basis, individually supplied

² See proposed text in § 95486.1(g).

³ Attachment A-1 Page 181, § 95488.10(a)(7) states that “If the verified operational CI is found to be greater than the certified CI (including provisionally certified) ~~and/or an associated temporary pathway CI for the same feedstock-fuel combination processed at the same facility~~”

⁴ If this approach is adopted, a MOS of should also be allowed to be added to a temporary CI.

CARB with detailed economics for the development of dairy RNG facilities that clearly demonstrate the importance of avoided methane crediting to project economics.

At current LCFS credit prices, a framework without avoided methane crediting does not cover even operating costs for some existing agricultural projects. For projects where that is true—absent some new market that covers the cost of operations—existing digesters will not continue operating after their avoided methane crediting periods expire, potentially reversing progress made by the program.

Further, the proposed 15-Day Package change provides *less* incentive to develop methane capture projects during the critical period between 2025 and 2030. As discussed by CARB staff at the recent dairy workshop held on August 22, 2024, “while the State has made significant progress toward meeting the SB 1383 target for the dairy & livestock sector, additional mitigation measures are still needed.”⁵ Therefore, it is baffling to see the 15-Day Package propose *diminishing* credit for RNG projects that could be built in a timeline to help achieve this goal.

Attempting to recover capital costs over 20 years will mean that projects built between now and 2030 will need much higher LCFS prices, all else equal, than they would if they could count on a full 30 years of avoided methane crediting. Even if LCFS prices recover more quickly, as suggested by the scenarios in Attachment C to the 15-Day Package, fewer RNG projects will be viable because of this proposed change.

2.4 Avoided Methane Crediting Should Continue in LCFS Unless and Until a Realistic and Proven Replacement Policy is Implemented

We are extremely disappointed to see the 15-Day Package’s approach to avoided methane crediting remains untethered to any long-run strategy that would ensure continued methane abatement. It is unwise and irresponsible to propose an arbitrary phase-out of avoided methane crediting without a detailed plan for developing a supporting replacement policy. The treatment of avoided methane continues to create significant project uncertainty and increases the potential for stranded assets—an issue correctly cited by CARB staff during prior workshops as a key outcome to be avoided.⁶

Beyond the new availability of the true-up value, the only other rational for reducing crediting periods for avoided methane provided in the 15-Day Package Notice is alignment with the end-dates for avoided methane pathways that break ground after December 31, 2029, as proposed in the Initial Statement of Reasons (ISOR). This is not sufficient policy rational, as the ISOR proposal’s end dates for pathways built in 2030 and beyond is also arbitrary.

2.5 New CADD Data Implies that Emissions Leakage Should Be a Bigger Concern in the Dairy Sector

At the August 22, 2024, Dairy Workshop CARB Staff presented the California Dairy and Livestock Database (CADD) and showed that California’s statewide dairy manure cow population may be declining

⁵ See CARB staff’s presentation at the August 22, 2024, dairy workshop, slide 55.
https://ww2.arb.ca.gov/sites/default/files/2024-08/CARB_Dairy_Sector_Workshop_Staff_Presentation_08-22-2024.pdf

⁶ See CARB’s Presentation at the February 22, 2023, LCFS Workshop, slide 31.
https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/lcfs_meetings/LCFSpresentation_02222023.pdf

more quickly than previously understood.⁷ In our comments on the ISOR, we warned that a California-only mandate for dairy manure methane control would likely drive “economic leakage” (unless LCFS support continued as well).

Economic leakage in the environmental context occurs when a regulatory environment in one jurisdiction drives the migration of a key business sector to another region without similar regulations. This can lead to simply shifting the pollution location without any global reduction in GHGs. This is particularly likely to occur in markets with the demand for the product is steadily increasing, such as the market for milk products.⁸ Given this, it seems unlikely that it would be smart policy to phase out the current incentive-based approach to manure methane abatement (including LCFS credits) and replace it with a California-only mandate to control.

Due to these enhanced leakage challenges, we recommend an approach to ag and waste methane that looks across state borders (which aligns with our desire to see a robust North American Market for RNG, as discussed below). Markets for dairy and swine products are not limited to just within California, and a reasonable response to methane controls for those markets also cannot be limited to just one state.

It is possible that a more-effective Federal mandate to control manure methane could be developed, promulgated, and in effect sometime in the 2040s, and RNG Coalition would consider supporting Federal (or multi-state⁹) control requirements, if such requirements treated anaerobic digestion with productive energy use as best available control technology. However, no changes to the current LCFS regulation would be required in the federal mandate case, as the current rule already specifies that, “in the event that any law, regulation, or legally binding mandate requiring either greenhouse gas emission reductions from manure methane emissions from livestock and dairy projects or diversion of organic material from landfill disposal, comes into effect in California during a project’s crediting period, then the project is only eligible to continue to receive LCFS credits for those greenhouse gas emission reductions for the remainder of the project’s current crediting period.”¹⁰

Although we currently see no signs that such a federal or multi-state effort is on the horizon, we continue to support CARB requiring phase-out of avoided methane crediting once replacement policies are in place. However, we do not support the Proposed Rule’s various phase-outs of avoided methane crediting *without* a suitable replacement policy.

2.6 We Thank CARB for Recognizing that There is No Evidence of a Perverse Incentive to Increase Farm Size from LCFS Credits to RNG Projects

The CADD data also shows that California farms with digesters have not expanded any faster than comparable farms without digesters.¹¹ This reinforces what we’ve stated in prior comments—LCFS

⁷ See CARB staff’s presentation at the August 22, 2024, dairy workshop, slide 42.

⁸ Office of Environmental Farming and Innovation, California Department of Food and Agriculture, March 29th 2022 Workshop Presentation, Slide 3, Dr. Amrith Gunasekara, Manager.
<https://ww2.arb.ca.gov/sites/default/files/2022-04/dairy-ws-session-2-CDFA.pdf>

⁹ Multiple states are moving to adopt LCFS policies that could provide a regional framework for addressing these emissions. Beyond expansion of LCFS-style policy no other serious state-level collaboration on manure management methane emissions has yet been proposed.

¹⁰ See § 95488.9(f)(3)(B) in the current rule.

¹¹ See CARB staff’s presentation at the August 22, 2024, dairy workshop, slide 43.

credits from biomethane production does *not* incentivize manure production or increased herd size. Many dairy farmers remain reluctant to install digesters, which are a complex and expensive new asset, and farmers certainly are not changing herd sizes based on RNG LCFS credit value.

2.7 *Deliverability Language Creates a Barrier to Imports, Should Not be Adopted in the LCFS*

The 15-Day Package's changes to deliverability requirements are still problematic for RNG development. While RNG stakeholders will be happy to engage further with CARB staff about how the gas system currently functions, additional public process on this topic (proposed through June 2026) reduces investment certainty and delays investment in RNG projects and thus slows critical near-term methane reductions.

Conceptually, we fail to see how directional flow data from 2020 to 2023 should hold any relevance to permissible long-run delivery patterns for RNG. Assuming California (and hopefully other states) are serious about cutting fossil demand and increasing renewable gas supply at the rate called for in the Scoping Plan, the gas system would fundamentally change, from a system that is driven heavily by fossil gas flows to one driven by renewable gas flows.

As we described in our opening comments on the ISOR, gas flows change over time and are subject to pipeline operator business practices, market demand, and other factors outside of the control of RNG developers. It is illogical to exclude RNG projects that could serve California (if fossil gas wasn't ubiquitous and dictating flow direction today) based on a snapshot of the current gas system. It is also impossible for a RNG project developer to predict how flows might change in the future or where to build their project to guarantee flow will always reach a certain end user in California. This is not required for any fossil gas supply and is, frankly, impossible to implement physically from a practical perspective.

Protectionist language in California's RPS that created a de-facto ban on imported RNG (and also limited other forms of imported renewable electricity)—has not succeeded in creating a well-functioning California-only energy system, able to function entirely without imports and exports. Instead, the California Independent System Operator is currently trying to expand electricity markets regionally to make it easier to adopt more renewables¹² and *California currently imports more than 90% of our fossil gas* (a large portion of which is for power production).¹³

Given that California clearly benefits from broad North American and global energy markets for other types of energy—and the recent trend toward significant increases of the California-based supply of RNG,¹⁴ with in-state production increasing from 6.74% in 2021 to 18.23% in 2023—we question why CARB would propose eliminating any imported RNG eligibility from any portion of the North American gas system. All RNG projects produce the desired benefits of displacing fossil gas, and most create significant methane reductions. Achieving these benefits should remain the primary focus for California RNG policy.

¹² <http://www.caiso.com/informed/Pages/RegionalSolutions.aspx>

¹³ <https://www.pge.com/assets/pipeline/docs/library/regulatory/downloads/cgr24.pdf.coredownload.pdf>

¹⁴ <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>

3 Improving the Framework for Organic Waste Diversion Projects

3.1 The Definition of “Food Scraps” Has Been Improved but Still Needs Further Adjustment

We appreciate that the 15-Day Package includes changes to the definition of “food scraps”. The initial ISOR definition unintentionally (and incorrectly) would have excluded all wastes that are handled as a liquid, even those liquified for treatment through AD. We appreciate that the 15-Day Package provides a fix on this topic, but additional attention on this definition is still needed.

The 15-Day Package definition effectively removes credit for processing organic waste that come directly from food manufacturers – which is normally “offspec” products, or excess supply that needs to be shed. Examples of food waste from food manufacturing plants that may be impacted include packaged or unpackaged liquids (e.g., expired juice, soda, dressing, condiments, yogurt) or solids (e.g., expired potatoes from a chip factory). Organic materials that come from food manufacturing plants in California do still enter waste streams and do produce methane when landfilled.

The definition should be adjusted to read as follows:

“Food Scraps” is the portion of municipal solid waste (MSW) that consists of inedible or post-consumer food collected from residences, hospitality facilities, institutions, and grocery stores, as well as organic waste materials from industrial food manufacturing and distribution facilities that cannot be placed for feeding people or animals. Feedstocks that are not typically landfilled do not qualify as Food Scraps, including: fats, oils, or greases (FOG), and unpackaged liquids at the point of collection.

If necessary, we would also be happy to work with CARB staff (and/or verification firms) on tests to demonstrate that food scrap feedstocks could not otherwise be beneficially used to feed humans or animals and, if not sent to AD/compost, would otherwise have been destined for landfill.

3.2 Recognition of Methane Benefits of RNG Projects Diverting Organic Material from Landfills Should be Revisited and Expanded

We continue to emphasize that LCFS can do more to incent methane reduction from organic waste handling through better recognition of the benefits of RNG projects that divert organics from landfills and into dedicated digesters. Better quantification of the methane benefits of avoided landfilling and incenting such reductions in the LCFS should be a key focus for CARB, rather than setting arbitrary dates for sunseting of avoided methane crediting or incorrectly limiting definitions of AD feedstocks, which both hurt the viability of such projects.

We are disappointed that this rulemaking appears to not be moving far enough to make this happen. We encourage additional public process on this topic.

4 Other Suggested Adjustments

The following key concepts highlighted in our ISOR comments were not addressed in the 15-Day Package:

- The temporary fuel pathway codes for hydrogen derived from RNG remain unnecessarily high. For example, compressed or liquified hydrogen derived from dairy or swine manure has a temporary CI of 40, yet registered pathways under the Current Rule producing hydrogen from such RNG are highly carbon negative.
- A temporary pathway for biogas to power should be established.
- RNG producers should be allowed to source renewable power from offsite to lower their CI scores.
- Accounting frameworks should allow RNG delivery to non-located power generation facilities, hydrogen production, and as an input to liquid biofuel production (and especially SAF production).
- The ability to increase methane capture rates and reduce flaring through landfill RNG projects should be fully recognized.

In the absence of attention to these issues, the LCFS will not maximize GHG reductions associated with RNG across all energy carriers and end uses.

5 Conclusion

RNG Coalition appreciates the opportunity for continued engagement on these topics. We also appreciate the increased program ambition in the 15-Day Package. Increased ambition is critical to reset incentives for rapid low carbon fuel deployment and greater GHG reduction. However, even more can be done.

Some portions of the package continue to ignore RNG benefits. If RNG is treated as a temporary solution that might be arbitrarily phased out—without regard to scientific analysis of ongoing emission benefits or development of a replacement strategy—investors will view RNG as a permanently “at risk” fuel, less favored by regulators and therefore not worthy of investment. The underlying facts that justify avoided methane crediting to RNG projects have not changed, CARB should leave the current framework in place.

CARB has an opportunity to provide clarity and investment certainty through another 15-Day Package to the Proposed Rule, leveraging renewable gas production to help reduce methane emissions, improve organic waste management, and decarbonize California’s transportation sector. We thank CARB for your continued work toward these goals and look forward to the successful conclusion of the LCFS rulemaking.



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August 27, 2024

Carolyn Lozo
Chief, Transportation Fuels Branch
California Air Resources Board
1001 "I" Street
Sacramento, CA 95814

Via electronic submission

Re: Proposed Low Carbon Fuel Standard 15-Day Changes

Transportation Fuels Branch Chief Lozo:

The National Oilseed Processors Association (NOPA) appreciates the opportunity to comment in response to the California Air Resources Board's (CARB) proposed 15-Day Changes to the Proposed Amendments to the Low Carbon Fuel Standard (LCFS) Regulation (15-Day Changes or Proposal).

NOPA strongly encourages CARB to follow its own modeling and conclusions CARB presented in its workshop on April 10, 2024 which show that an artificial cap on vegetable oil feedstocks is unwarranted and would only increase fuel prices and harm air quality. With the implementation of a cap on biomass-based diesel (BBD) feedstocks, a phaseout of BBD pathways, and even more restrictive and costly traceability and verification system, this proposal will only lead to more combustion of fossil diesel fuel, higher fuel prices at the pump, and poorer air quality. It may also lead to a surge of more imported foreign feedstocks such as Used Cooking Oil (UCO) and tallow - some of which may not be legitimate - being used to fuel California instead of local U.S. grown options - all at the expense of the U.S farmer, the U.S. crusher and the California taxpayer.

CARB should therefore reject the imposition of a vegetable oil cap and adopt a targeted, risk-based approach to sustainability requirements which does not penalize sustainable U.S. fuels and feedstocks at the expense of foreign imports which may not be legitimate.

At a minimum, CARB should take additional time and effort to comprehensively consider the full impact of its proposal and give impacted parties the chance to fully respond. While NOPA has endeavored to identify all of the issues to date in this comment letter, 15 days is not a sufficient amount of time to fully address CARB's proposed vegetable oil cap and other significant and unexpected changes in the proposal. NOPA therefore strongly recommends that CARB extend the comment period and hold an additional public workshop on these potential changes.

Background

Organized in 1930, NOPA represents the U.S. soybean, canola, flaxseed, safflower seed, and sunflower seed-crushing industries. NOPA's membership includes 16 members that are engaged in the processing of oilseeds for meal and oil that are utilized in the manufacturing of food, feed, renewable fuels, and industrial products.

NOPA member companies operate a total of five softseed and 63 soybean solvent extraction plants across 21 states. NOPA members crush approximately 95 percent of all soybeans processed in the U.S.

NOPA members' oilseed processing operations yield protein-rich meal for human and animal nutrition, as well as vegetable oil that is used as an ingredient in food manufacturing and as a feedstock for renewable fuels such as biodiesel, renewable diesel and sustainable aviation fuel (SAF). These sustainably produced biofuels help reduce carbon dioxide equivalent (CO₂e) greenhouse gas emissions and the carbon intensity of transportation fuels in use today. NOPA is uniquely qualified to respond to CARB's proposed sustainability criteria for crop-based biofuels given the number of markets that NOPA members serve including the food, feed, fuel, and industrial markets.

CARB's Own Analysis Supports the Elimination of a Cap on Vegetable Oils

While the intention behind CARB's proposal is to diversify feedstock sources and promote sustainability, it will have the opposite effect, outweighing its potential benefits. First and foremost, capping the use of vegetable oil will significantly increase fuel costs. Because vegetable oil is currently one of the most efficient fungible, and cost-effective feedstocks, limiting their use will constrain the supply of renewable diesel in California. Renewable diesel and biodiesel are crucial components of California's efforts to reduce greenhouse gas emissions and transition to cleaner energy sources and this artificial limitation will create a supply-demand imbalance, driving up the costs of renewable diesel production and, consequently, the price at the pump for California consumers.

Moreover, CARB's goal of 100 percent renewable liquid fuels with the proposed feedstock constraints in place is unrealistic and impractical. The renewable diesel industry is still developing, and waste feedstocks are not available in sufficient quantities to meet the state's ambitious targets. By capping vegetable oil usage, the proposal risks stalling the progress made to reduce carbon emissions by creating a bottleneck in renewable diesel production for the California market. In fact, CARB's own analysis supports this assessment.

NOPA strongly supports CARB's findings presented at the April 2024 workshop that renewable diesel and biodiesel have a positive impact on both consumers and the environment. CARB's "Staff Report: Initial Statement of Reasons" (ISOR) specifically modeled an alternative (Alternative 1) which "includes several policy mechanisms that have the effect on limiting the number of credits created from existing low-CI pathways" including "a limit on total credits from diesel fuels or sustainable aviation fuel produced from virgin oil feedstocks." The report's impacts are glaring – and each of them are attributed to more fossil diesel use in lieu of renewable diesel:

- **Increased Fuel Costs:** Alternative 1 had total costs of \$162 billion, 1 percent more than the scenario without a vegetable oil cap and similar policies. According to CARB, "The main reason is that diesel fuel is a larger part of the fuel mixture and continues generating large amounts of in-state deficits through 2046. This is because renewable diesel produced from virgin oil feedstock is phased out...and more fossil diesel is needed to fuel the remaining vehicles with internal combustion engines."
- **Increased Emissions:** Alternative 1 had greater emissions of greenhouse gases, particulate matter (PM_{2.5}) and nitrous oxide (NO_x) than the baseline. The higher NO_x and PM_{2.5} emissions in particular were attributed specifically to reduced renewable diesel—CARB found that "Alternative 1 increases NO_x emissions by an additional 10,981 tons and increases PM_{2.5} emissions by 2,773 tons. Alternative 1 has more NO_x and PM_{2.5} emissions than the proposed amendments because this

scenario uses less renewable diesel than the proposed amendments.”

- **Fewer Health Benefits:** In line with its higher emissions, Alternative 1 also had correspondingly lower health benefits. CARB found that “Alternative 1 has a valuation of health benefits at \$1.58 billion compared to the proposed amendments with a valuation of \$4.98 billion, a difference of \$3.4 billion less in health benefits. The lower avoided health impacts of Alternative 1 are primarily associated with increases in PM2.5 over the baseline due to lower utilization of renewable diesel.”

CARB Staff justifiably rejected Alternative 1, citing the fact that it “relies more heavily on fossil fuels...than the proposed amendments. As a result, [Alternative 1] does not achieve the same level of NOx and PM2.5 emissions reductions as the proposed amendments and potentially exacerbates existing air quality challenges in the State.”

Additionally, the ISOR included an analysis, and the rejection, of another proposal by CARB’s Environmental Justice Advisory Committee which included a cap on vegetable oils set at 2020 levels. CARB found that “due to limitations on lipid biofuels and dairy biogas, the Comprehensive EJ Scenario results in higher volumes of fossil diesel being used than any of the other scenarios evaluated.” However, despite the demonstrated negative economic and health impacts of a vegetable oil cap, CARB’s 15-Day Changes seek to accelerate those adverse impacts through additional regulatory requirements and market limitations on crop-based feedstocks. The additional restrictions will effectively create a decreasing volumetric cap as the price of compliance to maintain market access become cost prohibitive.

CARB’s analysis therefore appears to be at odds with its own prior findings. The ISOR concludes that just the imposition of a cap on vegetable oil feedstocks will increase fossil diesel use. Yet, CARB’s proposal summary states that “this [vegetable oil cap] allows for California to displace up to 100 percent of the State’s fossil diesel demand with cleaner alternative diesel.” This will not be possible with the combined establishment of a cap on feedstocks, a phaseout of new BBD pathways, and the imposition of even more costly traceability and verification measures. CARB has not explained why it is rejecting or ignoring its prior conclusions in the ISOR.

The proposed phasing out of new BBD pathways by 2031 is also concerning and unwarranted. CARB has a stated goal to achieve 100 percent renewable diesel, and phasing out new pathways would be unnecessary at best and counterproductive at worst. If the market becomes saturated, new pathways would no longer be needed and applications for new pathways will stop on their own. If market has not yet achieved 100 percent saturation, then additional pathways are likely to be needed to achieve CARB’s goal. The inclusion of this provision only serves to send a market signal that will limit both near and long-term supplies of feedstocks and fuel necessary to achieve the climate goals of the LCFS.

Making these significant policy adjustments without more solid footing sends the wrong signal to the market that the LCFS program is subjective and unpredictable, particularly at a time when the fuel supply chain works toward to goal the California has set decarbonizing the transportation fuel supply. As a result, this proposal could impact investments from the same companies who have committed to climate smart agricultural practices and invested in dedicated innovative crops like pennycress, camelina, carinata and winter canola. These investments represent a new wave in renewable energy production, based on the promise of a predictable market which rewards sustainability and carbon reduction – not artificial caps and arbitrary prohibitions which would stymie innovation.

NOPA urges CARB to eliminate the proposal's cap on vegetable oil feedstocks. In its place, we continue to recommend implementing policies that encourage the responsible production and use of renewable feedstocks while addressing concerns about deforestation through targeted risk-based measures.

The Proposal Contradicts the Requirements and Purposes of AB 32, the LCFS, and other California Laws

CARB's proposal to minimize biomass-based diesel used to comply with the LCFS flies in the face of the purposes of AB 32 and is inconsistent with several of its explicit requirements. To begin with, AB 32 requires that CARB design its LCFS regulations in a way that "maximizes benefits for California's economy, improves and modernizes California's energy infrastructure and maintains electric system reliability, maximizes additional environmental and economic co-benefits for California, and complements the state's efforts to improve air quality." Cal Health and Safety Code § 38501(h). But by minimizing renewable diesel and biodiesel production through a vegetable oil cap and related proposals, CARB would reduce environmental co-benefits and harm air quality. Because renewable diesel achieves significant NOx and PM2.5 reductions relative to fossil diesel, a cap that artificially reduces renewable diesel in the market will reduce the environmental benefits of the LCFS. As discussed above, that is borne out by CARB's own modeling in its ISOR.

AB 32 also requires CARB to meet GHG emissions limits in a way that "minimizes costs." A cap that artificially distorts the market inherently increases costs because regulated parties cannot choose the economically optimal way to comply with the obligations of the program. Again, this is supported by CARB's analysis in its ISOR that found increased costs in a scenario with a vegetable oil price cap.

AB 32's purposes are further embodied by its explicit requirements to minimize costs and maximize the total benefits to California. Cal Health and Safety Code § 38562. *See also id.* (requiring CARB to "Consider cost-effectiveness" and "minimize the administrative burden of complying with its regulations"); *id.* § 38560 (requiring CARB to issue "regulations in an open public process to achieve the maximum technologically feasible and cost-effective greenhouse gas emission reductions"). And CARB has designed its LCFS regulations accordingly by focusing solely on reducing the "carbon intensity of the transportation fuel pool," and taking a technology-neutral approach that allows various compliance mechanisms in order to maximize carbon intensity reduction. *See* 17 CCR §§ 95480, 95484. A vegetable oil price cap and freeze of vegetable oil pathways do the opposite – they create inefficiencies in the LCFS that add costs without corresponding improvements in GHG reductions. Indeed, without a vegetable oil cap, the market is optimally incentivized to comply in a way that both lowers costs and maximizes greenhouse gas reductions. A vegetable oil cap artificially skews that incentive, so the program will either need to be more costly to achieve the same level of GHG reductions or achieve less GHG reduction at the same cost.

CARB's proposal provides little basis or explanation for its abrupt shift in policy. To the extent there is any, it is CARB's statement that it expects that ZEVs will reduce diesel demand in "coming decades." But that speculative assertion is unsupported and ignores technical challenges with electrifying the heavy-duty sector. It also ignores another instruction in AB 32 to for CARB to design its regulations in a manner that "encourages early action to reduce greenhouse gas emissions." Cal Health and Safety Code § 38562. Biodiesel and renewable diesel are available to decarbonize trucks and other heavy-duty vehicles *now*, and it is illogical and arbitrary for CARB to miss out on those benefits in favor of speculative benefits in the future.

Finally, the proposal is inconsistent with other California laws designed to improve air quality and the environment, including California's State Implementation Plan ("SIP") under the Clean Air Act. In CARB's most recent SIP submission, it reiterated the imperative of reducing NOx and PM2.5. CARB, Proposed 2022 State SIP Strategy (Aug. 12, 2022). CARB noted in particular the impact of PM2.5 emissions from mobile sources on environmental justice communities and found that it is "imperative that we optimize our control programs to maximize emissions reductions and provide targeted near-term benefits in those communities that continue to bear the brunt of poor air quality." *Id.* at 2. CARB's proposal to eliminate a source of near-term PM2.5 improvement for the *possibility* of greater future electrification runs directly counter to the SIP's objectives.

CARB Should Take a Targeted Risk-Based Approach to Sustainability Requirements While Increasing Scrutiny on Waste Feedstocks

NOPA appreciates CARB's continued recognition that some geographic regions carry a higher risk for deforestation. However, the proposal doubles down on a one-size-fits-all approach which, according to CARB's Recirculated Draft Environmental Impact Analysis (EIA), would "create an even stronger incentive to utilize waste feedstocks," without any additional analysis of direct or market-mediated effects from such a policy, nor any additional proposed compliance requirements to ensure waste feedstocks are not fraudulent.

Moreover, CARB's proposal would further disadvantage regions of crop-based feedstock production with low-risk of deforestation (U.S. and Canada) that are already subject to multiple compliance programs, thereby favoring feedstocks produced in regions with a significantly higher risk of fraud or deforestation.

At CARB's April workshop, staff noted additional measures which were under consideration to address potential fraud in sourcing waste feedstocks, including "additional detailed traceability, verification and/or enforcement of waste feedstocks to avoid fraud." Yet, despite additional proposals that would accelerate waste feedstock demand, the 15-Day Changes inexplicably included none of those measures.

NOPA strongly supports heightened scrutiny, oversight, and traceability to ensure the integrity of imported feedstocks for the CARB LCFS. NOPA recommends stepped up enforcement laws for imported feedstocks while exploring all possible viable options in the long term to ensure the origin and content of imports are legitimate. NOPA supports paperwork and in-person audits, potential testing, and stronger attestations which will ensure the continued integrity of low carbon fuel programs. NOPA strongly urges CARB to include increased measures into its final rule to ensure foreign feedstocks are in fact legitimate and traceable. CARB should work in close coordination with federal officials who all touch imported feedstocks in some capacity such as the U.S. Department of Agriculture, Environmental Protection Agency (EPA), U.S. Trade Representative and U.S. Customs and Border Protection. NOPA also encourages CARB to work with other countries who have experienced their own instances of fraudulent activity as it relates to imports in their own low carbon fuel programs such as the European Commission.

Further, implementing a targeted, risk-based approach to the proposal's sustainability criteria offers several advantages. It allows CARB to prioritize resources and regulatory efforts where they are most needed, ensures that sustainability criteria are effectively applied without imposing unnecessary burdens on low-risk regions or established sustainability programs, and ensures sufficient supplies of low-carbon fuels for the California market.

CARB appears eager to incorporate an EU policy paradigm without accounting for the risks brought upon the EU market. In the wake of EU policy to limit crop-based feedstocks and increase crediting for waste feedstocks under the Renewable Energy Directive (RED II), policymakers have struggled to address concerns about fraudulent waste feedstocks,¹ while significant imports of Chinese biodiesel recently led the Commission to place substantial provisional import duties² of up to 36.4 percent.

NOPA encourages CARB to not outsource sustainability certifications to the European Commission. CARB should recognize U.S. national, state, industry programs that meet the same intended goal of stopping deforestation and conversion. It is critical that CARB provide a tiered approach to feedstocks, fuels, and regions based on risk.

As NOPA previously submitted, for regions identified as having the lowest risks of deforestation associated with crop-based feedstocks, such as the United States and Canada, crop-based feedstocks should be deemed to be in compliance with CARB's proposed sustainability criteria.

In the event CARB is unwilling to deem U.S. and Canadian feedstocks compliant, for regions where crop-based feedstocks comply with another established sustainability system, such as the Renewable Fuel Standard (RFS) Canada's Clean Fuel Regulation (CFR), or energy tax credit provisions in the Inflation Reduction Act (IRA), CARB should permit some level of aggregate compliance. These programs offer established frameworks for verifying sustainable practices and are a practical and effective way to achieve CARB's environmental goals without sacrificing any sustainability gains.

Further it is critical to note that planting decisions for crops to be harvested in late 2025 are happening now and will be made prior to CARB's proposal being finalized which means the timeline to begin implementing the sustainability certification criteria which specifically calls for "geographical shapefiles or coordinates of plot boundaries" by 2026 is simply not possible based on how the agriculture supply chain and crop harvest cycle works. Because of this NOPA respectfully submits that a deadline beyond 2027 is more reasonable for the first phase of compliance should CARB determine to go down this path.

While biofuels represent one significant market for vegetable oil, they are by no means the sole destination for these products. Given the diverse end uses of vegetable oil and meal, oilseed processors must carefully evaluate the return on investment when considering participation in an expensive sustainability certification program like the one CARB is proposing. California represents an important market for biofuels, but it may constitute only a fraction of the overall market for oilseed products. In this context, the costs associated with obtaining and maintaining sustainability certifications for a market that CARB seems intent on phasing out, may outweigh the benefits for many processors, particularly those with limited exposure to the California market.

For these reasons, NOPA continues to urge CARB's inclusion of enhanced traceability and enforcement measures on waste feedstock imports and maintains that a targeted, risk-based approach would streamline compliance requirements while ensuring that sustainability criteria are met, and recognizing biofuels produced in compliance with existing U.S. programs is a practical and effective way to achieve this goal

¹ Kelly Norways, "[New biofuel data triggers fresh fraud concerns over EU imports](#)," S&P Global, December 14, 2023

² Kelly Norways, "[EU imposes anti-dumping duties targeting cheap Chinese biodiesel imports](#)," S&P Global, August 16, 2024

without sacrificing any sustainability gains. Should CARB proceed down a path to implement sustainability criteria, ample time to implement and comply beyond 2027 is essential.

Land Use Change (LUC)

168.1

While NOPA strongly supports free trade and open markets, currently the CARB LCFS is driving demand for imported waste feedstocks. These programs are built on carbon intensity modeling that considers feedstocks such as used cooking oil (UCO), tallow, and greases as “waste.” NOPA believes there is room for improvement when it comes to modeling waste feedstocks. In most instances the waste feedstock lifecycle begins when it is deemed “waste,” however key factors are not considered such as what the waste product was initially derived from and if it was grown on deforested land, for example. NOPA notes that the environmental impacts of a product's entire life cycle for waste feedstocks should be considered.

Imported feedstock volumes into the U.S. have skyrocketed in 2023 and 2024, displacing domestically produced feedstocks. One pound of imported feedstock displaces one pound of domestically produced soybean oil or the equivalent of 5 pounds of soybeans. From Jan 1, 2023- June 30, 2024 - the US imported a total of 7.9 billion pounds of UCO and tallow. Those 7.9 billion pounds of imported feedstocks displace the soybean oil crushed from an equivalent of over 650 million bushels of soybeans.³

As CARB noted at its April workshop and again in its recirculated EIA, “waste-based feedstocks, like UCO and animal fat, do not have additional LUC scores that are added to their CI value and made up 84% of all biomass-based diesel in the program from 2011 through 2022.”

However, non-waste feedstock carbon intensity modeling already includes direct and indirect land-use change values and CARB notes that existing modeling “may not be accurate for applicants sourcing feedstocks from outside 2015 analysis area.”

NOPA appreciates CARB’s consideration of assigning more conservative land use change values for high-risk feedstocks in regions with higher LUC risk than, for example, North American feedstocks currently modeled in Table 6 of the LCFS regulation. However, as the science on LUC continues to evolve, CARB should recognize that there are instances in which LUC should be reduced, not just the instances where LUC should be increased. In CARB’s proposal the regulatory flexibility and updated scientific modeling is afforded only to feedstock/fuel combinations not listed in Table 6. Further, the proposal only permits an increase in the LUC penalty. The final regulation should permit the flexibility to reflect when the science shows the penalty should be decreased, in addition to when LUC should be increased.

NOPA has repeatedly requested CARB to reassess its LUC model, particularly regarding soybean oil, given the evolving data from models like Argonne GREET’s Carbon Calculator for Land-Use and the Land Management Change from Biofuels Production (CCLUB) Model. CARB’s most recent modeling of LUC for BBD was done almost a decade ago, and produced a score of 29.1 gCO₂/MJ, which is significantly higher than the more recent findings from the 2023 R&D Argonne GREET Model with CCLUB and the 2024 40B SAF GREET model with CCLUB which estimate a value of 12.5 and 12.2 gCO₂/MJ for soybean oil – a nearly 60% decrease from CARB’s current value.

³ USDA GATS/US Census Bureau

AB 32 requires CARB to use the “best available economic and scientific information” in designing its LCFS regulations. Cal Health and Safety Code § 38562. CARB should therefore utilize the most recent science for all feedstock/fuel pathways and should not limit modeling updates to carbon intensity values only when the scores are worse, not better. To do so would undermine the scientific integrity underlying the basis of the entire LCFS program – to achieve the greatest carbon reductions based on unassailable science.

NOPA encourages CARB to update its LUC model with the latest science for all feedstock/fuel pathways. This adjustment would not only ensure that CARB's regulations remain grounded in the latest science but would also promote fairness and consistency within the industry.

Request for Additional Time for Public Input

NOPA notes that in the 15-Day Changes, the proposed cap on vegetable oil was the first time stakeholders had any opportunity to review these provisions or its concept. Given the precedent-setting nature of this program in the U.S., and the potential for significant cost and compliance burden to stakeholders, NOPA requests that CARB, as it did on February 14, take additional time to allow stakeholders to properly vet the intent, impact, and implications of the proposed requirements. Specifically, NOPA recommends that CARB at a minimum both extend the period for written comments and hold another public workshop. We appreciate and support the need to finalize this proposal to put the LCFS back on track but our concerns outlined above merit an open and transparent discourse.

Conclusion

In conclusion, CARB analysis, market and scientific data collectively demonstrate that consideration of a cap or limitation on crop-based feedstocks is unwarranted and in fact contradict AB 32, the LCFS regulations, and other California laws. Further, doing so unexpectedly and contrary to the reasonable expectations of regulated parties would undercut the necessary investments that are being made to support low carbon feedstocks and further feedstock expansion.

NOPA also continues to encourage CARB to adopt a targeted, risk-based approach to implementing sustainability criteria under the LCFS. By accurately assessing deforestation risk, leveraging existing sustainability frameworks, and implementing targeted measures for high-risk regions, CARB can achieve its environmental objectives while also supporting a sustainable and resilient biofuels industry.

NOPA is eager to continue working with CARB to support the role of agriculture in diversifying the fuel supply through more sustainable feedstocks, thereby supporting cleaner fuel options in California and beyond. We appreciate this opportunity to comment and look forward to collaborating with CARB and other relevant stakeholders.

Sincerely,

Kailee Tkacz Buller

Kailee Tkacz Buller
President & CEO
NOPA



August 27, 2024

Matthew Botill
California Air Resources Board
1001 I Street
Sacramento, California 95814

Submitted via [online comment portal](#)

Re: WM Comments on Low Carbon Fuel Standard 15-Day Amendments

Dear Mr. Botill,

WM respectfully submits these comments to the California Air Resources Board (CARB) in response to the August 12, 2024 Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information for the Proposed Low Carbon Fuel Standard (LCFS) Amendments (15-Day Package). WM provides waste and recycling collection and processing services for local jurisdictions, state agencies, and other entities throughout the country, including many communities throughout California. Since the passage of SB 1383 (Lara, Chapter 395, Statutes of 2016), WM has worked with the local jurisdictions and other regulated entities we serve in California to provide services compliant with CalRecycle's Short-lived Climate Pollutants (SLCP): Organic Waste Reductions Regulations. The organics diversion programs we are implementing on behalf of our customers are designed to maximize the volume and quality of organic waste that can be recovered and diverted to beneficial uses, including the production of low carbon fuels. To that end, we have the following comments on the definitions of "*food scraps*" and "*recovered organics*" to ensure clarity between regulatory programs and to fully capture the potential benefits of organic waste diversion projects:

169.1

To ensure all California-generated organic waste is an eligible feedstock, the definition of *food scraps* in the 15-Day Package should recognize inedible or post-consumer food collected from all generators, including commercial and industrial businesses (which would include sources such as restaurants and apartment complexes).

"Food scraps" is the portion of municipal solid waste (MSW) that consists of inedible or post-consumer food collected from locations which include, but are not limited to, residences, *commercial and industrial enterprises*, hospitality facilities, institutions and grocery stores.

Similarly, food processing operations generate both 1) materials that are considered recoverable organics (and so should be included in a definition of organic waste, whether *food scraps* or *recovered organics*), as well as 2) byproducts that are source-separated from other waste to become animal feed pursuant to state law (which would properly be exempted from the definition of *food scraps*). We recommend the following definition:

169.2

Feedstocks that are *source separated at the point of generation and that are not* typically landfilled do not qualify as Food Scraps, which include: fats, oils, or greases



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(415) 940-0501

169.2 Cont. (FOG), liquids at the point of collection, and materials from industrial food manufacturing and distribution facilities *that can be used as animal feed, as set forth in Chapter 6 of Food and Agricultural Code (FAC), commencing with Section 14901 et. seq and Title 3, Division 4, Chapter 2, Subchapter 2 commencing with Article 1, Section 2675 of the Code of California Regulations.*¹

169.3 In addition, the 15-Day Package includes a definition for *recovered organics*; however, the term does not seem to be used elsewhere in the Regulation. We ask that CARB clarifies how and where that term is proposed to be used in the Regulation; for example, are *recovered organics* a subset of organic waste? The following definition would more accurately represent the manner in which organic wastes are recovered from the remainder of the waste stream:²

“Recovered Organics” is the organic fraction of ~~mixed~~³ municipal solid waste that is *source separated at the point of generation or otherwise* manually or mechanically separated from the waste stream, typically at a materials recovery facility, *anaerobic digestion facility, compost facility*, or transfer station.

Please refer to comments from the Coalition for Renewable Natural Gas, the California Renewable Transportation Alliance, and The Transport Project for additional comments on the 15-Day Package. Thank you for your work on this critical program and for your consideration of our comments.

Sincerely,

Christine Wolfe
Director of Government Affairs, California, Hawaii, and Nevada
WM

¹ California Code of Regulations Title 14, Division 7, Section 18983.1(b)(7)

² California Code of Regulations Title 14, Division 7, Chapter 12, Articles 2 and 3

³ “Mixed” waste typically refers to a waste stream that combines some or all of MSW, recyclables, and organics; it is sufficient to say the organic portion of MSW.



Submitted electronically at:
<https://ww2.arb.ca.gov/applications/public-comments>

August 27, 2024

Clerks' Office
California Air Resources Board
1001 I Street
Sacramento, California 95814

Re: Support for California Air Resources Board Proposal to Retain Jet Fuel Exemption in Low Carbon Fuel Standard Program

Dear Chair Randolph,

170.1 In response to the revised Proposed Low Carbon Fuel Standard Amendments posted August 12th, 2024, I am writing in support of the recent California Air Resources Board (CARB) proposal to retain the jet fuel exemption under its Low Carb Fuel Standard (LCFS) Program. Alaska Airlines supports the withdrawal of the proposal to eliminate the jet fuel exemption and retain the existing opt-in approach for SAF under the CARB LCFS Program.

Alaska Airlines is committed to reducing its climate impact and achieving net zero carbon emissions, and transitioning to SAF is core to this commitment. We have long recognized that scaling up the supply of SAF and achieving net-zero carbon emissions can only happen by working collaboratively with governments and other stakeholders across sectors. Achieving this ambition for SAF will require new and additional policy incentives, streamlined permitting processes, and close collaboration among governments, the aviation industry, the fuels industry, environmental organizations and others.

Aviation accounts for 2.6% of the U.S. greenhouse gas emissions but 5% of U.S. Gross Domestic Product (GDP) and 4.1% of California's GDP, thus exerting outsized economic impact relative to its share of emissions. U.S. civil aviation firms employ more than 380,000 California-based employees, with an overall economic impact of \$194 billion.¹ Aviation is critical to driving California's economy and its rank as the 5th largest economy

¹ [The Economic Impact of Civil Aviation on the U.S. Economy, State Supplement, US Department of Transportation, November 2020](#)



in the world, enabling \$114 billion in annual trade flows and underpinning many of California's other significant economic drivers such as agriculture, tourism, manufacturing, banking, technology and small business.

California has established itself as an early leader in attracting investment, production, and use of SAF through the existing LCFS Program, which provides an opt-in credit for SAF that helps reduce the price difference between SAF and conventional jet fuel. Ensuring a healthy and vibrant aviation industry is essential to California's future, and leveraging CARB's early leadership on SAF can enable California leadership in the emerging SAF production industry, creating new jobs and economic development opportunities.

In its April 10th, 2024 workshop, CARB reiterated that a principal objective of its regulatory proposal is to "Increase the use of alternative jet fuel in the State." We share that objective, as reflected in our company commitment to achieve net zero carbon emissions by 2040 (primarily through the purchase and use of SAF) as well as the US airline industry's goal of achieving net zero carbon emissions by 2050 and support for the US government SAF Grand Challenge. Alaska Airlines and other U.S. airlines have clearly demonstrated a strong, enduring market signal for affordable SAF. The challenge remains the supply of affordable SAF, not the absence of a market signal by airlines. We strongly believe that maintaining the existing exemption for jet fuel along with the opt-in model for SAF provides a strong foundation to achieve our mutual objectives.

The primary impediment to increased SAF production and availability in California remains the higher cost of SAF for producers and buyers relative to conventional jet fuel and renewable diesel. Whether or not jet fuel becomes a deficit generating fuel has no direct impact on whether SAF is produced or used. Eliminating the exemption on jet fuel would have no material impact on the availability or use of alternative jet fuel in California.

Our mutual interest is to increase SAF production, availability, and use, and the most effective way to accomplish this is to continue the positive, collaborative approach represented by the existing "opt-in" mechanism developed by CARB and the aviation community. We support CARB's decision to withdraw the proposal to remove the exemption for jet fuel for intrastate flights, preserve the existing opt-in approach for SAF. We look forward to the opportunity to work with CARB and other stakeholders across the SAF ecosystem to explore solutions which build on the existing opt-in model of the LCFS



Program. We recommend that CARB establish a joint CARB-industry working group with stakeholders across the emerging SAF ecosystem to explore alternative policy and voluntary proposals to rapidly increase SAF production, availability and use in California. We look forward to working with CARB on such measures to accelerate SAF deployment.

Sincerely,

A handwritten signature in black ink, appearing to read "Scott Kennedy".

Scott Kennedy
Senior Manager, State and Local Government Affairs
Alaska Airlines



Tanya M. DeRivi

Senior Director, California Climate and Fuels

August 27, 2024

Ms. Rajinder Sahota
Deputy Executive Officer – Climate Change and Research
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Uploaded at:
<https://ww2.arb.ca.gov/applications/public-comments>

Re: WSPA Comments on 15-Day Low Carbon Fuel Standard (LCFS) Amendments Package

Dear Ms. Sahota,

The Western States Petroleum Association (WSPA) appreciates the opportunity to comment on the California Air Resources Board's (CARB) proposed "15-day" LCFS program amendments. WSPA is a non-profit trade association representing companies that import and export, produce, refine, transport, and market petroleum, petroleum products, alternative fuels, natural gas, and other energy supplies in California and four other western states, and has been an active participant in air quality planning issues for over 30 years. WSPA is proud of the technological advancements our member companies have made in bringing more alternative fuels and electricity to California's transportation market since the LCFS came into effect. We believe a well-designed LCFS program with clear objectives is essential to supporting a healthy lower carbon fuels market, including renewable fuels. It remains essential for CARB to finalize revisions that align with statutory requirements, are implementable, and achievable to continue this success.

WSPA highlights the following key issues with CARB's 15-day amendment proposals:

- 1) A biofuel cap would compromise the availability of lower-carbon fuels and would interfere with the development of alternative fuel pathways.
 - a) Sustainability guardrails are unnecessary and would impose arbitrary restrictions on biomass-based fuel pathway compliance. CARB has also failed to include a sufficient phase-in period for these requirements.
 - b) These amendments will likely result in access to ethanol – which has *limited to no substitutes* for E10 and, potentially, E15 gasoline – being compromised.
- 2) The change from the initially proposed 5% "step-down" to an almost doubled 9% "step-down" is arbitrary and threatens to upend LCFS program cost-effectiveness, feasibility, and success.
- 3) The newly proposed 2031 prohibition on hydrogen produced from fossil gas feedstocks violates CARB's mandate to "enable...carbon capture, utilization, and storage technologies in California to complement emissions reductions",¹ as a supplemental 15-day amendment proposal must be sufficiently related to the original 45-day proposal.²
- 4) Providing CARB's Executive Officer with extraordinary discretion over zero-emission vehicle (ZEV) crediting and fuel pathway applications is concerning and runs counter to achieving the goals outlined in CARB's 2022 Scoping Plan.
- 5) WSPA generally supports proposed clarifications for credit true-up after annual verifications, but CARB should remove the penalty if the verified carbon intensity (CI) is higher than the operational CI to enable this provision.
- 6) WSPA reiterates that any Land Use Change amendments to Table 6 must be subject to formal rulemaking.

¹ California Health and Safety Code (HSC) § 38562.2.

² Cal. Gov. Code § 11346.8(c).

- 171.9 7) Changes to RNG crediting should be reverted to the original 45-day proposal.
- 171.10 8) Only built fixed guideway systems after the baseline year should qualify for LCFS crediting.
- 171.11 9) CARB is correct to retain the intrastate fossil jet fuel exemption.

WSPA has been engaged throughout this LCFS rulemaking process, and previously submitted comments in response to prior workshops and proposed regulatory updates. Those comments are incorporated by reference and are also attached.^{3,4,5,6,7,8,9,10}

1. A Biofuel Cap Would Compromise the Availability of Lower-Carbon Fuels for Californians

171.12 WSPA strongly urges CARB to reconsider its decision – adopted very late in the agency’s extensive rulemaking process – to insert a 20% cap on biomass-based fuels produced from canola and soybean oil feedstocks. As recently as CARB’s April 10, 2024, workshop, CARB *declined* to include a “cap” on crop-based feedstocks¹¹ due to a lack of supporting evidence. At the time, CARB proposed to include “sustainability guardrails” in lieu of a cap in order to “reduce the risk that rapid expansion of biofuel production and biofuel feedstock demand could result in deforestation or adverse land use change.”¹² Now CARB proposes to impose both a feedstock cap and to **expand** requirements for the initially proposed “guardrails.” Having both a cap along with the guardrails is not only duplicative but will limit proven emissions reduction strategies that are currently effective and disincentivize additional investments in lower carbon renewable fuels.

With respect to the proposed cap on certain biomass-based fuels we discuss the following concerns.

First, CARB has failed to adequately consider the impacts a cap will create on biomass-based diesel producers. Many facilities are designed to handle specific feedstock qualities. Limiting the quantity of certain feedstocks will force these facilities to significantly alter their production processes and either increase the frequency of maintenance or cease production altogether. For example, in renewable diesel production, contaminants in certain feeds could poison the hydrotreating catalyst or increase the corrosion in piping. While these feedstocks can be treated, this requires additional investment in pretreatment capacity to be utilized for treatment or requires additional downtime for repair, which limits annual average renewable diesel production.

Second, as state agencies have repeatedly acknowledged in developing long-term planning, demand for liquid fuels in California will continue through at least 2045.^{13,14,15} CARB’s proposed biofuel cap would hinder the production of lower carbon liquid fuels by reducing the incentives to produce lower-CI biofuels, which would create an unnecessary burden for transportation fuel producers. These lower-carbon fuels may not be available to meet remaining liquid fuel demand, leading to the production of more traditional, higher-CI fuels. A cap may therefore ultimately **increase** statewide transportation emissions by limiting the availability of lower-carbon alternatives.

³ WSPA, “WSPA Comments on CARB Workshop to Discuss Potential Changes to the LCFS,” August 8, 2022.

⁴ WSPA, “WSPA Comments on the August 18th CARB Workshop to Discuss Potential Changes to the LCFS,” September 19, 2022.

⁵ WSPA, “WSPA Comments on the November 9th CARB Workshop regarding Potential Changes to LCFS,” December 21, 2022.

⁶ WSPA, “WSPA Comments on CARB Preliminary Discussion Draft of Potential Low Carbon Fuel Standard Regulation Amendments and February 22, 2023 LCFS Workshop,” March 15, 2023.

⁷ WSPA, “WSPA Comments on CARB’s Proposed Low Carbon Fuel Standard Auto-Acceleration Mechanism and May 23, 2023 Workshop,” June 6, 2023.

⁸ WSPA, “WSPA Comments on the Low Carbon Fuel Standard Modeling Updates Workshop,” September 12, 2023.

⁹ WSPA, “WSPA Comments on Proposed 2024 Low Carbon Fuels Standard Amendments,” February 20, 2024.

¹⁰ WSPA, “WSPA Comments on April 10, 2024, Low Carbon Fuel Standard Workshop,” May 10, 2024.

¹¹ CARB, April 10, 2024, California Low Carbon Fuel Standard Workshop at slide 40: <https://ww2.arb.ca.gov/sites/default/files/2024-04/LCFS%20April%20Workshop%20Slides.pdf>

¹² CARB, LCFS 2023 Amendments, Initial Statement of Reasons (ISOR), December 19, 2023 at 32, <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>.

¹³ CARB 2022 Scoping Plan Update, pgs. 86, 100: <https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>

¹⁴ CEC Transportation Fuels Assessment, pgs. 1, 9, 22 at: <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=23-SB-02>

¹⁵ CARB, April 10, 2024, California Low Carbon Fuel Standard Workshop at slide 38: <https://ww2.arb.ca.gov/sites/default/files/2024-04/LCFS%20April%20Workshop%20Slides.pdf>

Given these significant emissions impacts, CARB's proposed cap conflicts with CARB's mandate, pursuant to California Health and Safety Code (HSC) § 38560, to adopt measures "to achieve the maximum technologically feasible and cost-effective greenhouse gas emission reductions from sources."¹⁶ The proposed cap may also conflict with HSC § 38562's requirement to consider "diversification of energy sources, and other benefits to the economy, environment, and public." Further, by restricting the quantity of fuel a given company produces, CARB's proposal impacts the instrumentalities of interstate transportation and may impermissibly impede the flow of interstate commerce in violation of the Dormant Commerce Clause.¹⁷

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cont.

Third, CARB's last-minute change in position on the need for a cap likely conflict with CARB's rulemaking obligations under Government Code § 11346.8(c). This provision makes clear that CARB cannot significantly alter its proposal from what was originally proposed in the 45-day notice unless CARB provides a new 45-day public comment period. To avoid triggering a new 45-day notice period, any substantive proposed changes in a supplemental 15-day comment period must be "sufficiently related to the original text that the public was adequately placed on notice that the change could result from the originally proposed regulatory action." CARB indicated in its initial rulemaking package that there was not sufficient evidence to support a cap, and that the CI-based program will incentivize the most economically viable biofuels. Further, CARB's April 10, 2024, presentation made several statements that indicate CARB does not believe a cap is necessary:¹⁸

- On Slide 40, CARB stated that "Credit Generation for Virgin Oil Feedstocks Naturally Phases Out," going on to state that these feedstocks become *deficit generating* in 2033 unless the Automatic Acceleration Mechanism (AAM) is triggered twice at which point, they generate deficits in 2030.
- On Slide 53, CARB explained that "[f]rom 2022-2023, waste-based feedstocks have risen more rapidly than oilseed feedstocks," indicating that these feedstocks have not experienced the kind of growth that would justify a cap.
- On Slide 57, CARB stated that, "Based on current and future understanding of market conditions, it is uncertain if substantial increases in virgin oil fuel use in California will occur over long-term."

CARB is now proposing a significant programmatic change late in the rulemaking process without adequate technical justification nor sufficient time for affected stakeholders to understand potential impacts for California's fuel market.

Fourth, the proposed regulatory language related to the 20% cap on the production of soybean and canola oil is ambiguous and will make it difficult for covered entities to understand their compliance requirements:

- The proposed language is confusing with respect to the point of obligation. The language appears to be targeted at the *production* (not the *supply*) of soybean and canola oil fuels in California, but offers no direction on what that means for a company producing or supplying (sometimes both) biomass-based diesel.
- The proposed language is unreasonably vague in setting annual production reporting requirements for these entities.
- The proposed language is not clear on what production or capacity applies to the 20% cap from the 2023 baseline year, and how imports and purchases from a third-party would or would not apply.

a. Specific Concerns Regarding Newly Modified "Sustainability Guardrails"

As mentioned, CARB is proposing to impose both a feedstock cap and "sustainability guardrail"

¹⁶ See also HSC § 43018.

¹⁷ *Pike v. Bruce Church, Inc.*, 397 U.S. 137, 142 (1970).

¹⁸ <https://www2.arb.ca.gov/sites/default/files/2024-04/LCFS%20April%20Workshop%20Slides.pdf>

171.13

requirements. In previous comments, WSPA identified serious issues with these guardrails, emphasizing that these guardrails may unreasonably limit the supply of crop-based feedstocks for biofuels. Rather than revising these guardrails, CARB is choosing to retain more onerous requirements which are not only duplicative but will limit proven emissions reduction strategies that are currently effective and disincentivize additional lower carbon investments in renewable fuels. We offer the following additional concerns.

- **Sustainability Guardrails Are Unnecessary.** WSPA remains concerned that “guardrails” will disincentivize the production of additional lower-CI fuels. CARB still has not provided data demonstrating that there is a sustainability issue that must be addressed¹⁹ and has not adequately considered that placing a limit on crop-based feedstocks for biomass-based diesel to California’s fuels market could potentially increase costs for California consumers. We previously emphasized that creating an entirely new crop-based biofuel certification regime by 2028 will be a daunting task, is unjustified, and will only further add to the already overly burdened CARB staff and regulated entities. WSPA reiterates that existing LCFS program measures and related Federal programs provide sufficient guardrails to address potential land use changes associated with crop-based feedstocks that are of unsubstantiated concern.
- **No Sufficient Phase-In.** While WSPA appreciates CARB’s attempt to incorporate a transition period for the 2026 fuel pathways requirements, the currently proposed phase-in is not realistic. Assuming CARB adopts final LCFS amendments in November 2024, and the Office of Administrative Law approves them by/in early 2025, the 2026 requirement for tracking production would need to begin with the 2025 harvest (which begins in the spring, further compounding timing challenges). The nation’s current agricultural system is not set up to capture and independently certify this data, nor are there enough auditors to audit the data even with the proposed phase-in implementation. The concern then becomes a lack of supply of certified feedstock for valid pathways which currently are in the program.
 - Further, new pathways would have to meet the 2026 fuel pathway requirements *immediately*, without *any* phase-in period. Requiring new pathways to meet these requirements before standard practices are established industry-wide will disadvantage new facilities and processes, which could significantly delay supply of rapidly developing biofuels, such as Sustainable Aviation Fuel (SAF), to California.
- **Arbitrary Restrictions on Biomass-Based Diesel Pathways.** To the extent CARB’s updated proposal clarifies the definition of “new pathway applications,” WSPA remains extremely concerned that the proposal will completely forestall producers’ ability to apply for biomass-based diesel pathways that need an update for process changes or other CI reduction projects in the event that Class 3-8 ZEVs exceed a certain threshold by 2029. Biomass-based diesel technologies may be developed in the future that will have significant emissions benefits. However, CARB’s proposal disincentivizes the development of these innovative technologies by explicitly favoring electricity-based technologies. Further, WSPA is concerned that any future requirement to resubmit biodiesel or renewable diesel pathways under new GREET models may qualify as “new pathway applications” without further clarification to that term, as discussed below, and will be disallowed under this provision. In addition, this proposal depends on the success of the Advanced Clean Trucks (ACT) and Advanced Clean Fleets (ACF) regulations. It is unreasonable for CARB to tie the targets and administrative functioning of LCFS on outcomes under ACT and ACF, particularly since (1) CARB has not received the necessary Clean Air Act waiver from the United States Environmental Protection Agency for the ACF Regulation; (2) CARB already anticipates a need to amend the ACT Regulation – including to align sales requirements

¹⁹ See Cal. Gov. Code § 11346.2(b)(1) (requiring the agency to submit “A statement of the specific purpose of each adoption, amendment, or repeal, the problem the agency intends to address, and the rationale for the determination by the agency that each adoption, amendment, or repeal is reasonably necessary to carry out the purpose and address the problem for which it is proposed.”); see also § 11349.1(a)(1) (requiring the agency to review its regulations and make determinations based off the regulation’s “necessity.”).

171.14 cont. with ACF purchasing requirements; (3) the ACF Regulation also includes numerous extensions and exemptions to address the plethora of concerns raised by stakeholders during the rulemaking process concerning the practical, near-term implementation challenges – especially regarding transportation electrification; and (4) as both regulations are in their infancy of implementation, it remains to be seen how effective these regulations will be in achieving stated goals.

171.15 • **European Sustainability Scheme Issues.** There have been numerous compliance issues with European sustainability schemes over the years. CARB should not explicitly favor these schemes over North American programs, like Canada's Clean Fuel Regulation, or other schemes.

171.16 • **Undefined “New Pathway Applications.”** CARB has inserted, and then repeatedly used, new terminology for “new pathway applications” in the proposed 15-day regulatory package without providing a definition. WSPA is concerned about potential market impacts from attempting to interpret what, when, and how CARB would interpret a “new pathway application” subject to new multi-year, phased-in fuel pathway requirements. Outside of a GREET model update, the use of the term “new pathway application” needs to be carefully understood. Based on this, WSPA recommends that when CARB refers to “new pathway applications” in the ban on biomass-based diesel applications in § 95488(d) and the feedstock sustainability guardrails in § 95488.9(g), that a new pathway application means: *a pathway request for a biomass-based feedstock not previously processed at a facility.*

171.17 In general, WSPA opposes arbitrary caps and additional “guardrails” that will create an unnecessary burden for transportation fuel producers and may impact the availability of alternative transportation fuels.

b. CARB’s 15-Day Amendments Will Likely Compromise California’s Access to Ethanol

171.18 Nearly all gasoline sold in California today includes blends of up to 10% ethanol by volume. Ethanol has been used in California for decades and is an important renewable fuel with lower CI. ***Ethanol has limited-to-no substitutes.*** CARB’s proposed feedstock limitations would increase the risk of a supply shortage for ethanol and would run counter to CARB’s ongoing efforts to evaluate potential future approval of E15 blends. For example, with these proposed timing requirements, ethanol will ultimately be imported into California and will have actual GHG reduction benefits, but may nevertheless be generating deficits under the new “sustainability guardrail” changes due to producers’ inability to meet the pathways requirements. This will create a significant cost to producers, undermining the program.

As WSPA has previously explained, CARB’s proposed sustainability guardrails in its 45-day rulemaking package included overly broad language that may have, unintentionally, required ethanol feedstocks to meet the certification and tracking requirements. Meeting these requirements would significantly increase the cost and burden of ethanol, thus disincentivizing ethanol development and conflicting with HSC § 38560’s mandate that CARB adopt measures “to achieve the maximum technologically feasible and cost-effective greenhouse gas emission reductions from sources.” In our May 10, 2024, comment letter, we urged CARB to clarify this regulatory language in its subsequent 15-day rulemaking action to ensure that any new sustainability requirements **would not** apply to ethanol, and account for costs related to ethanol production and importation in assessing the program amendments.

Rather than correct what appears to have been an oversight, the 15-day regulatory language amplified the problem: the new sustainability requirements for biomass make clear that ethanol **is** also subject to them. This could have a devastating impact on industry’s ability to import ethanol into California to help lower the CI of gasoline emissions. We urge CARB to correct this in a second 15-day regulatory language proposal.

2. A 9% Step-Down in 2025 Compromises LCFS Program Cost-Effectiveness and Feasibility

CARB initially proposed increasing the 2025 CI target by a **5%** near-term “step down.” WSPA cautioned that these aggressive proposed reduction targets would likely increase consumer cost impacts and disincentivize longer-term advancements in transportation fuel development, disrupting the balance between the costs and the environmental benefits of the LCFS program. We are concerned that CARB now proposes to increase the 2025 target to **9%**, nearly doubling the stringency of CARB’s already-aggressive reduction targets.

While WSPA appreciates CARB’s efforts to secure additional GHG emissions reductions, WSPA reiterates that CARB must also consider that the immediate increased program stringency will likely impact California’s transportation fuel costs. The State of California has repeatedly acknowledged^{20,21,22} that the LCFS program has a direct cost impact to California consumers, which can disproportionately burden low- and moderate-income Californians. Any significant cost increases would conflict with Senate Bill (SB) X1-2 (2023), which directed State agencies to evaluate measures “*to ensure a reliable supply of affordable and safe transportation fuels in California.*”²³

WSPA is concerned that nearly doubling the initially proposed 5% “step-down” of CI benchmarks in 2025 could exacerbate California’s pressing energy affordability challenges and worsen existing challenges with CARB’s proposed limits on crop-based biofuels. These alternative liquid fuels contribute sizeable emissions reductions under the current LCFS program. Constraining credit generation opportunities for these more affordable fuels while simultaneously increasing CI benchmark stringency could push credit prices up towards the LCFS program’s price ceiling and could result in “*potential adverse impacts to California consumers,*” counter to CARB’s program goals.²⁴

CARB is required, pursuant to HSC §§ 38560 and 43018, to ensure that its program amendments are cost-effective, taking into account technological feasibility and necessity. California Gov. Code § 11346.2(b)(4) also requires CARB to consider “*reasonable alternatives to the regulation that would lessen any adverse impact on small business,*” and reasonable alternatives that are “*less burdensome.*” As part of these alternatives, CARB must consider “*overall societal benefits, including reductions in other air pollutants, diversification of energy sources, and other benefits to the economy, environment, and public health.*”²⁵ To comply with these provisions, WSPA urges CARB to **revise its potential program amendments to create a more cost-effective, technology-neutral, and less burdensome regulatory program** that protects a diverse energy portfolio, including for fuels that are contributing to significant emissions reductions efforts today.

Requiring a 9% reduction in a single year would effectively mandate that industry achieve approximately **eight years’** worth of progress (as measured under the current program²⁶) in a single year. Rather than “super-accelerating” reductions, CARB should adopt more feasible CI reduction

²⁰ CARB, LCFS 2023 Amendments, Standardized Regulatory Impact Assessment, September 8, 2023 at 58, <https://dof.ca.gov/wp-content/uploads/sites/352/2023/09/LCFS-SRIA-to-DOF-ADA-Compliant> (estimates that the proposed amendments to the LCFS program will potentially increase the price of gasoline by an average of \$0.37 per gallon between 2024 and 2030, and further increase the price of gasoline by \$1.15 per gallon between 2031 and 2046.).

²¹ See Legislative Analyst’s Office report, “Assessing California’s Climate Policies – Transportation,” December 2018 at 30, <https://lao.ca.gov/reports/2018/3912/climate-policies-transportation-122118.pdf>.

²² See CEC, Senate Bill (SB) X1-2 Refiner Margin Data at <https://www.energy.ca.gov/data-reports/energy-almanac/californias-petroleum-market/california-oil-refinery-cost-disclosure>.

²³ SB X1-2 (2023) (emphasis added) at https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202320241SB2.

²⁴ CARB, LCFS 2020 Amendments, ISOR, October 1, 2019 at II-2, <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2019/lcfs2019/isor.pdf>.

²⁵ HSC § 38562.

²⁶ LCFS SRIA Table 2 at: <https://dof.ca.gov/wp-content/uploads/sites/352/2023/09/LCFS-SRIA-to-DOF-ADA-Compliant.pdf>

targets to mitigate potentially significant consumer cost impacts and encourage longer-term advancements in lower-CI transportation fuels development, and program stability.

First, “super-accelerating” near-term program stringency may compromise CARB’s efforts to balance program costs with the emission reductions obtained. While WSPA acknowledges that predictable market signals are necessary to incentivize the production of lower-CI fuels, CARB must also account for potential impacts on California’s energy affordability challenges in evaluating extremely aggressive reduction targets.

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Second, CARB previously illustrated in its Standardized Regulatory Impact Assessment²⁷ a significant reliance on banked credits to achieve its proposed targets, resulting in a dramatic credit bank draw-down, leaving little time for regulated entities to innovate and bring additional lower-CI fuels to market that will add credits to the market and stabilize program costs. As a result, WSPA previously raised the need to incorporate a “reset mechanism” to ensure a modeled target does not become a model of how *not* to achieve emission reductions. Given the even more stringent reduction targets CARB is now proposing, we strongly urge CARB to insert such a reset mechanism to: (1) bring greater regulatory certainty; (2) strike an appropriate balance between achieving meaningful reductions and offering sufficient business, technology, and financial support and stability to industry; and (3) help ensure that the accelerated targets are durable and achievable.

Third, CARB has failed to provide any substantive insight into the impact to markets and suppliers as fuels transition from being *credit* generators to being *deficit* generators. This change can severely hamper the ability of some fuel *suppliers* to manage the transition and could significantly harm the LCFS program.

Fourth, “super-accelerating” LCFS program stringency – particularly in the near-term – will likely run counter to efforts underway before the California Energy Commission under SB X1-2 to identify ways to ensure an affordable and reliable supply of transportation fuels. WSPA has provided extensive comments about the need to address policies that constrain supply despite ongoing and very high demand for transportation fuels. CARB premises these very aggressive CI reduction targets on the assumption that gasoline demand (and, therefore, CARBOB demand) is expected to decline quickly with an increase in light-duty ZEV penetration. However, if ZEV penetration does not take place as quickly as CARB anticipates, LCFS deficit generation will be significantly higher than CARB’s scenarios and the program could become infeasible.

3. WSPA Objects to the 2031 Prohibition on Hydrogen Produced from Fossil Gas Feedstocks

WSPA strongly opposes CARB’s newly added provision (§ 95482(h)) which would effectively ban LCFS crediting for hydrogen produced using fossil natural gas as a feedstock and assign any volumes of such hydrogen the default ULSD CI, starting in 2031.

171.20

CARB clearly signaled in its 2022 Scoping Plan that hydrogen will play a critical role in achieving California’s ambitious 2030 and 2045 climate change targets towards achieving carbon neutrality. The 2022 Scoping Plan specifically included steam methane reformation in its discussion of hydrogen resources, explaining that this process can be paired with carbon capture and sequestration to limit emissions. Yet CARB’s proposed updates undermine this finding and arbitrarily limit hydrogen production to only certain preferred hydrogen technologies. However, rapid growth across a broad range of hydrogen technologies must be incentivized to successfully scale up hydrogen production. Large-scale innovation and new investment in various industrial sectors rely on a diverse portfolio of resources. Arbitrarily restricting production technologies will stifle investments and innovation and will drive up program costs. For example, CARB’s proposal would

²⁷ LCFS SRIA at: <https://dof.ca.gov/wp-content/uploads/sites/352/2023/09/LCFS-SRIA-to-DOF-ADA-Compliant.pdf>

favor electrolysis using renewables, even though this technology is, by most estimates,²⁸ at least triple the cost of hydrogen currently produced by steam methane reforming.

171.20 cont. The LCFS *market-based program* should continue to preserve consumer choice by providing a level playing field for *all* technologies, embracing fuel- and technology-neutral principles that focus on the meaningful and timely reduction of GHG emissions. By constraining production eligibility, CARB is failing to achieve the “maximum technologically feasible and cost-effective greenhouse gas emission reductions” in accordance with HSC § 38560. A technology-neutral approach would better align with CARB’s rulemaking obligations under Gov. Code § 11346.2(b)(4)(A), which requires CARB to consider performance standards as an alternative to mandating the use of specific technologies or equipment, or prescribing specific actions or procedures. Further, HSC § 38562.2 obligates CARB to “[i]dentify and implement a variety of policies and strategies that enable carbon dioxide removal solutions and carbon capture, utilization, and storage technologies in California to complement emissions reductions . . .”. By disallowing fossil gas feedstocks under the LCFS, CARB is violating the mandate under HSC § 38562.2 and preventing the use of “blue hydrogen” under the program.

171.21 Furthermore, these changes were not included, nor contemplated, in CARB’s formal January 2024 proposal and CARB has not adequately solicited feedback from the public and regulated industry. In CARB’s original proposal, § 9488.8(i)(3) defines low-CI hydrogen as “having well-to-wheel carbon intensity not to exceed 55.00 gCO₂e/MJ of gaseous hydrogen or 95.00 gCO₂e/MJ if transported as liquid before pipeline injection.” CARB’s updated proposal is inconsistent with this definition. This runs wholly counter to the statutory limitations for 15-day proposals that the proposal must be “non-substantial” or “sufficiently related to the original text that the public was *adequately* placed on notice.”²⁹ In other words, CARB is not allowed, at this stage of the rulemaking process, to produce a wholly new concept like prohibiting the inclusion of hydrogen produced from fossil gas feedstocks in the program.

4. Significant Changes to ZEV Crediting and Fuel Pathway Applications Based on ZEV Market Penetration Are Concerning

171.22 The proposed 15-day regulatory language includes major changes – again, inserted late into this extensive rulemaking process – that affect crediting for ZEV charging crediting. CARB is now proposing to provide the Executive Officer extraordinary discretion to assign a significant portion of base credits to Original Equipment Manufacturers (OEM) – up to 45% if the share of certified ZEV sales for Model Year 2024 is less than 30%. The proceeds from these base credits are *required* to be used to “support transportation electrification” per § 95483 (c)(1)(D)(1). In addition, CARB is now proposing that the Executive Officer may choose not to accept new fuel pathway applications for biomass-based diesel if the number of Class 3-8 ZEVs registered or reported in California exceeds 132,000 ZEVs. These changes unreasonably favor ZEV technologies over other emission reduction technologies.

First, WSPA emphasizes here that the LCFS *market-based program* should continue to preserve consumer choice by providing a level playing field for *all* technologies –which will be a critical component towards achieving the goals outlined in CARB’s 2022 Scoping Plan as discussed above. A technology-neutral approach better aligns with CARB’s rulemaking obligations under Gov. Code § 11346.2(b)(4)(A), which requires CARB to consider performance standards as an alternative to mandating the use of specific technologies or equipment or prescribing specific actions or procedures.

²⁸ Justin Bracci, Adam Brandt, Sally M. Benson, Gireesh Shrimali and Sarah D. Saltzer, “Pathways to Carbon Neutrality in California: The Hydrogen Opportunity,” Stanford Center for Carbon Storage and Stanford Carbon Removal Initiative. <https://sccs.stanford.edu/california-projects/pathways-carbon-neutrality-california>. https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/lcfs_appa1.pdf

²⁹ Cal. Gov. Code § 11346.8(c).

171.23

Second, WSPA questions the appropriateness of relying on ZEV sales under the “Zero-Emission Vehicle Standards for 2018 Through 2025 Model Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles” (California Code of Regulations Title 13 § 1962.2) for OEMs to be eligible for base credits. CARB is therefore setting up a structure for granting a subsidy to OEMs within the LCFS program by tying the ability of the Executive Officer to reallocate the base credits on known sales numbers, which effectively guarantees this reallocation. This provision is also not currently enforceable because CARB still has not received a required Clean Air Act waiver from the United States Environmental Protection Agency. Further, as related to the Executive Officer discretion to stop accepting biomass-based diesel pathways, both the ACF and ACT regulations must contend with serious implementation challenges. CARB has identified significant issues with its ACT Regulation, and already anticipates a need to amend this regulation to align sales requirements with ACF purchasing requirements. In addition, stakeholders during the ACF rulemaking process raised a plethora of concerns concerning practical, near-term implementation challenges – especially regarding transportation electrification.

171.24

Third, CARB’s late addition of these provisions likely conflicts with CARB’s rulemaking obligations under Gov. Code § 11346.8(c), which makes clear that CARB cannot significantly alter its proposal from what was originally proposed in the 45-day notice without providing a new 45-day public comment period. To avoid triggering a new 45-day comment period, any substantive proposed changes in a supplemental 15-day comment period must be “sufficiently related to the original text that the public was adequately placed on notice that the change could result from the originally proposed regulatory action.” The 15-day changes are not sufficiently related to the original proposal to provide stakeholders with sufficient notice of CARB’s newly added proposal.

5. WSPA Generally Supports Clarifications for Credit True-Up After Annual Verification, But Penalty Should Be Removed

171.25

WSPA appreciates and generally supports CARB’s updated language in § 95488.10(b) that clarifies that CARB’s Executive Officer may provide for credit true up beginning with the 2025 annual Fuel Pathway Report data reporting year for “a fuel pathway, including a temporary pathway used by an entity that subsequently receives fuel pathway certification for the associated production facility” that has a lower verified operational CI upon receiving a positive or qualified positive verification statement. WSPA reiterates here that it is critically important that CARB ensure there are adequate resources to support the development and implementation of an efficient fuel pathway review process in a timely manner; credit true ups should not prevent pathways from being approved.

171.26

CARB’s updated proposal also explains that “Only reporting quarters for which *complete operational data* are reported in the applicable AFPR are eligible for credit true up of a temporary fuel pathway” (emphasis added). WSPA recommends that CARB provide a reasonable definition for “complete operational data” that makes clear that entities will not be penalized for receiving LCFS credits after the annual verification process.

171.27

WSPA strongly encourages CARB to reconsider penalties under § 95486.1(g)(1), whereby pathway holders would incur a deficit of **four times** the amount of the annual excess CI generated – and have excess credits invalidated. This provision effectively creates a penalty of **five times** the amount of the annual excess CI generated, which is disproportionate to the severity of the violation and will likely have an outsized impact on pathway holders. This penalty would likely lead fuel producers to be unreasonably conservative and, as a result, the true-up provision would likely not be used effectively. WSPA requests that the language related to four times penalty be removed in the final proposed regulation.

6. Any LUC Changes to Table 6 Must Be Subject to Rulemaking

WSPA is concerned that affording the Executive Officer a tremendous amount of discretion, as proposed in the 15-day regulatory language, would circumvent an important rulemaking process and fail to provide affected stakeholders an appropriate opportunity to contribute to any changes. As WSPA has previously explained, CARB should not attempt to introduce new and complex topics, such as the proposed conditions for use of Table 6 Land Use Change (LUC) provisions, this late into the rulemaking process, for the following reasons:

- These changes were not included, nor contemplated, in CARB's formal January 2024 proposal, and therefore violate CARB's rulemaking obligations under Gov. Code § 11346.8(c), which prohibits CARB from significantly altering its proposal from what was originally proposed in the 45-day notice without providing an additional 45-day public comment period.
- CARB had not adequately solicited public feedback on any methodology being considered.³⁰ CARB must provide stakeholders with sufficient opportunity to meaningfully evaluate this methodology prior to finalizing these provisions.
- CARB had not yet presented evidence that "high-risk crop-based feedstocks" exist.

CARB has also failed to adequately consider whether these provisions are necessary, consistent with CARB's obligations under HSC § 43018. The Global Carbon Project's 2023 report continues to show that land-use change emissions have declined since the 1990s and are a small portion of global carbon emissions. While indirect land use change may not be directly observable, data over the past few decades tends to show much smaller impacts than previously predicted.³¹

LUC changes to Table 6 should be the subject of a subsequent rulemaking. However, if CARB decides to proceed with the implementation of adjustments to LUC values before a new LUC rulemaking is undertaken, CARB should recognize both when LUC values need to be *adjusted either upward or downward* based on current research and/or documentation provided by feedstock producers, trade organizations, and fuel producers and avoid any circumstance where affected stakeholders are subject to duplicative penalties given the newly proposed "sustainability guardrails."

If CARB decides to proceed with a change to Table 6, WSPA recommends CARB modify § 95488.3(d)(1) and (2) to read:

(1) The Executive Officer calculated LUC effects for certain region-specific crop-based biofuels using the GTAP model (modified to include agricultural data and termed GTAP-BIO) and the AEZ-EF model. LUC values for six feedstocks and regions of origin region/feedstock/fuel combinations are provided in Table 6 below. The Executive Officer may require a fuel pathway applicant to use one of the values in Table 6, if the Executive Officer deems that value appropriate to use for a feedstock from a region that is region/feedstock/fuel combination not currently listed in Table 6, based on empirical LUC, crop yields, and emissions factors.

(2) The Executive Officer may determine that no value in Table 6 is conservatively representative of the LUC for a feedstock from a region that is not listed in Table 6 particular region/feedstock/fuel combination and assign a more conservative LUC value. Such determination must be based on the best available empirical data, including but not limited to satellite-based remote sensing data for land cover monitoring, crop yields, and emission factors from the AEZ-EF model or carbon stock datasets. For feedstock types not listed in Table 6, the Executive Officer may determine and assign an appropriate LUC value based on empirical land cover data, crop yields, and emission factors.

WSPA emphasizes that this language should not prevent a lower LUC score for any individual pathway applicant to be considered.

³⁰ See Cal. Gov. Code §11346.45(a) (requiring the agency to hold discussions with the public "when the proposed regulations involve complex proposals or a large number of proposals that cannot easily be reviewed during the comment period."); §§ 11346.2(b)(3)-(4) (requiring identification of any technical documents relied upon by the agency and the consideration of "reasonable alternatives" and the agency's reason for rejecting alternatives," respectively.); see also HSC § 38560.

³¹ <https://globalcarbonbudget.org/download/924/?tmstv=1701440441>

7. Proposed 15-Day Changes to RNG Crediting Should Be Reverted

171.30 The proposed 15-day regulatory language would also reduce crediting periods afforded to dairy and swine manure pathways from three consecutive 10-year crediting periods, to two, starting the quarter following CARB's approval of the application. This change would impose an undue regulatory burden on existing facilities – especially for early adopters. Such regulatory uncertainty does not inspire confidence in the long-term durability of the LCFS program given the significant investments such projects involve and the financial assumptions that are made based on rules in place at that time. WSPA recommends that CARB revert to the original regulatory language.

In addition, the proposed 15-day regulatory language again affords CARB's Executive Officer extraordinary discretion to approve a gas system map to support implementation of biomethane deliverability requirements, with little practical implementation time given the constraints outlined. The mapping requirements, however, appear to be vague and potentially challenging to implement given the restrictions outlined. CARB has also provided little explanation or justification regarding this proposed change. The proposed 15-day regulatory language would also add a deliverability requirement for projects after 2037, also subject to the discretion of the Executive Officer.

8. Increasing Crediting for Legacy Fixed Guideway Systems

171.31 The proposed 15-day regulatory language appears to significantly increase crediting for legacy trains by removing the crediting previously limited under § 95486.1 (a)(4). WSPA questions what CARB's rationale and justification is for this change, given this infrastructure was in place prior to the program baseline. Only built fixed guideway systems after the baseline year should qualify for LCFS crediting.

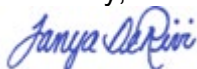
9. CARB Is Correct to Retain the LCFS Exemption for Intrastate Fossil Jet Fuel

171.32 WSPA supports CARB's proposal not to eliminate the existing intrastate fossil jet fuel exemption. As WSPA has previously explained, eliminating this exemption would be extraordinarily complex given the significant new obligations that would be required. Staff is correct to find other, more effective ways to reduce emissions from the aviation sector through the production and use of lower emission aviation fuels and other low-carbon alternatives to fossil jet fuel.³²

WSPA reiterates its previous comments that obligating intrastate jet fuel as a deficit-generator under the LCFS program will not bring additional SAF into California because it can otherwise be met with credits from any lower-CI fuel source.³³ This requirement may also impermissibly burden interstate commerce in violation of the Dormant Commerce Clause doctrine.³⁴ Should CARB consider a similar obligation in future year regulatory proposals, we remind staff that aircraft operators are best positioned to report on their fuel usage and can best ensure that the reported information is accurate.

WSPA appreciates the opportunity to provide these comments.

Sincerely,



Tanya DeRivi
Senior Director, California Climate and Fuels

³² CARB's Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information, Proposed Low Carbon Fuels Standard Amendments, released August 12, 2024, at page 3:

https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_notice.pdf

³³ WSPA, "WSPA Comments on Proposed Low Carbon Fuels Standard Amendments," February 20, 2024.

³⁴ *Pike v. Bruce Church, Inc.*, 397 U.S. 137, 142 (1970).

To: California Air Resources Board
From: Jeremy Martin, Daniel Barad, David Reichmuth and Don Anair
Date: August 27th, 2024
Subject: Comments on Low Carbon Fuel Standard 15-day changes

The Union of Concerned Scientists (UCS) is a long-standing supporter of the Low Carbon Fuel Standard (LCFS) and has been actively involved in its implementation for more than 15 years. We urge the California Air Resources Board (CARB) to modernize the LCFS to ensure it equitably meets the needs of Californians and supports the attainment of air quality standards. We appreciate the opportunity to comment on the 15-day changes, which include several useful changes aligned with our previous input, but also fail to address many of the substantial concerns we raised in our comments submitted in February¹ and May² this year. We reiterate our view, explained in detail in previous comments, that CARB should rapidly phase out counterproductive methane digester subsidies and rebalance supply and demand for credits by reducing credits that are misaligned with California's goals rather than focusing entirely on increasing stringency. We also have specific responses to several changes proposed in the 15-day change package.

The proposed limit on vegetable oil-based diesel fuels is a step in the right direction, but must be strengthened

172.1 We applaud CARB for acknowledging the harm caused by diverting food to fuel. We are resubmitting a letter which has now been signed by more than 50 experts in food markets, deforestation and energy policy calling on CARB “to immediately cap the use of vegetable oil-based biofuels and to strengthen safeguards within the Low Carbon Fuel Standard (LCFS) to ensure that the use of biofuels does not directly or indirectly contribute to global food price shocks, agricultural expansion, and deforestation.” A recent report from the US Department of Agriculture’s Foreign Agriculture Service highlights what is at stake, finding that “*the United States is rapidly expanding imports of animal fats and vegetable oils to both use as feedstocks for renewable diesel production and to backfill other feedstocks, like soybean oil, that have been diverted to renewable diesel production.*”³ Because of the renewable diesel boom, “*the United States became a net soybean oil importer for the first time in 2023.*” The report also concludes that “*the real driver for renewable diesel expansion has been the California Low-Carbon Fuel Standard.*”

While the proposal takes a step in this direction, it must be strengthened to effectively prevent food versus fuel conflicts and deforestation.

¹ <https://www.arb.ca.gov/lists/com-attach/6955-lcfs2024-Wi8CZ1MhUFwHYgFu.pdf>

² <https://ww2.arb.ca.gov/form/public-comments/submissions/11181>

³ US Department of Agriculture’s Foreign Agriculture Service. June 2024. U.S. Renewable Diesel Production Growth Drastically Impacts Global Feedstock Trade. <https://fas.usda.gov/data/us-renewable-diesel-production-growth-drastically-impacts-global-feedstock-trade>

172.1
Cont.

For reasons we explained in our earlier comments and our 2022 briefing paper⁴ a policy change that only limits the share of soy and canola oil feedstock is a poor substitute for a cap on all lipid biofuel feedstocks based on sustainable availability. Even with limits on the share of vegetable oil used for bio-based diesel, California will continue to draw vastly more than its share from global lipid markets, importing used cooking oil and animal fat from around the world. The consequence is that California's LCFS policy can't be replicated by other states or countries. There simply isn't enough used cooking oil to go around, and capping one set of feedstocks with no limit on others can lead to counterproductive feedstock and fuel shuffling and carbon leakage. **A more systematic and effective approach would cap all feedstocks based on a reasonable share of what is sustainably available, and implement this limit on obligated parties or the market as a whole, rather than individual fuel producers. While this approach might be more work to implement, it would yield a more stable and replicable policy over the long term.** However, to focus on our comments on the 15-day changes we suggest ways the proposed mechanism could be strengthened within the general parameters proposed.

172.2

Cap the volume not the share: Limiting the share of bio-based diesel produced from vegetable oil will not put a firm cap on the diversion of food to fuel. According to the latest data (and excluding the unspecified other category) in 2023 vegetable oil made up a little less than 20 percent of bio-based diesel feedstock. A 20 percent cap may discourage the share of vegetable oil feedstock from growing, but the total volume of bio-based diesel fuel from all feedstocks has been growing rapidly. For example, renewable diesel grew 43% in 2023. Thus, the total amount of vegetable oil-based diesel fuel can keep growing even if the share of vegetable oil feedstock remains the same.

Global vegetable oil markets are not responsive to the share of bio-based diesel used in California but instead to the volume of food diverted to fuel. An effective cap should limit the volume not the share of vegetable oil used for fuel.

To convert the proposed cap into one that more effectively limits the volume of vegetable oil-based fuels, the cap should get more stringent over time in line with increases in the size of the overall lipid-based fuel pool. Thus, if the total volume of lipid-based fuels increases by 10 percent the cap should be reduced in the following period from 20 percent to 18 percent to keep the effective volumetric cap on vegetable oil-based fuels constant.

172.3

Apply the cap to all fuels, not just bio-based diesel: Because the cap covers only diesel fuels, and not gasoline and jet fuel, there is potential for additional use of vegetable oil-based fuels in other categories. This is a secondary issue today, but it could become a much bigger problem in the future if federal subsidies for bio-based jet fuel make it economically attractive. Recent experience with the renewable diesel boom shows how quickly booming markets can outpace expectations⁵ and how difficult and time consuming it is to establish safeguards once an unsustainable market is established. CARB should act now before a problem with vegetable oil-based jet fuel materializes.

The limits on vegetable-oil feedstocks should apply to all fuel types, including bio-based jet fuel and gasoline

⁴ O'Malley, Pavlenko, Searle and Martin. Setting a lipids fuel cap under the California Low Carbon Fuel Standard. August 2022. theicct.org/publication/lipids-cap-ca-lcfs-aug22/

⁵ For more details see Marti, Jeremy. Everything You Wanted to Know About Biodiesel and Renewable Diesel. Charts and Graphs Included. January, 2024. <https://blog.ucsusa.org/jeremy-martin/all-about-biodiesel-and-renewable-diesel/>

172.4

Treat fuels above the cap as equivalent to fossil diesel: Despite the proposed cap on credit generation, vegetable oil-based diesel fuels above the cap still provide obligated parties with substantial and growing compliance value because displacing fossil diesel with vegetable oil-based diesel will still reduce an obligated party's deficit generation, as well as reducing their obligations under Cap and Trade. As the standard gets more stringent, the relative importance of avoided deficit generation grows, and once the standard matches the CI of the vegetable oil-based fuel the proposed cap is no longer a disincentive at all.

A stronger safeguard would treat fuels above the limit as equivalent to fossil diesel in both the LCFS carbon intensity and under the Cap and Trade policy. This is how a similar cap is implemented in Germany. If the proposed cap is indeed a sufficient disincentive and no fuels above the cap are produced, then this change will have no impact on the market. But it will provide a more effective assurance that the LCFS does not lead to use beyond the proposed cap.

172.5

Sustainability certification requirements should apply to wastes and residues: The LCFS has already transformed global markets for oils and fats, and the 15-day changes may intensify this by limiting vegetable oils without any limit on fats and used cooking oil. Waste oils are closely linked with reporting fraud, which has been under increasing scrutiny in the U.S. and Europe. To ensure the LCFS does not exacerbate this problem it is essential that CARB expands third-party certification requirements to include biofuels made from wastes and residues. The following comments from the International Council for Clean Transportation lay out the evidence of the risks and implementation details.

Waste oils have made up the largest share of BBD credits since the start of the LCFS program and are incentivized due to their low CI value relative to crop-based fuel pathways. Waste oils are closely linked with reporting fraud, which has been under increasing scrutiny in the U.S. and Europe. EPA is currently investigating two renewable fuel producers for used cooking oil (UCO) fraud and the EU is undergoing similar investigations.⁶ A renewed focus on fraud comes after a sharp rise in UCO imports from Asia, which grew from 0.4 thousand tonnes to 718 thousand tonnes between 2022 and 2023 alone.⁷

UCO fraud is prevalent due to the difficulty in distinguishing between filtered UCO and vegetable oil during chemical testing. The European Anti-Fraud Office has investigated cases where virgin vegetable oil was fraudulently labeled as UCO to avoid anti-dumping fees and benefit from national-level renewable energy incentives.⁸ In 2020, the Dutch company Sunoil forged sustainability certification scheme (SCS) certificates that credited crop-based biofuels as waste-based biofuels.⁹ Similar fraud schemes have occurred in the U.S. in early years of the Renewable Fuel Standard (RFS) program where biodiesel producers forged quality tests for UCO biodiesel as well as overstated production quantities that received RIN credits.¹⁰ An ICCT study that compiled data on UCO trade, collection rates, and resource potential in various Asian

⁶<https://www.reuters.com/business/energy/us-epa-says-it-is-auditing-biofuel-producers-used-cooking-oil-supply-2024-08-07/>; <https://www.reuters.com/sustainability/climate-energy/france-germany-urge-tougher-eu-checks-biofuel-imports-fraud-probe-2024-05-31/>

⁷<https://comtradeplus.un.org/TradeFlow?Frequency=A&Flows=M&CommodityCodes=151800&Partners=842&Reporters=all&period=2023&AggregateBy=none&BreakdownMode=plus>

⁸ https://anti-fraud.ec.europa.eu/system/files/2021-09/olaf_report_2019_en.pdf

⁹ <https://op.europa.eu/en/publication-detail/-/publication/ec9c1003-76a7-11ed-9887-01aa75ed71a1/language-en>

¹⁰ United States Department of Justice, "Pennsylvania Biofuel Company and Owners Sentenced on Environmental and Tax Crime Convictions Arising out of Renewable Fuels Fraud," news release, October 20, 2020, <https://www.justice.gov/opa/pr/pennsylvania-biofuel-company-and-owners-sentenced-environmental-and-tax-crime-convictions>.

countries found that UCO exports may already exceed volumes that are plausibly produced and imported.¹¹ This risk is exacerbated if BBD demand continues to grow due to policy incentives from federal and state-level fuel programs.

172.5
cont.

The use of third-party auditors such as those approved under CORSIA and the EU Renewable Energy Directive (RED) can help mitigate the risk of reporting and testing fraud; however, they cannot eliminate this risk entirely.¹² However, a third-party certification can still help to improve the integrity of waste oils credited within the LCFS. For example, the RSB certification for advanced biofuels includes detailed requirements for traceability of waste biomass, specifying that 1) collectors and aggregators in the waste supply chain maintain data and a mass balance system to track their material flows, 2) that collectors maintain evidence to track material back to its point of origin, and 3) that points of origin can be accessed and audited.¹³

EV base credits should be prioritized to support medium and heavy-duty electrification

The proposed language to issue base credits to light-duty vehicle OEMs is concerning and is a significant departure from CARB's initial proposal, which was to support truck electrification by updating the Clean Fuels Reward program to focus on new and used medium and heavy-duty vehicles (MHDV). Medium and heavy-duty vehicles are at an earlier stage of adoption than light-duty vehicles and their pollution has an outsized impact on freight-impacted communities. UCS continues to support using the base credits for MHDV electrification efforts under a revised Clean Fuel Reward Program or focusing on other electrification efforts that specifically advance equity in EV deployment.

172.8 The proposed amendments allowing the Executive Officer to return base credits to light-duty vehicle OEMs have several shortcomings, including:

- (1) The language as proposed would provide the Executive Officer with enormous discretion as to how base credits worth potentially hundreds of millions of dollars would be allocated with no oversight or public input on how the associated revenue would be spent.
- (2) It is unclear how the Executive Officer would allocate credits between OEMs. If credits are simply based on estimates of residential charging as a fraction of OEM market share or EV vehicle stock, this program will send the majority share of funds to dominant EV manufacturers like Tesla whose vehicles represent the largest share of EVs on the road. It is unclear how this distribution of funds would help the EV market overall.
- (3) The list of potential investments is extensive, ranging from rebates to marketing expenses. These are all activities which OEMs undertake in the normal course of business. While OEMs would need to disclose how they plan to spend the funds, there is no guarantee these investments would result in net increases in overall support for EV deployment (i.e. shuffling of OEM investments could occur).
- (4) A 7% administrative allowance is proposed with no justification. Utilities using holdback credits to implement equity-focused programs have indicated higher levels of administrative expenses. There are no equity program requirements for OEMs under this proposal and no justification for providing a 7% administrative allowance.

¹¹ https://theicct.org/wp-content/uploads/2023/02/US-UCO-potential_fs_final.pdf

¹² https://theicct.org/wp-content/uploads/2023/02/US-UCO-potential_fs_final.pdf

¹³ <https://rsb.org/wp-content/uploads/2020/06/RSB-STD-11-001-01-010-v.2.1-RSB-EU-RED-Standard-Adv-Fuels.pdf>

172.8
Cont.

(5) There is no sunset date for these provisions, meaning OEMs could continue to receive credits under these provisions in perpetuity regardless of the progress towards electrification.

While we do not support CARB moving forward with the proposed amendments, the issues stated above must be resolved should CARB decide to move forward. CARB should ensure OEM investments provide additionality by limiting the types of investments allowed and focusing on those that advance equitable EV deployment. Additionally, allowing MHDV OEMs to participate would allow for increased support of electric truck deployment. Sunsetting the provisions would ensure a future public opportunity to evaluate and revisit the program to ensure electricity credits are being used effectively to support an equitable transition to electric cars and trucks.

Add safeguards to direct air capture provisions

172.9

We are concerned that the lack of guardrails around the direct air capture provisions (DAC) could destabilize the LCFS and undermine its ability to support low carbon transportation fuel and California's climate goals. Federal subsidies or other private support for DAC could lead to a flood of credits that destabilize the LCFS credit market. We urge CARB not to wait until a problem occurs but to proactively limit credit generation for DAC to a small share of deficit generation, not more than 2.5 percent. Additionally, we urge CARB to adopt stringent requirements for low carbon electricity used for DAC to ensure the projects do not increase emissions elsewhere on the grid. We are concerned that the proposal "to harmonize the matching period for book-and-claim accounting for low-CI electricity for direct air capture projects [...] with the matching period for electricity used as a transportation fuel." will increase the matching period from one quarter to three, increasing the risk of increased emissions elsewhere on the grid.



August 27, 2024

California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812
[submitted electronically]

RE: Electric Hydrogen Comments on the Low Carbon Fuel Standard's August 2024 15-Day Comment Period

Dear California Air Resources Board,

Electric Hydrogen¹ appreciates the opportunity to submit comments to the California Air Resources Board (CARB) on the 15-Day Changes released on August 12, 2024. To address our proposed amendments, Electric Hydrogen would like to call on CARB to issue a second 15-day package.

With significant facilities, management groups, and employees in California and Massachusetts, Electric Hydrogen manufactures the world's most powerful electrolyzers for critical industries to produce low-cost green hydrogen. Our 100 MW electrolyzer plant is designed to generation-follow variable renewable energy resources and enable customers to efficiently convert renewable electrical energy into clean molecular energy in the form of hydrogen. Electric Hydrogen's mission is to make green hydrogen cost competitive with fossil hydrogen in a timeframe that matters. Put another way, the company exists to make green hydrogen an economic inevitability, giving hard to decarbonize industries, like heavy-duty transportation, aviation, and maritime transport, a viable and cost-effective solution to meet their urgent net-zero climate objectives. Green hydrogen is a necessary tool in the energy transition to a net-zero economy.

173.1 Given that the LCFS is fundamental to reducing carbon emissions from the transportation sector, Electric Hydrogen is appreciative of the proposed near-term increase in stringency to a 9% carbon intensity (CI) reduction in 2025.² This is an important step in helping to realize the climate benefits needed to reach California's environmental and clean energy goals.

To effectively leverage hydrogen for decarbonization, the state must significantly boost demand for green hydrogen. The LCFS program is essential in driving this demand within the transportation sector, fostering industry scale, and reducing green hydrogen costs across the economy. Scaling the industry is vital to supporting the 2022 California Scoping Plan for

¹ See <https://eh2.com/>

² Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information: Proposed Low Carbon Fuel Standard Amendments. California Air Resources Board, Aug. 2024, https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_notice.pdf.

173.1 Cont. Achieving Carbon Neutrality, which indicates that California must increase green hydrogen production by 1700-fold to meet its net-zero goal by 2045.³ Additionally, the LCFS program is crucial for advancing statewide clean energy objectives, including the clean hydrogen hub through the Alliance for Renewable Clean Hydrogen Energy System. Since California's LCFS program frequently serves as a model for other low-carbon initiatives across the U.S., it is crucial to ensure it sends the right market signals to effectively expand the clean hydrogen economy.

173.2 As stated in comments submitted in response to the April 10 LCFS Workshop⁴ and the December 2023 Proposed 2024 LCFS Amendments,⁵ Electric Hydrogen recommends that CARB make the following two amendments to ensure that the LCFS is fully optimized to drive green hydrogen production, displace fossil fuels, and deliver air quality benefits:

- **Amendment 1:** Allow book-and-claim delivery of low-CI electricity for electrolytic hydrogen production used as a feedstock in transportation fuel.
- **Amendment 2:** Allow book-and-claim delivery of low-CI hydrogen in dedicated hydrogen pipelines outside of California.

173.3 The first amendment is critical to encouraging the replacement of natural gas with green hydrogen as a feedstock, specifically in the production of sustainable aviation fuel (SAF). Over 30 refineries around the country, including seven in California, produce renewable diesel and/or SAF for the California transportation market. These refineries currently use steam methane reformers (SMRs) to reform natural gas into hydrogen for fuel processing and production. The 15-Day Changes' prohibition on the use of book-and-claim delivery of low-CI electricity for the production of electrolytic hydrogen used as a feedstock effectively locks in the use of SMRs and prohibits these refineries from switching their hydrogen source to electrolytic hydrogen. This prohibition perpetuates significant local air pollution and greenhouse gas (GHG) pollution for communities adjacent to these refineries. The median SMR in California emits as much as 80 tons of fine particulate matter, 132 tons of NOx, and 777,274 tons of CO2 annually. While the 15-Day Changes allow these refineries to utilize book-and-claim accounting to source renewable natural gas (RNG) to mitigate GHG emissions, sourcing RNG at these facilities does nothing to reduce local air pollution for vulnerable communities adjacent to the refineries. Extending book-and-claim accounting beyond RNG to renewable electricity would allow these facilities the option to replace their SMRs with electrolyzers to lower or eliminate both local air pollution and GHG emissions.

³ 2022 Scoping Plan for Achieving Carbon Neutrality. California Air Resources Board, Dec. 2022, <https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>.

⁴ Electric Hydrogen Comments on Low Carbon Fuel Standard April 10, 2024, Workshop. Available at: https://ww2.arb.ca.gov/system/files/webform/public_comments/11301/2024.05.10_EH2_LCFS_Workshop_Comments_Final.pdf.

⁵ Electric Hydrogen Comments on Proposed 2024 LCFS Amendments. Available at: <https://www.arb.ca.gov/lists/com-attach/6869-lcfs2024-AGVUPgZiAjIFd1cl.pdf>



173.4 Failing to provide equal treatment to RNG and renewable electricity as it relates to the use of book-and-claim accounting is also a missed opportunity to drive investment in the green hydrogen industry into California. Under the European Union's (EU) third Renewable Energy Directive (RED III), the EU is requiring refineries to use at least 42% green hydrogen by 2030 and 60% by 2035. This policy is driving significant investment into the EU. For example, just last month green hydrogen developers in the EU took final investment decisions (FID) on 730 megawatts of green hydrogen projects in the EU. Allowing refineries to utilize book and claim delivery of low-CI electricity for electrolytic hydrogen production could unlock similar investment in California.

The second amendment would provide fuel producers with greater access to green hydrogen to lower the carbon intensity of their liquid transportation fuels. Today, California has only 16 miles of dedicated hydrogen pipelines. However, nationwide there are about 1,600 miles of dedicated hydrogen pipelines, 90% of which are concentrated in the Gulf Coast.⁶ Since this existing hydrogen pipeline infrastructure network serves a variety of industrial customers, it can also be a tool to help ensure California has access to the low-cost and low-carbon fuels needed to support the state's climate and air quality goals. As the proposed changes are currently written, however, the vast network of Gulf Coast hydrogen pipelines would not be eligible for book-and-claim within the LCFS. As a result, the state's access to low-cost, low-carbon fuels is restricted, which runs

173.5a counter to the findings of the 2022 Scoping Plan and the state's broader climate goals. However, if amended as outlined, the LCFS program would help facilitate an influx of clean fuels, such as SAF made with green hydrogen, to reduce emissions in California.

173.5b In summary, Electric Hydrogen is appreciative of CARB's near-term increase in stringency for the LCFS but believes it must better support the development of a robust electrolytic hydrogen market. Amending the book-and-claim pathways as outlined will help California become a leader in the green hydrogen economy by supporting clean technology innovation, encouraging the transition away from natural gas, and improving local air quality for front-line communities. In this way, the LCFS would help support the statewide clean hydrogen hub and underpin the state's broader climate and air quality goals. Electric Hydrogen appreciates CARB's consideration of the proposed amendments and looks forward to continuing to work with CARB on this critical effort.

Sincerely,

/s/ Paul Wilkins

Paul Wilkins

Vice President for Policy and Government Engagement

Electric Hydrogen

⁶ Justin Bracci, Adam Brandt, Sally M. Benson, Gireesh Shrimali and Sarah D. Saltzer, "Pathways to Carbon Neutrality in California: The Hydrogen Opportunity", Stanford Center for Carbon Storage and Stanford Carbon Removal IniKaKve, February 2022, page 25.



August 27, 2024

California Air Resources Board
1001 I Street
Sacramento, California 95814
Via electronic submittal

Re: Comments on Proposed 15-day Changes, Proposed Amendments to the Low Carbon Fuel Standard (LCFS) Regulation

Dear Chair Randolph and Board Members:

The undersigned organizations are pleased to submit comments specifically on the use of credits generated by electricity used as a transportation fuel. We believe that credits representing non-metered residential electric vehicle (EV) charging should be used to benefit our disadvantaged and low-income communities that have suffered the greatest impacts of transportation pollution. These communities also face the greatest barriers to adopting clean transportation. The 15-day changes would not serve those communities as well as the previous proposal, so we recommend the following:

1. The majority of the statewide program's funding should be directed toward speeding the transition to zero-emission transportation in the medium and heavy-duty sectors. Pollution and adverse health effects from heavy-duty transportation are primarily and disproportionately borne by low-income communities and communities of color. The transition to zero-emissions (ZE) transportation in those sectors is essential to meeting our air quality and climate standards; this transition is well behind the pace of the light-duty sector, so prioritizing medium and heavy-duty is appropriate.
2. Any light-duty EV incentives funded by LCFS credits, whether administered by Electricity Distribution Utilities (EDUs) or Original Equipment Manufacturers (OEMs), should be targeted only to low and moderate-income Californians. Achieving air quality and climate standards requires a focus on equity, so that all our residents benefit from access to clean transportation. Credits should go to assuring that successful existing programs like Clean Cars 4 All are fully funded, as well as supporting innovative new approaches.

174.3

3. CARB should retain and enhance the existing category of "Multilingual marketing, education and outreach" within the list of pre-approved projects eligible for funding by holdback credits. Equity-focused community groups and stakeholders participating in CARB work groups are consistently asking for greater investment in this area, and specifically for investments that directly fund local community-based organizations (CBOs) who are trusted in priority communities and are best able to support Californians facing the highest barriers to transitioning to EVs. This would also align with how the proposed 15 day changes explicitly add "marketing and outreach programs" as an approved use of base credit proceeds by the OEMs, and create critical opportunities for coordination and collaboration. We recommend that this category be retained in the revised regulations and amended to explicitly pre-approve investments in outreach through CBOs.

Thank you for your consideration.

Sincerely,

Bill Magavern
Coalition for Clean Air

Román Partida-López
The Greenlining Institute

Zach Franklin
GRID Alternatives

Maya Golden-Krasner
Center for Biological Diversity

Maya Iñigo-Anderson
Communities for a Better Environment

Kevin D Hamilton
Central California Asthma Collaborative

David Reichmuth
Union of Concerned Scientists

Bobbi Jo Chavarria
Sierra Club California



SIERRA PACIFIC INDUSTRIES

Forestry Division • PO Box 496014 • Redding, CA 96049-6014 • (530) 378-8000

August 27, 2024

Clerk's Office
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Submitted via electronic mail to: <https://ww2.arb.ca.gov/lispub/comm/bclist.php>

**RE: Public Comment on Proposed Amendments to the Low Carbon Fuel Standards – 15 Day
Public Notice**

Executive Officer Cliff,

Sierra Pacific Industries (SPI) respectfully submits this comment letter in response to the 15-day public notice for the proposed amendments to the Low Carbon Fuel Standards (LCFS). We also support the comments submitted by the California Forestry Association (Calforests), et al.

We appreciate the opportunity to offer our perspective on these amendments, particularly as they pertain to the treatment of forest biomass as a feedstock for low carbon fuels as provided in Title 17, CCR Sections 95488.8 and 95488.9, respectively.

SPI is a third-generation family-owned forest products company, headquartered in Anderson, California. While we have operations across the United States, California represents the majority of our operations, including over 3600 employees, 1.9 million acres of sustainably managed timberland, 10 sawmills, several secondary manufacturing plants (i.e. millwork, chips and bark), five biomass energy co-generation facilities, and windows & doors manufacturing operations.

SPI is committed to sustainable, long-term stewardship of our lands and partners with state and federal agencies to address a variety of environmental values. Sierra Pacific has several ARB-compliance grade offset projects, all of which are on our California timberlands. We operate under several federal and state wildlife conservation agreements for the safeguarding of habitat for listed and at-risk species, including California spotted owls, northern spotted owls, Pacific fisher and salmon. We are committed to reduce the risk of catastrophic wildfire, including operating under an MOU with the U.S. Forest Service, CAL FIRE, National Fish and Wildlife Foundation, neighboring property owners and several other signatories for a jointly planned and implemented fuel break network in California to provide for wildfire risk reduction and habitat protection.

A theme woven through these local, state and federally recognized agreements is SPI's commitment to maintain healthy forests. Importantly, these commitments are a reflection of the foundational principle that sustainably managed forests provide the greatest number of economic and environmental benefits – for products, for communities and for ecosystems.

This foundational principle is also reflected in the Intergovernmental Panel Climate Change report that finds “in the long-term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fibre or energy from the forest, will generate the largest sustained mitigation benefit” to the atmosphere. Further, the IPCC stated that “Mitigation options by the forestry sector include extending carbon retention in harvested wood products, product substitution, and producing biomass

for bio-energy. This carbon is removed from the atmosphere and is available to sustainably meet society's needs for timber, fiber, and energy."

With that background, SPI provides the following comments and recommendations.

Need For Definitional Distinctions between Agricultural Crop Feedstocks and Forest-Derived Feedstocks.

175.2

While agricultural crops and forest-derived feedstocks have some commonality, there are significant differences in how they are grown, their existing markets, and land ownership structures and strategies. Most agricultural crops, such as rice and corn, reflect an annual cycle of planting, harvesting, tilling and planting again. Forest-derived feedstocks have a much longer cycle – varying between 50-80 years in California, though there may be periodic (i.e. every 20-40 years) treatments where smaller diameter trees are thinned out and other brush removed. Additionally, a harvested tree has several components – many that have current markets (i.e. logs for lumber and plywood) and others that have little to no markets in California (i.e., treetops and branches).

In many places throughout the proposed amendments, there are definitions that fit well for agricultural crops, but not for forest-derived feedstocks. Specifically, the definition in 95488.9(g) excludes forest-derived biomass as it requires biomass to, among other things, come from land that has been "...non-forested since January 1, 2008." As a result, except for that biomass definition in section 95488.8(g)(1)(A), all forest-derived feedstocks are excluded. We recommend a definition in this section that provides a pathway for forest-derived feedstocks to qualify, such as:

Agricultural-derived biomass used in fuel pathways must only be sourced on land that was cleared or cultivated prior to January 1, 2008, and actively managed or fallow, and non-forested since January 1, 2008. Forest-derived biomass used in fuel pathways must only be sourced on forestlands established before January 1, 2008. Biomass may not be sourced from land that is covered under international or national law or by the relevant competent authority for nature protection purposes.

Exclusion of Timberlands from Wildfire Risk Reduction Efforts

175.3

While the Initial Statement of Reasons suggests that these standards are intended to reduce wildfire risk, the definition in section 95488.8(g)(1)(A) excludes large portions of timberlands where innovative solutions are being implemented to reduced risk to catastrophic wildfire. For example, Sierra Pacific is establishing a network of 3300 miles of fuel breaks across our lands. Much of these fuel breaks are tied to projects on neighboring lands in a complete and coordinated network that crosses ownership types. This fuel break network will require ongoing maintenance which will produce materials that are appropriate feedstock for low carbon fuel production. However, the current definition would preclude this material from qualifying as SPI's lands are not likely to be considered "non-industrial forestlands." The inclusiveness of all land ownership types in these standards will aid in the creation and success of these fuel break networks by making more projects viable for implementation and continual maintenance.

We recommend a more inclusive definition to "forest biomass waste" to be used for within Title 17, CCR 95488.8(g)(1)(A)3.

"Forest Biomass Waste" means residues that are 1) removed for wildfire mitigation, forest restoration projects, or the protection of public safety, or 2) small-diameter, non-merchantable residues, limited to forest understory vegetation, ladder fuels, limbs, branches, and logs that do not meet regional minimum marketable standards for processing into wood products."

Sustainable Management and Regulatory Oversight

175.4

The timberlands in question are managed sustainably under strict regulatory requirements. Excluding these lands from the scope of the LCFS amendments overlooks their potential contribution to low carbon fuel production while maintaining environmental sustainability. California provides the highest standards for environmental protection in the United States and globally under the state's Forest Practice Rules when harvesting of trees occurs within the state. These rules ensure sustainability and protection of all resources for the good of the state. The LCFS must promote the utilization of these resources where environmental protection is paramount rather than sourced from areas with lower standards of protection.

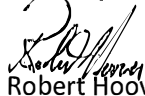
Confusion Regarding Third-Party Certification Requirements

175.5

The Initial Statement of Reasons, along with the proposed amendments provided in the 15-Day rule text lack clarity on whether woody feedstocks must originate from lands that are third-party certified. Conflicting language within the rulemaking documents raises concerns about whether non-industrial landowners, who are less likely to hold third-party certifications, would be excluded from participating in the program. If this is the case, constriction on availability of feedstocks and reduced participation from non-industrial landowners would be a certainty given that very few non-industrial timberland owners hold and maintain third -party forest sustainability certifications, like the Sustainable Forestry Initiative, Forest Stewardship Council and others recognized through the Programme for the Endorsement of Forest Certification.

We appreciate the consideration of these comments. We look forward to working with the California Air Resources Board on developing an LCFS program that will assist in ameliorating wildfire and forest health issues within California.

Sincerely,



Robert Hoover

Vice President, Resources
Sierra Pacific Industries

The Honorable Liane M. Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

August 27, 2024

RE: Comment on Draft Amendments to the Low Carbon Fuel Standard (LCFS) Regulation 15-day Changes

Dear Chair Randolph,

On behalf of the Low Carbon Fuel Coalition Working Group on Biomass, we appreciate the opportunity to comment on the Draft Amendments to the LCFS Regulation. We support the LCFS program's objectives and offer the following recommendations regarding the inclusion of biomass feedstocks:

Modifications to Section 95488.8 - Fuel Pathway Application Requirements:

- We support the inclusion of forest waste biomass feedstocks as specified source feedstocks.
- 176.1 • CARB has not provided a clear path forward for thinning and slash. The proposed regulation conflicts with the RFS, posing a major challenge for fuel producers. We recommend reintroducing the condition that forest biomass can be used if it is cut for "forest stand improvement" in addition to wildfire abatement. The EPA's requirement for the categorization of thinnings includes a stipulation that the thinning process is required to increase the productivity of surrounding trees¹. Forest thinnings and slash are a key resource for sustainable fuel production. These materials participate in sustainability certifications such as Forest Stewardship Council (FSC).
- 176.2 • We propose the following amendment to the definition to include qualified feedstock from industrial forestlands:

"Forest biomass waste from forestlands removed for the purpose of wildfire fuel reduction or forest stand improvement, to reduce the risk to public safety or infrastructure, to create defensible space, or for forest restoration; and was performed in compliance with all local, State, and federal rules and permits."
- 176.3 • Restricting qualified forest biomass feedstock to "non-industrial forestlands" will significantly limit the material available for cellulosic biofuels projects. Industrial forestland owners are essential for offering reliable long-term supply agreements necessary for project financing. We urge CARB to allow qualified biomass from industrial forestlands.
- The proposed exclusion of industrial forestlands and the exclusion of materials removed for forest stand improvement as specified source feedstocks were added to the 15-day package

¹ 40 CFR §80.2 RFS (Definitions) <https://www.ecfr.gov/current/title-40/section-80.2>

176.3 Cont. without any discussion or public comment. We believe that CARB could address appropriate biomass resources as part of the review of certification schemes.

Modifications to Section 95488.9 - Special Circumstances for Fuel Pathway Applications:

- 176.4
- We have concerns about the proposed sustainability certification requirements. CARB is requiring certifications for well-established and previously recognized waste biomass unless specifically enumerated in 95488.8(g)(1)(A).
 - The proposed rules could preclude the use of corn stover or sugarcane straw for process heat in ethanol production and preclude the use of corn kernel fiber as a feedstock for ethanol unless proven to arise from certified sustainable operations, despite the fact that these biomass types have been previously approved as waste feedstocks.

Thank you for your consideration. We look forward to working together to strengthen the LCFS program.

Sincerely,

ROBIN VERCRUSE
Executive Director
LOW CARBON FUELS COALITION

STEFAN UNNASCH
Managing Director
LIFE CYCLE ASSOCIATES

MICHAEL C. DARCY
Chairman & CEO
DG FUELS, LLC

CHRISTOPHER EFIRD
Chairperson and CEO
NXTCLEAN FUELS, INC.

JEFF MCDANIEL
VP New Projects
VELOCYS

DAN SHAPIRO
CEO
FIDELIS NEW ENERGY, LLC

JOSHUA P. WILSON
Senior Regulatory Counsel
POET



August 27, 2024

California Air Resources Board
1001 I Street
Sacramento, California 95814
Via electronic submittal

Re: Comments on Proposed 15-day Changes, Proposed Amendments to the Low Carbon Fuel Standard (LCFS) Regulation

Dear Chair Randolph and Board Members:

The Coalition for Clean Air has long supported the Low Carbon Fuel Standard as an essential tool for reducing harmful emissions from the transportation sector, California's largest source of both air and climate pollution. The LCFS supports both the end goal of achieving zero-emission transportation and the interim goal of substituting low carbon renewable fuels for gasoline and diesel during the current period when we still have combustion vehicles on the road. Meeting California's greenhouse gas emission caps under SB 32 and AB 1279 will require more rapid progress in phasing out petroleum fuels in the transportation sector, our largest source of climate-changing emissions. Alongside CARB's regulations and incentives for deploying cleaner engines, and the state's as-yet unrealized targets for reducing vehicle miles travelled, the LCFS provides a vital tool for curbing transportation emissions, as reiterated by the 2022 Scoping Plan Update, which calls for a 94% reduction in petroleum use and identifies the LCFS as a key route to that goal. Because of the magnitude of our air pollution and climate crises, we now need the LCFS to both work harder, through greater stringency, and work smarter, by incenting the cleanest fuels and avoiding harms to communities.

We recommend the following:

Further limit crediting of crop-based biofuels.

177.1 CARB should establish additional guardrails to prevent incentivizing conversion of crop lands to fuel production, which exacerbates already-existing food shortages in much of the world. While biofuels made from wastes can provide a net climate benefit, using productive land to produce fuel is detrimental to the climate, because carbon-absorbing natural land elsewhere will be converted into crop production.

177.2 We agree with the new proposals to increase stringency, enable an end to new bio-based diesel pathways after 2030 and to allow the Executive Officer to assign more conservative LUC values when warranted by empirical data. But these measures and the proposed 20% limit on bio-based diesel from soy and canola, while they go in the right direction, are unlikely to be sufficient to prevent the LCFS from being swamped with soy-based diesel fuels that are shuffled in from other states, depressing LCFS credit values and providing no additional benefit to our climate, because they are already required for compliance with the Federal Renewable Fuel Standard. Ultimately, these fuels should be phased out of the LCFS.

Remove the exemption for aviation fuel by 2026 for both intrastate and interstate flights.

- 177.3 After previous proposals to remove the exemption for aviation fuel received resounding support from both the public and the Board, it is deeply disappointing to suddenly see a proposal to backtrack and continue exempting fossil jet fuel. Conventional jet fuel should be held to the same standard as other petroleum-based transportation fuels. California currently lacks a comprehensive plan for decarbonizing aviation fuels, and including conventional aviation fuel as a deficit generator under the LCFS would help to spur innovation in cleaner fuels and equipment. Cleaning up aviation fuels and equipment will also help protect the health of workers and communities who are most exposed to the emissions from this sector.

Allow crediting in the marine sector.

- 177.4 We urge CARB to allow credits for zero-emission transportation fuels used for ocean-going vessels, and to simplify the process for credits for shore power installations serving electrified harbor craft and for dispensing green hydrogen. The marine sector is a substantial source of emissions in much of the state, and the LCFS can spur conversion to cleaner fuels and support CARB's regulations of ocean going vessels and commercial harbor craft.

Include Plastics in the Definition of Petroleum Product.

- 177.5 We support the proposed change in the definition of "Petroleum Product" that would strike the exemption for plastics and plastic products. Global plastic production is a major driver of climate change. Therefore, it is important that the LCFS not incent the production of plastic or plastic waste.

Regulate methane emissions from large dairies.

- 177.6 This issue is not included within the four corners of the LCFS rulemaking but is related. Dairies are the largest California source of methane, a potent short-lived climate pollutant. CARB should require the large dairies to reduce their emissions of both manure and enteric methane. The regulations should also strive to protect local communities from the adverse impacts of large-scale dairy production.

Use credits representing non-metered residential electric vehicle (EV) charging to benefit our disadvantaged and low-income communities that have suffered the greatest impacts of transportation pollution.

These communities also face the greatest barriers to adopting clean transportation. The 15-day changes would not serve those communities as well as the previous proposal, so we recommend the following:

- 177.7 1. The majority of the statewide program's funding should be directed toward speeding the transition to zero-emission transportation in the medium and heavy-duty sectors. Pollution and adverse health effects from heavy-duty transportation are primarily and disproportionately borne by low-income communities and communities of color. The transition to zero-emissions (ZE) transportation in those sectors is essential to meeting our air quality and climate standards; this transition is well behind the pace of the light-duty sector, so prioritizing medium and heavy-duty is appropriate.
- 177.8 2. Any light-duty EV incentives funded by LCFS credits, whether administered by Electricity Distribution Utilities (EDUs) or Original Equipment Manufacturers (OEMs),

177.8 Cont. should be targeted only to low and moderate-income Californians. Achieving air quality and climate standards requires a focus on equity, so that all our residents benefit from access to clean transportation. Credits should go to assuring that successful existing programs like Clean Cars 4 All are fully funded, as well as supporting innovative new approaches.

177.9 3. CARB should retain and enhance the existing category of "Multilingual marketing, education and outreach" within the list of pre-approved projects eligible for funding by holdback credits. Equity-focused community groups and stakeholders participating in CARB work groups are consistently asking for greater investment in this area, and specifically for investments that directly fund local community-based organizations (CBOs) who are trusted in priority communities and are best able to support Californians facing the highest barriers to transitioning to EVs. This would also align with how the proposed 15 day changes explicitly add "marketing and outreach programs" as an approved use of base credit proceeds by the OEMs, and create critical opportunities for coordination and collaboration. We recommend that this category be retained in the revised regulations and amended to explicitly pre-approve investments in outreach through CBOs.

Thank you for your consideration.

Respectfully,

A handwritten signature in black ink that reads "Bill Magavern". The signature is written in a cursive, flowing style.

Bill Magavern
Policy Director
Coalition for Clean Air



August 27, 2024

California Air Resources Board
Low Carbon Fuel Standard Program
1001 I St.
Sacramento, CA 94814

RE: American Biogas Council Comments on the 15-Day Changes Amendments to the Low Carbon Fuel Standard

Dear Chair Randolph and Members of the Board,

The American Biogas Council (ABC) appreciates the opportunity to comment on the proposed 15-Day changes amendments to the Low Carbon Fuel Standard (LCFS). The ABC is the voice of the U.S. biogas industry dedicated to maximizing carbon reduction and economic growth using biogas systems. We represent more than 400 companies leading the way to a better future by maximizing all the positive environmental and economic impacts biogas systems offer when they are used to recycle organic material into renewable energy and soil products. All of this is an effort to protect our air, water, and soil – crucial parts of the solution our members provide to help California meet its environmental and climate goals. The scientifically-based design of the LCFS recognizes the benefits of projects that collect biomethane that would otherwise be emitted to the atmosphere making it available for use in transportation. Millions of gallons of petroleum-based diesel fuel have been replaced with clean biomethane over the past several years delivering substantial reductions in greenhouse gas (GHG) emissions as well as other co-benefits (e.g., reductions in emissions of particulate matter). Furthermore, in August 2023, the California Air Resources Board (CARB) announced that in Q1 2023 clean fuels replaced more than 50% of the diesel used in the state for transportation purposes, equating to nearly two billion gallons of avoided fossil diesel use in 2022.¹ This further underscores the success of the program and continued need for the LCFS to deliver GHG reductions from the transportation sector.

Carbon Intensity (CI) Benchmarks

Over the past two years, CARB staff have held numerous public workshops to gather feedback on potential changes to the program, where ABC participated, and we are happy to see that the rulemaking is nearing completion. Following the release of the 45-day package in December 2023 and subsequent stakeholder feedback urging CARB to increase the carbon intensity (CI) step-down from the proposed 5%, we are pleased to see that staff have proposed a more aggressive step-down of 9% in the 15-day changes. This is a much-needed market correction, to align targets with available supply, which has been delivered to the LCFS program in excess in recent years, creating a credit bank. While this alone will not fully address the oversupply of credits in the cumulative credit bank, this single adjustment will translate into millions of additional tons of GHG emission reductions that would've otherwise gone unabated.

Furthermore, while not significantly modified in the 15-day changes, the ABC would like to reiterate its support for the Auto-Acceleration Mechanism (AAM). The AAM is a necessary complement to the CI target adjustment and as designed, will send a clear, supportive, and unambiguous market signal to continue investments in clean fuels by tightening the program in the event overperformance occurs. Adoption and implementation of this

¹ California Air Resources Board. *For the first time 50% of California Diesel Fuel is replaced by clean fuels.* August 23, 2023. <https://ww2.arb.ca.gov/news/first-time-50-california-diesel-fuel-replaced-clean-fuels>

mechanism will ensure that potential emission reductions are not left on the table and will help California reach its climate goals faster if triggered.

Avoided Emissions Crediting

178.1

The proposed amendments in the 45-day package seek to phase out avoided emission pathways for projects that break ground after December 31, 2029, for biomethane used as a transportation fuel through 2040 and for biomethane used to produce hydrogen through 2045. The 15-day changes aim to expand this phase out to projects breaking ground before January 1, 2030, restricting the total number of crediting periods for avoided methane emissions from three consecutive 10-year periods to two. The ABC does not support the phase out of avoided emission crediting in the 45-day package, nor the expanded scaling back from three to two 10-year crediting periods. Eliminating the third 10-year crediting period while facilities still incur operational and maintenance costs places them at a significant disadvantage, potentially leading to shutdowns. This would make flaring emissions more economically viable than capturing methane and bearing the ongoing expenses associated with producing biomethane for use as transportation fuel. Emission reductions continue to occur for the life of the methane capture project (i.e., the biomethane digester's asset life). Therefore, the crediting period for avoided emissions should mirror the asset life of the capture technology, which is greater than 20 years. Additionally, despite the state regulations like Advanced Clean Trucks and Advanced Clean Fleets, CARB should be looking to retain the practice of recognizing avoided methane emissions as a scientifically robust safeguard in the event that the goals stated in these regulations are not met by their respective target date, resulting in more combustion trucks on the road than anticipated. Scaling back to two crediting periods is not necessary and removes the providing an effective backstop in the event there are disruptions with the implementation of the zero emission truck programs. Considering the requirements that CARB is pursuing via deliverability provisions for out of state biomethane, retaining three 10-year crediting periods is even more important to ensure sufficient supplies are available, and to avoid unintended consequences.

As previously noted in our February 16, 2024, comment letter responding to the proposed amendments in the 45-day package, avoided methane emissions are a critical part of science-based life cycle assessments, and their inclusion in CI scores is consistent with internationally recognized standards of carbon accounting. While the ABC understands CARB's intention is to better align the proposed end dates for avoided emission pathways with its mobile source regulations focused on transitioning to electric vehicles, the underlying rationale is being construed by some as science-driven fact rather than a policy decision. Thus, CARB should be explicit that the policy decision to eventually discontinue avoided emissions crediting should not be interpreted as a departure from the established and rigorous science of accounting for the benefits of avoided methane emissions but rather policy oriented.

Additionally, the ABC is requesting that CARB consider adding language to Section 95488.9(f)(3)(A) to further clarify what projects are eligible by adding electricity under the following sentence: *"For pathways for biomethane used to produce hydrogen or electricity that break ground after December 31, 2029, the Executive Officer may only approve avoided methane crediting through December 31, 2045."* The proposed modification is ambiguous seeing as it was also not added to the book-and-claim portions of the regulation.

Deliverability

178.2

First, the ABC would like to reiterate that we do not believe the addition of deliverability requirements under the program is necessary. The proposal unnecessarily complicates the program, disadvantages out of state projects that produce low CI-biomethane, and increase program costs without providing any commensurate environmental benefits. Even with deliverability requirements, there will be no change to the way molecules flow through the gas system compared to today. Rather, deliverability requirements will increase costs to renewable fuel producers and will result in a more limited supply coming into California, which will put California in a tougher position to meet their climate goals. The 15-day changes added a provision to section 95488.8(i)(2) that would allow the Executive Officer to approve a gas system map that identifies transcontinental and connected pipelines for which gas flows to California at least 50% of the time. Should the Executive Officer approve this map before July 1, 2026, then entities reporting under bio-CNG, bio-LNG, and bio-L-CNG must demonstrate physical flow to the state 50% of the time after December 31, 2037, not January 1, 2041.

178.2
Cont.

While it appears that the addition of a gas flow map, for which the Executive Officer isn't technically required to approve, may address some implementation questions, this modification does not address the overall lack of detail with the proposal or the reality that an implementation date of 2037 or 2041 will be difficult to achieve. As mentioned in our February 16, 2024, comments, the ABC believes that CARB should require further guidance on the proposed deliverability requirements as they lack detail. The proposed amendments aim to adopt the California Renewable Portfolio Standard (RPS) requirement of ensuring biomethane injected into a common carrier pipeline physically flows towards California 50% of the time. Yet, the referenced RPS framework does not provide any clarity on how these biomethane molecules can be traced to California, how a 50% average flow toward California may be modeled, nor expected geographical indications of regions anticipated to remain eligible for book-and-claim accounting. While the proposed map may aid geographical clarity for some projects, those projects that remain outside geographic boundaries, but may otherwise be able to demonstrate deliverability, are left without clear guidance on how they may meet the requirements. We look forward to discussing these provisions with CARB staff in the coming year and highly encourage CARB to conduct a full and transparent public process to inform any gas maps the Executive Officer may consider.

True-Up Provision

178.3

The ABC is pleased to see the proposed amendments to expand the credit true-up to include periods using temporary pathway CIs after annual verification following stakeholder input highlighting the benefits of the credit true-up. Based on our understanding of the language, reporting that is submitted March 31, 2025, will cover the years 2023-2024 and include a credit true-up back to 2023. The proposal includes true-up provisions that adjust credits based on verified operational CIs relative to certified CIs, applying a penalty of four times the spread for shortfalls; however, the justification for this 4X multiplier is unclear, as a smaller multiplier, such as 2X, would still effectively discourage overconfidence in CI analysis. Lastly, we urge CARB to establish a temporary CI pathway for biogas-to-electricity projects, as the absence of such a pathway currently puts biogas-to-electricity at a disadvantage compared to biomethane projects, which already have access to temporary CI pathways.

Definitions

178.4

The ABC believes that the modification made to the definition of "Food Scraps" in the 15-day changes does not accurately reflect the spectrum of food waste feedstocks that are landfilled and can support the production of clean renewable transportation fuels. Thus, we propose the following change to the definition of "Food Scraps", which is shown in italics:

"Food Scraps" is the portion of municipal solid waste (MSW) that consists of inedible or post-consumer food collected from residences, hospitality facilities, institutions, and grocery stores, *as well as organic waste materials from industrial food manufacturing and distribution facilities that cannot be eaten by people or animals*. Feedstocks that are not typically landfilled do not qualify as Food Scraps, which include: fats, oils, or greases (FOG), and liquids at the point of collection.

Biomethane derived from food waste is an important decarbonization tool and is necessary to meet the state's climate goals, specifically the state's landmark organic waste diversion law, SB 1383. The currently proposed definition assumes that pre-consumer food waste and food processing wastes including liquid wastes are not landfilled, which is incorrect. Further clarification is needed to illustrate that many of these pre-consumer wastes are often landfilled, and therefore, should be able to qualify for a pathway given that sufficient documentation that it was landfilled is provided as it is a requirement for certification of a LCFS pathway.

Thank you for the opportunity to comment on the modified amendments, and we look forward to engaging with CARB staff on these topics.

Sincerely,



Patrick Serfass, Executive Director

About the American Biogas Council The American Biogas Council is the voice of the US biogas industry dedicated to maximizing carbon reduction and economic growth using biogas systems. We represent more than 400 companies in all parts of the biogas supply chain who are leading the way to a better future by maximizing all the positive environmental and economic impacts biogas systems offer when they recycle organic material into renewable energy and soil products. Learn more online at www.AmericanBiogasCouncil.org, Twitter [@ambiogascouncil](https://twitter.com/ambiogascouncil), and [LinkedIn](https://www.linkedin.com/company/ambiogascouncil).



August 27, 2024

Chair Liane Randolph and Members of the Board
 California Air Resources Board
 1001 I Street
 Sacramento, CA 95814

Re: Sacramento Municipal Utility District's Comments on the Proposed 15-Day Changes to the Low Carbon Fuel Standard Amendments

The Sacramento Municipal Utility District (SMUD) appreciates the opportunity to provide comments on the California Air Resources Board's (CARB or Board) Proposed 15-Day Changes to the Proposed Amendments to the Low Carbon Fuel Standard Regulation issued on August 12, 2024 (Proposed Amendments).¹ The Low Carbon Fuel Standard (LCFS) serves as a critical policy tool to complement and support SMUD and others in the effort to eliminate emissions from the transportation sector.

179.1

While SMUD continues to support many elements of the Proposed Amendments, SMUD is deeply concerned about the practical implications of newly introduced provisions that would allow the Executive Officer to assign base credits to the original equipment manufacturers (OEMs). As drafted, these provisions have the potential to significantly disrupt electric distribution utility (EDU) holdback programs as well as EDU planning and implementation of the newly refocused medium- and heavy-duty (MHD) vehicle Clean Fuel Reward (CFR) program. SMUD is also disappointed that many of SMUD's and the California Electric Transportation Coalition's (CaETC) recommended revisions to the amendments issued on December 19, 2023 (45-Day Language), which were necessary to support clear, consistent, and effective implementation, were not addressed within the Proposed Amendments.^{2,3}

SMUD offers the following recommendations on the Proposed Amendments and respectfully requests that CARB issue additional 15-day changes to address these issues. SMUD is additionally a signatory to the "CA Utilities" comments submitted August 27 and also supports the comments submitted by CaETC on the same date.

The Proposed Amendments must expressly clarify that any base credit allocation to OEMs would not reduce *individual* utilities' holdback credits, which provide vital support for transportation electrification investments and programs.

Under the existing regulations, EDUs are assigned base credits and contribute a specified percentage of those credits to the statewide CFR. The remaining base credits ("holdback

¹ Notice of Availability of Modified Text and Availability of Additional Documents and/or Information, Proposed Low Carbon Fuel Standard Amendments (August 12, 2024) *available at* https://www.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_notice.pdf.

² Sacramento Municipal Utility District's Comments on the Proposed Amendments to the Low Carbon Fuel Standard (February 20, 2024) *available at* <https://www.arb.ca.gov/lists/com-attach/6970-lcfs2024-AXJROgRwBTIKU1lx.pdf>.

³ CaETC's Comments on the Proposed Amendments to the Low Carbon Fuel Standard (February 20, 2024) *available at* <https://www.arb.ca.gov/lists/com-attach/6856-lcfs2024-UjFQN1Y7UGYKeFU2.pdf>.

credits”) are used to support specified transportation electrification investments, including investment in equity programs. Holdback credits provide crucial funding support for programs that help expand equitable access to electric vehicles (EVs) and electric mobility options without impacting ratepayers – which is increasingly important as rising costs and other factors challenge affordability across the state.

Section 95483 (c)(1)(A) and (B) of the Proposed Amendments would significantly alter the current base credit framework, allowing the Executive Officer to direct up to 45% of base credits to eligible OEMs if the share of new zero-emission vehicle sales for model year 2024 is less than 30%; EDUs would be assigned the remaining base credits if this option is exercised. The 15-Day Notice explains that if OEMs receive base credits, “utilities will no longer be required to contribute to a Clean Fuel Reward Program, and credits available for holdback equity projects are unaffected.”⁴

179.2

While SMUD appreciates CARB’s stated intent to preserve utility holdback credits, SMUD is deeply concerned that the Proposed Amendments, as currently drafted, could reduce individual EDUs’ holdback even if the aggregate EDU allocation is unchanged. For example, under the Proposed Amendments, SMUD would contribute 25% of base credits to the CFR and retain 75% for holdback. If 45% of each EDU’s base credits were reallocated to OEMs, then SMUD’s holdback *would* be affected because this would decrease SMUD’s holdback credits (i.e., from 75% to 55%). Such a reduction would challenge already stressed budgets and jeopardize SMUD’s ability to maintain transportation electrification programs, expand EV charging infrastructure, increase electric mobility investments in low-income and equity communities, and avoid or limit rate impacts from distribution grid upgrades to support long-term growth in EV charging.

To avoid ambiguity and the risk of this adverse outcome, the Proposed Amendments must be clarified to ensure that *individual* utilities’ holdback would be unaffected if OEMs are assigned base credits. SMUD’s recommended revisions to section 95483 (c)(1)(B) are incorporated in the recommended revisions to the Proposed Amendments offered in the following section.

The Proposed Amendments must include additional specificity regarding the implementation of potential base credit assignment to OEMs and its impact on the CFR.

As currently drafted, the Proposed Amendments lack critical details regarding the potential base credit assignment to OEMs, which directly impacts EDUs’ planning and implementation of the new MHD vehicle focused CFR. SMUD agrees with the Joint Utilities that, to avoid potentially significant disruptions in the progress of EV growth and unintended consequences, the Proposed Amendments must expressly incorporate the following:

179.3

- *A one-time deadline of March 15, 2025, for the Executive Officer to assign any base credits to OEMs, and express clarification that EDUs shall not implement the CFR if base credits are assigned to OEMs. Upfront certainty about funding for the CFR is necessary for EDUs to develop and implement the program without risk of stranding investments or disrupting customer experience. This determination must be made with sufficient lead time ahead of the March 31, 2025, deadline for CFR transfers.*
- *A deadline of January 1, 2027, for the Executive Officer to review the implementation of any OEM holdback programs and present a report to the Board with a recommendation*

⁴ Notice at 5.

179.3
Cont.

to either continue or decrease OEM base credits. The trigger for assigning base credits to OEMs is based, in large part, on a point-in-time assessment of ZEV sales. The Executive Officer should reevaluate the continued need for and efficacy of OEM base credit assignments and present recommendations to the Board by January 1, 2027. This is consistent with the proposed requirements for reevaluation of CFR contributions in section 95483 (c)(1)(A).

SMUD recommends the following revisions to section 95843 (c) of the Proposed Amendments to clarify the potential base credit assignment to OEMs and impacts to the CFR and utility holdback.

A. *Base Credits to EDUs.* The EDU or its designee is the credit generator for base credits for the portion of residential EV charging assigned to that EDU by the Executive Officer, except for any portion of base credits that the Executive Officer assigns to OEMs pursuant to section 95483(c)(1)(B). ~~If the Executive Officer assigns a portion of base credits to OEMs pursuant to section 95483(c)(1)(B), the EDUs are assigned the remaining base credits.~~ The EDU may authorize a third party to sell the EDU's credits. The EDU or its designee must meet the requirements set forth in paragraphs 1. through 5. below, and 95491(e)(5).

[...]

179.4

B. *Base Credits to OEMs.* No later than March 15, 2025, the ~~The~~ Executive Officer may reallocate some or all of the EDUs' credits that would have otherwise been allocated to the Clean Fuel Rewards contributions, not to exceed 45% of base credits, to eligible OEMs, if the share of new zero emission vehicle sales for model year 2024 zero emission vehicles certified under California Code of Regulations, title 13, section 1962.2 is less than 30 percent. If the Executive Officer directs base credits to eligible OEMs, the following provisions apply:

i. Each EDU's base credits shall be reduced by no more than the percent contribution for the applicable EDU category as specified in section 95483 (c)(1)(A)2.

ii. ~~the~~ The requirements of section 95483(c)(1)(A)2 ~~do not~~ shall no longer apply.

179.5

iii. No further contributions to the Clean Fuel Reward program shall be made, and the administrator of the Clean Fuel Reward program shall implement the windup procedures set forth in the statewide program Governance Agreement.

[...]

D. Reporting Requirements. The Executive Officer shall review the implementation of any OEM program and present a report to the Board annually, beginning January 1, 2027, with recommendations for continuing or decreasing allocations to the OEMs. Documentation of adherence to the following restrictions must be included in the annual report submitted pursuant to section 95491(e)(5)(A).

179.5
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The Proposed Amendments must resolve the inconsistencies in the rulemaking package and clarify that POUs must spend 50% of holdback credits on equity.

The rulemaking package contains inconsistencies regarding the equity spending requirements for POUs. SMUD understands that CARB's intent is to maintain the 50% spending requirement for POUs, consistent with the rationale outlined in the Staff Report and Appendix E.⁵ As noted in SMUD's previous comments, maintaining the 50% holdback equity requirements appropriately allows POUs, as not-for-profit utilities that are accountable to their communities, the flexibility to prioritize programs and direct investment to areas of greatest need. In addition, for many POUs, including SMUD, LCFS is the primary source of funding for transportation electrification programs. There remains a significant need for investment in programs and infrastructure throughout the Sacramento area, and maintaining the 50% holdback equity requirements in conjunction with the increased holdback will allow SMUD to accelerate transportation electrification investments in equity communities while also supporting EV charging needs across the region.

The Proposed Amendments should incorporate necessary revisions to equity holdback project categories and to proposed EV charging verification requirements.

As identified in SMUD's comments on the 45-Day Language, several revisions to the proposed equity holdback project categories and verification requirements for EV chargers are necessary to ensure clear and practical implementation. SMUD was disappointed that these revisions were not addressed in the Proposed Amendments and respectfully requests that CARB incorporate them in subsequent 15-day changes. These revisions include:

179.6

- *Expressly clarifying that MHD EV charging infrastructure projects, regardless of geographic location, are considered equity holdback projects.* MHD EV infrastructure investments primarily benefit equity communities regardless of the infrastructure's location or proximity to such communities, since equity communities often bear a disproportionate share of pollution associated with major transportation corridors.
- *Broadening the scope of entities that EDUs may coordinate with on reskilling and workforce development programs to include workforce development agencies or community-based programs, a California community college, or a workforce strategy adopted by the Board of a POU.* SMUD coordinates with a range of entities, including community-based organizations and local community colleges, to develop transportation electrification-focused workforce development programs. Requiring EDUs to specifically coordinate with workforce development agencies, which may not be familiar with transportation electrification and community needs, is unnecessary and may slow development of programs.
- *Combining and clarifying two partially overlapping eMobility project categories.* SMUD supports the recognition of eMobility projects, but the current structure of the Proposed Amendments creates confusion over scope and application. Clarification should be provided to ensure that e-mobility incentives and supporting investments are included.

⁵ Appendix E specifies that the "holdback equity requirement for Publicly Owned Utilities would remain at 50%" and explains that the purpose of increasing holdback equity requirements for the investor-owned utilities was to align with CPUC requirements for the IOUs. Refer to the *Staff Report* at pp. 36 and 67, and *Appendix E* at pp. 14-15.

179.6
Cont.

- *Retain an equity holdback project category for focused education and outreach to underserved communities.* Equity focused education and outreach projects, such as direct community outreach events and needs-based assessments, provide substantial value that should be recognized in the equity project list.
- *Remove site visit requirement for verification of covered EV chargers.* The Proposed Amendments would require site visits to confirm the accuracy of EV chargers as part of newly proposed verification requirements. These site visits would be costly and unlikely to provide any material benefits, as EV charging data can be collected without a site visit.

Further rationale for these changes, along with suggested redlines, can be found in SMUD's comments on the 45-Day Language.

Conclusion

Thank you for the opportunity to provide feedback on the Proposed Amendments. SMUD looks forward to continuing to work with CARB on amendments to strengthen the LCFS regulation.

/s/

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cc: Corporate Files (LEG 2024-0118)

August 27, 2024
California Air Resources Board
1001 I Street
Sacramento, CA 95814
Rajinder Sahota
Deputy Executive Officer, Climate Change and Research

Several items in the 15-day notice which are worthy of reconsideration. These include changes in the categorization of biomass, the treatment of renewable power for hydrogen production, and modifications to the Tier1 HEFA calculator.

The Biomass Gap

180.1

While identifying biomass used in wildfire reduction, CARB has not provided a detailed approach to quantifying emissions associated with other types of biomass. The lack of such transparent guidance impinges the ability to plan and execute biofuel projects that can deliver alternative biomass residue fates for hard-to-decarbonize sectors such as sustainable aviation fuel. As a result, these types of biomass residues may continue to emit GHG emissions associated with business-as-usual conventional fates, e.g., burning and decomposition, as uncertainty of their treatment in the LCFS increases perceived investor risk.

The proposed modifications to the rule exclude industrial forest residue from source specific feedstocks. Please review the attached report “Biomass Accounting Principles, Alternative Fates, and Verification” prepared by Life Cycle Associates. It provides extensive background on GHG emissions associated with biomass and its alternative fate. The report could provide support for a design pathway for biomass as a feedstock or process fuel.

180.2

Regrettably, during the course of this rulemaking, CARB did not hold a workshop to discuss and examine the many complexities presented by forest biomass. CARB also did not share with stakeholders the extensive new language pertaining to forest biomass contained in the 15-Day Changes in §95488.8(g)(1)(A)(3) and the approximately six pages of new language proposed to be added to §95488.9(g).

We respectfully submit that this LCFS proposal would have benefitted from a stricter reading of the California Administrative Procedure Act particularly given the tremendous wildfire risk in California that is fueled by such massive and dangerous quantities of forest biomass that the State has established a million-acre fire treatment strategy as further discussed by the comment letter of the California Forestry Association.

180.2 cont

From our perspective, the forest biomass scheme proposed in the 15-Day Changes is unworkable. We do not think it feasible to propose simple fixes to make the scheme workable and would recommend that it be completely redesigned. However, we think this redesign is a process that will require many months if not a year. We also think it imperative that the many positive changes that CARB has made to the LCFS program should not be further delayed in terms of implementation. Therefore, we would recommend that CARB delete all of the new language pertaining to woody biomass from the LCFS rulemaking package and initiate a separate focused rulemaking that involves stakeholders and California agencies with forestry expertise in the process.

RECs for Hydrogen

- 180.3 Changes made to the regulation and not adjusted in the 15-day package include the exclusion of the use of RECs for hydrogen production to make fuel in:
§ 95488.8. Fuel Pathway Application Requirements Applying to All Classifications.
- 180.4 (i) *Indirect Accounting for Low-CI Electricity, Biomethane, and Low-CI Hydrogen.*
(1) *Book-and-Claim Accounting for Low-CI Electricity Supplied as a Transportation Fuel, Direct Air Capture projects, or Used to Produce Hydrogen as a transportation fuel.* Reporting entities may use indirect accounting mechanisms for low-CI electricity supplied as a transportation fuel, for hydrogen production and processing for hydrogen used as a transportation fuel, or for direct air capture projects, provided the conditions set forth below are met:
- This language limits the use of hydrogen only for transportation and excludes its use in fuel production including hydrogen boost for syngas to SAF, HEFA hydrotreated, and other hydrotreating processes. This is a change from the current regulation and warrants some reconsideration as the use of low CI hydrogen is an essential component of many fuel strategies and allowed in policies such as CORSIA. The exclusion of hydrogen to produce fuel was not addressed robustly in workshops. So; allow us to identify some of the pros and cons of limiting the use of RECs for the production of hydrogen by electrolysis.
- 180.5 First, CARB's focus is on the promotion of zero emission hydrogen vehicles and the use of low CI hydrogen in other applications would appear to be misdirecting the hydrogen for the production of liquid fuels. However, the limitation on hydrogen fuel cell vehicles lies in the fueling infrastructure and availability of vehicles and new electrolysis capacity would be built as part of new fuel production facilities including e-fuels and biomass waste to SAF. Therefore, hydrogen produced from new electrolysis facilities for e-fuels would not necessarily be available for transportation applications in California.
- 180.6 Secondly, ARB might be concerned about stacking of incentives electrolysis from hydrogen that complies with the three pillars of. Renewable production would receive a \$3 per kilogram incentive under section 45v of the inflation reduction act. The additional LCFS credit would correspond to another \$0.65 per kilogram at credit prices of \$50 per tonne. This incentive would accrue to the renewable diesel producer but would be tied to the generation of RECs. Note that the development of renewable hydrogen projects is very challenging and complying with the three pillars will require new ways of tracking renewables and much of the incentive may be passed on to the consumer due to competition if stacking of incentives results in over crediting. Certainly, over crediting is an issue and may relate to some of the consternation regarding RNG pathways. However, developing new technologies is costly and the principles of technology neutrality are generally inconsistent with the assessment of profits and losses of fuel developers.
- 180.7 Finally, ARB may have been concerned about the leveraging of RNG to CNG to hydrogen via electrolysis with the CI becoming more and more negative with every loss in the system. This effectively becomes a form of gearing which ARB has addressed by placing a 50% efficiency limit on biogas to power projects. Many SAF projects are targeting the use of renewable electricity for SAF based on solar and wind. The key point is that the availability of renewable power and

renewable hydrogen do not drive the transport market, the availability of vehicle and fueling/charging infrastructure are the limiting factors.

Tier1 HEFA Calculator

180.8

Several changes were introduced in the tier 1 HEFA calculator. First, the GHG emissions from tailpipe from diesel increased from 0.76 to 3.5 g CO₂e/MJ. This large increase is due to the higher rate of N₂O emissions from diesel vehicles in the future based on the EMFAC model which are readily confirmed by running the on-line EMFAC model. While the N₂O emissions from heavy-duty vehicles are likely part of another CARB comment process, the significant impact on GHG emissions is so noteworthy that the phenomenon could be discussed. A N₂O emissions increasing due to NO_x controls? Is this an appropriate trade-off? Note that the increase in N₂O our emissions has little effect on credit generation for HEFA diesel as the baseline will also increase and more credits will be generated from zero emission vehicles. However, the same N₂O a factor is applied to SAF. There is no reason to expect N₂O emissions from jet turbine engines to increase in the future as the fleet is not turning over and the core engine technology is based on combustion with high excess air rates and low N₂O emissions. The solution to this calculator issues is simple. Simply add several more rows to the calculator with exhaust emissions and a total CI for each fuel product. This approach is only reasonable as each fuel product is assigned its own fuel pathway code. Since the fuel pathway code can accommodate a unique CI providing the unique CI for SAF would be a very simple solution to this issue.

180.9

Finally, the tier 1 HEFA calculator allows for the use of source specific CI values for hydrogen. These CI values are based on the Tier 1 hydrogen calculator. However, they include standard values for compression and chilling. Hydrogen used in HEFA facilities which is transported by pipeline would not require the same level of compression and chilling as a hydrogen fueling station. We recommend that either these emission sources are excluded or that the hydrogen producer could provide data in the Tier 1 hydrogen calculator for HEFA supply. This level of detail is relatively straightforward and should not require a tier 2 out application.

Thank you for your consideration.

Best Regards,



Stefan Unnasch
Managing Director
Life Cycle Associates, LLC



August 27, 2024

Carolyn Lozo
Chief, Transportation Fuels Branch
California Air Resources Board
1001 "I" Street
Sacramento, CA 95814

Via electronic submission

Transportation Fuels Branch Chief Lozo:

Thank you for the opportunity to comment in response to the California Air Resources Board's (CARB) proposed 15-Day Changes to the Proposed Amendments to the Low Carbon Fuel Standard (LCFS) Regulation (15-Day Changes or Proposal). North Dakota Soybean Processors (NDSP) appreciates the opportunity to provide additional insights.

NDSP is a joint venture between CGB Enterprises, Inc and Minnesota Soybean Processors and is building a state-of-the-art soybean processing plant in Casselton, ND. CGB and MnSP made this significant investment to help meet the need for additional feedstock for the biofuel industry.

181.1 NDSP strongly encourages CARB to follow its own modeling and conclusions CARB presented in its workshop on April 10, 2024, which show that an artificial cap on vegetable oil feedstocks is unwarranted and would only increase fuel prices and harm air quality. With the implementation of a cap on biomass-based diesel (BBD) feedstocks, a phaseout of BBD pathways, and even more restrictive and costly traceability and verification system, this proposal will only lead to more combustion of fossil diesel fuel, higher fuel prices at the pump, and poorer air quality. It may also lead to a surge of more imported foreign feedstocks such as Used Cooking Oil (UCO) and tallow - some of which may not be legitimate - being used to fuel California instead of local U.S. grown options - all at the expense of U.S farmer, the U.S. crusher and the California taxpayer.

181.2 CARB should therefore reject the imposition of a vegetable oil cap and adopt a targeted, risk-based approach to sustainability requirements which does not penalize sustainable U.S. fuels and feedstocks at the expense of foreign imports which may not be legitimate.

181.3 At a minimum, CARB should take additional time and effort to more fully consider the important issues involved and give parties the chance to more fully respond to the proposal. While NDSP has endeavored to identify all of the issues to date in this comment letter, 15 days is not a sufficient amount of time to fully address CARB's proposed vegetable oil cap and other significant and unexpected changes in the proposal. NDSP therefore strongly recommends that CARB extend the comment period and hold an additional public workshop on these potential changes.



Background

NDSP's oilseed processing operations yield protein-rich meal for human and animal nutrition, as well as vegetable oil that is used as an ingredient in food manufacturing and as a feedstock for renewable fuels such as biodiesel, renewable diesel and sustainable aviation fuel (SAF). These sustainably produced biofuels help reduce carbon dioxide equivalent (CO₂e) greenhouse gas emissions and the carbon intensity of transportation fuels in use today.

CARB's Own Analysis Supports the Elimination of a Cap on Vegetable Oils

While the intention behind CARB's proposal is to diversify feedstock sources and promote sustainability, it will have the opposite effect, outweighing its potential benefits. First and foremost, capping the use of vegetable oil will significantly increase fuel costs. Because vegetable oil is currently one of the most efficient fungible, and cost-effective feedstocks, limiting their use will constrain the supply of renewable diesel. Renewable diesel and biodiesel are crucial components of California's efforts to reduce greenhouse gas emissions and transition to cleaner energy sources and this artificial limitation will create a supply-demand imbalance, driving up the costs of renewable diesel production and, consequently, the price at the pump for California consumers.

Moreover, CARB's goal of 100 percent renewable liquid fuels with the proposed feedstock constraints in place is unrealistic and impractical. The renewable diesel industry is still developing, and waste feedstocks are not available in sufficient quantities to meet the state's ambitious targets. By capping vegetable oil usage, the proposal risks stalling the progress made to reduce carbon emissions by creating a bottleneck in renewable diesel production. In fact, CARB's own analysis supports this assessment.

NDSP strongly supports CARB's findings presented at the April 2024 workshop that renewable diesel and biodiesel have a positive impact on both consumers and the environment. CARB's "Staff Report: Initial Statement of Reasons" (ISOR) specifically modeled an alternative (Alternative 1) which "includes several policy mechanisms that have the effect on limiting the number of credits created from existing low-CI pathways" including "a limit on total credits from diesel fuels or sustainable aviation fuel produced from virgin oil feedstocks." The report's impacts are glaring – and each of them are attributed to more fossil diesel use in lieu of renewable diesel:

- **Increased Fuel Costs:** Alternative 1 had total costs of \$162 billion, 1 percent more than the scenario without a vegetable oil cap and similar policies. According to CARB, "The main reason is that diesel fuel is a larger part of the fuel mixture and continues generating large amounts of in-state deficits through 2046. This is because renewable diesel produced from virgin oil feedstock is phased out...and more fossil diesel is needed to fuel the remaining vehicles with internal combustion engines."
- **Increased Emissions:** Alternative 1 had greater emissions of greenhouse gases, particulate matter (PM_{2.5}) and nitrous oxide (NO_x) than the baseline. The higher NO_x and PM_{2.5} emissions in particular were attributed specifically to reduced renewable diesel—CARB found that "Alternative 1 increases NO_x emissions by an additional 10,981 tons and increases PM_{2.5}



emissions by 2,773 tons. Alternative 1 has more NOx and PM2.5 emissions than the proposed amendments because this scenario uses less renewable diesel than the proposed amendments.”

- **Fewer Health Benefits:** In line with its higher emissions, Alternative 1 also had correspondingly lower health benefits. CARB found that “Alternative 1 has a valuation of health benefits at \$1.58 billion compared to the proposed amendments with a valuation of \$4.98 billion, a difference of \$3.4 billion less in health benefits. The lower avoided health impacts of Alternative 1 are primarily associated with increases in PM2.5 over the baseline due to lower utilization of renewable diesel.”

CARB Staff justifiably rejected Alternative 1, citing the fact that it “relies more heavily on fossil fuels...than the proposed amendments. As a result, [Alternative 1] does not achieve the same level of NOx and PM2.5 emissions reductions as the proposed amendments and potentially exacerbates existing air quality challenges in the State.”

Additionally, the ISOR included an analysis, and the rejection, of another proposal by CARB’s Environmental Justice Advisory Committee which included a cap on vegetable oils set at 2020 levels. CARB found that “due to limitations on lipid biofuels and dairy biogas, the Comprehensive EJ Scenario results in higher volumes of fossil diesel being used than any of the other scenarios evaluated.” However, despite the demonstrated negative economic and health impacts of a vegetable oil cap, CARB’s 15-Day Changes seek to accelerate those adverse impacts through additional regulatory requirements and market limitations on crop-based feedstocks. The additional restrictions will effectively create a decreasing volumetric cap as the price of compliance to maintain market access becomes cost prohibitive.

CARB’s analysis therefore appears to be at odds with its own prior findings. The ISOR concludes that just the imposition of a cap on vegetable oil feedstocks will increase fossil diesel use. Yet, CARB’s proposal summary states that “this [vegetable oil cap] allows for California to displace up to 100 percent of the State’s fossil diesel demand with cleaner alternative diesel.” This will not be possible with the combined establishment of a cap on feedstocks, a phaseout of new BBD pathways, and the imposition of even more costly traceability and verification measures. CARB has not explained why it is rejecting or ignoring its prior conclusions in the ISOR.

The proposed phasing out of new BBD pathways by 2031 is also concerning and unwarranted. CARB has a stated goal to achieve 100 percent renewable diesel, and phasing out new pathways would be unnecessary at best and counterproductive at worst. If the market becomes saturated, new pathways would no longer be needed and applications for new pathways will stop on their own. If the market has not yet achieved 100 percent saturation, then additional pathways are likely to be needed to achieve CARB’s goal. The inclusion of this provision only serves to send a market signal that will limit both near and long-term supplies of feedstocks and fuel necessary to achieve the climate goals of the LCFS.

Making these significant policy adjustments without more solid footing sends the wrong signal to the market that the LCFS program is subjective and unpredictable, particularly at a time when the fuel supply chain works toward the goal the California has set decarbonizing the transportation fuel supply. As



a result, this proposal could impact investments from the same companies who have committed to climate smart agricultural practices and invested in dedicated energy crops like pennycress, camelina, carinata and winter canola. These investments represent a new wave in renewable energy production, based on the promise of a predictable market which rewards sustainability and carbon reduction – not artificial caps and arbitrary prohibitions which would stymie innovation.

NDSP urges CARB to eliminate the proposal's cap on vegetable oil feedstocks. In its place, we continue to recommend implementing policies that encourage the responsible production and use of renewable feedstocks while addressing concerns about deforestation through targeted risk-based measures.

The Proposal Contradicts the Requirements and Purposes of AB 32, the LCFS, and other California Laws

CARB's proposal to minimize biomass-based diesel used to comply with the LCFS flies in the face of the purposes of AB 32 and is inconsistent with several of its explicit requirements. To begin with, AB 32 requires that CARB design its LCFS regulations in a way that "maximizes benefits for California's economy, improves and modernizes California's energy infrastructure and maintains electric system reliability, maximizes additional environmental and economic co-benefits for California, and complements the state's efforts to improve air quality." Cal Health and Safety Code § 38501(h). But by minimizing RD and biodiesel production through a vegetable oil cap and related proposals, CARB would reduce environmental co-benefits and harm air quality. Because RD achieves significant NOx and PM2.5 reductions relative to fossil diesel, a cap that artificially reduces RD in the market will reduce the environmental benefits of the LCFS. As discussed above, that is borne out by CARB's own modeling in its ISOR.

AB 32 also requires CARB to meet GHG emissions limits in a way that "minimizes costs." A cap that artificially distorts the market inherently increases costs because regulated parties cannot choose the economically optimal way to comply with the obligations of the program. Again, this is supported by CARB's analysis in its ISOR that found increased costs in a scenario with a vegetable oil price cap.

AB 32's purposes are further embodied by its explicit requirements to minimize costs and maximize the total benefits to California. Cal Health and Safety Code § 38562. *See also id.* (requiring CARB to "Consider cost-effectiveness" and "minimize the administrative burden of complying with its regulations"); *id.* § 38560 (requiring CARB to issue "regulations in an open public process to achieve the maximum technologically feasible and cost-effective greenhouse gas emission reductions"). And CARB has designed its LCFS regulations accordingly by focusing solely on reducing the "carbon intensity of the transportation fuel pool," and taking a technology-neutral approach that allows various compliance mechanisms in order to maximize carbon intensity reduction. *See* 17 CCR §§ 95480, 95484. A vegetable oil price cap and freeze of vegetable oil pathways do the opposite – they create inefficiencies in the LCFS that add costs without corresponding improvements in GHG reductions. Indeed, without a vegetable oil cap, the market is optimally incentivized to comply in a way that both lowers costs and maximizes greenhouse gas reductions. A vegetable oil cap artificially skews that incentive, so the program will



either need to be more costly to achieve the same level of GHG reductions or achieve less GHG reduction at the same cost.

181.8
cont.

CARB's proposal provides little basis or explanation for its abrupt shift in policy. To the extent there is any, it is CARB's statement that it expects that ZEVs will reduce diesel demand in "coming decades." But that speculative assertion is unsupported and ignores technical challenges with electrifying the heavy-duty sector. It also ignores another instruction in AB 32 to for CARB to design its regulations in a manner that "encourages early action to reduce greenhouse gas emissions." Cal Health and Safety Code § 38562. Biodiesel and renewable diesel are available to decarbonize trucks and other heavy-duty vehicles *now*, and it is illogical and arbitrary for CARB to miss out on those benefits in favor of speculative benefits in the future.

Finally, the proposal is inconsistent with other California laws designed to improve air quality and the environment, including California's State Implementation Plan ("SIP") under the Clean Air Act. In CARB's most recent SIP submission, it reiterated the imperative of reducing NOx and PM2.5. CARB, Proposed 2022 State SIP Strategy (Aug. 12, 2022). CARB noted in particular the impact of PM2.5 emissions from mobile sources on environmental justice communities and found that it is "imperative that we optimize our control programs to maximize emissions reductions and provide targeted near-term benefits in those communities that continue to bear the brunt of poor air quality." *Id.* at 2. CARB's proposal to eliminate a source of near-term PM2.5 improvement for the *possibility* of greater future electrification runs directly counter to the SIP's objectives.

CARB Should Take a Targeted Risk-Based Approach to Sustainability Requirements While Increasing Scrutiny on Waste Feedstocks

181.9

NDSP appreciates CARB's continued recognition that some geographic regions carry a higher risk for deforestation. However, the proposal doubles down on a one-size-fits-all approach which, according to CARB's Recirculated Draft Environmental Impact Analysis (EIA), would "create an even stronger incentive to utilize waste feedstocks," without any additional analysis of direct or market-mediated effects from such a policy, nor any additional proposed compliance requirements to ensure waste feedstocks are not fraudulent.

Moreover, CARB's proposal would further disadvantage regions of crop-based feedstock production with low-risk of deforestation (U.S. and Canada) that are already subject to multiple compliance programs, thereby favoring feedstocks produced in regions with a significantly higher risk of fraud or deforestation.

181.10

At CARB's April workshop, staff noted additional measures which were under consideration to address potential fraud in sourcing waste feedstocks, including "additional detailed traceability, verification and/or enforcement of waste feedstocks to avoid fraud." Yet, despite additional proposals that would accelerate waste feedstock demand, the 15-Day Changes inexplicably included none of those measures.



181.10
cont.

NDSP strongly supports heightened scrutiny, oversight, and traceability to ensure the integrity of imported feedstocks for the CARB LCFS. NDSP recommends stepped up enforcement laws for imported feedstocks while exploring all possible viable options in the long term to ensure the origin and content of imports are legitimate. NDSP supports paperwork and in-person audits, potential testing, and stronger attestations which will ensure the continued integrity of low carbon fuel programs. NDSP strongly urges CARB to include increased measures into its final rule to ensure foreign feedstocks are in fact legitimate and traceable. CARB should work in close coordination with federal officials who all touch imported feedstocks in some capacity such as the U.S. Department of Agriculture, Environmental Protection Agency (EPA), U.S. Trade Representative and U.S. Customs and Border Protection. NDSP also encourages CARB to work with other countries who have experienced their own instances of fraudulent activity as it relates to imports in their own low carbon fuel programs such as the European Commission.

181.11

Further, implementing a targeted, risk-based approach to the proposal's sustainability criteria offers several advantages. It allows CARB to prioritize resources and regulatory efforts where they are most needed, ensures that sustainability criteria are effectively applied without imposing unnecessary burdens on low-risk regions or established sustainability programs, and ensures sufficient supplies of low-carbon fuels for the California market.

181.12

CARB appears eager to incorporate an EU policy paradigm without accounting for the risks brought upon the EU market. In the wake of EU policy to limit crop-based feedstocks and increase crediting for waste feedstocks under the Renewable Energy Directive (RED II), policymakers have struggled to address concerns about fraudulent waste feedstocks,¹ while significant imports of Chinese biodiesel recently led the Commission to place substantial provisional import duties² of up to 36.4 percent.

NDSP encourages CARB to not outsource sustainability certifications to the European Commission. CARB should recognize U.S. national, state, industry programs that meet the same intended goal of stopping deforestation and conversion. It is critical that CARB provide a tiered approach to feedstocks, fuels, and regions based on risk.

181.13

Regions identified as having the lowest risks of deforestation associated with crop-based feedstocks, such as the United States and Canada, crop-based feedstocks should be deemed to be in compliance with CARB's proposed sustainability criteria.

In the event CARB is unwilling to deem U.S. and Canadian feedstocks compliant, for regions where crop-based feedstocks comply with another established sustainability system, such as the Renewable Fuel Standard (RFS) Canada's Clean Fuel Regulation (CFR), or energy tax credit provisions in the Inflation Reduction Act (IRA), CARB should permit some level of aggregate compliance. These programs offer established frameworks for verifying sustainable practices and are a practical and effective way to achieve CARB's environmental goals without sacrificing any sustainability gains.

¹ Kelly Norways, "[New biofuel data triggers fresh fraud concerns over EU imports](#)," S&P Global, December 14, 2023

² Kelly Norways, "[EU imposes anti-dumping duties targeting cheap Chinese biodiesel imports](#)," S&P Global, August 16, 2024



181.14 Further it is critical to note that planting decisions for crops to be harvested in late 2025 are happening now and will be made prior to CARB's proposal being finalized which means the timeline to begin implementing the sustainability certification criteria which specifically calls for "geographical shapefiles or coordinates of plot boundaries" by 2026 is simply not possible based on how the agriculture supply chain and crop harvest cycle works. Because of this NDSP respectfully submits that a deadline beyond 2027 is more reasonable for the first phase of compliance should CARB determine to go down this path.

181.15 While biofuels represent one significant market for vegetable oil, they are by no means the sole destination for these products. Given the diverse end uses of vegetable oil and meal, oilseed processors must carefully evaluate the return on investment when considering participation in an expensive sustainability certification program like the one CARB is proposing. California represents an important market for biofuels, but it may constitute only a fraction of the overall market for oilseed products. In this context, the costs associated with obtaining and maintaining sustainability certifications for a market that CARB seems intent on phasing out, may outweigh the benefits for many processors, particularly those with limited exposure to the California market.

For these reasons, NDSP continues to urge CARB's inclusion of enhanced traceability and enforcement measures on waste feedstock imports and maintains that a targeted, risk-based approach would streamline compliance requirements while ensuring that sustainability criteria are met, and recognizing biofuels produced in compliance with existing U.S. programs is a practical and effective way to achieve this goal without sacrificing any sustainability gains. Should CARB proceed down a path to implement sustainability criteria, ample time to implement and comply beyond 2027 is essential.

Land Use Change (LUC)

181.16 While NDSP strongly supports free trade and open markets, currently the CARB LCFS are driving demand for imported waste feedstocks. These programs are built on carbon intensity modeling that considers feedstocks such as used cooking oil (UCO), tallow, and greases as "waste." NDSP believes there is room for improvement when it comes to modeling waste feedstocks. In most instances the waste feedstock lifecycle begins when it is deemed "waste," however key factors are not considered such as was that waste initially from a product that was grown on deforested land, for example. NDSP notes that the environmental impacts of a product's entire life cycle for waste feedstocks should be considered.

Imported feedstock volumes into the U.S. have skyrocketed in 2023 and 2024, displacing domestically produced feedstocks. One pound of imported feedstock displaces one pound of domestically produced soybean oil or 5 pounds of soybeans. From Jan 1, 2023- June 30, 2024 - the US imported a total of 7.9 billion pounds of UCO and tallow. Those 7.9 billion pounds of imported feedstocks displace the soybean oil crushed from an equivalent of over 650 million bushels of soybeans.³

³ USDA GATS/US Census Bureau



As CARB noted at its April workshop and again in its recirculated EIA, “waste-based feedstocks, like UCO and animal fat, do not have additional LUC scores that are added to their CI value and made up 84% of all biomass-based diesel in the program from 2011 through 2022.”

- 181.16a However, non-waste feedstock carbon intensity modeling already includes direct and indirect land-use change values and CARB notes that existing modeling “may not be accurate for applicants sourcing feedstocks from outside 2015 analysis area.”

NDSP appreciates CARB consideration of assigning more conservative land use change values for high-risk feedstocks in regions with higher LUC risk than, for example, North American feedstocks currently modeled in Table 6 of the LCFS regulation. However, as the science on LUC continues to evolve, CARB should recognize that there are instances in which LUC should be reduced, not just the instances where LUC should be increased. In CARB’s proposal the regulatory flexibility and updated scientific modeling is afforded only to feedstock/fuel combinations not listed in Table 6. Further, the proposal only permits an increase in the LUC penalty. The final regulation should permit the flexibility to reflect when the science shows the penalty should be decreased, in addition to when LUC should be increased.

NDSP requests CARB to reassess its LUC model, particularly regarding soybean oil, given the evolving data from models like Argonne GREET’s Carbon Calculator for Land-Use and the Land Management Change from Biofuels Production (CCLUB) Model. CARB’s most recent modeling of LUC for BBD was done almost a decade ago, and produced a score of 29.1 gCO₂/MJ, which is significantly higher than the more recent findings from the 2023 R&D Argonne GREET Model with CCLUB and the 2024 40B SAF GREET model with CCLUB which estimate a value of 12.5 and 12.2 gCO₂/MJ for soybean oil – a nearly 60% decrease from CARB’s current value.

AB 32 requires CARB to use the “best available economic and scientific information” in designing its LCFS regulations. Cal Health and Safety Code § 38562. CARB should therefore utilize the most recent science for all feedstock/fuel pathways and should not limit modeling updates to carbon intensity values only when the scores are worse, not better. To do so would undermine the scientific integrity underlying the basis of the entire LCFS program – to achieve the greatest carbon reductions based on unassailable science.

NDSP encourages CARB to update its LUC model with the latest science for all feedstock/fuel pathways. This adjustment would not only ensure that CARB’s regulations remain grounded in the latest science but would also promote fairness and consistency within the industry.

Request for Additional Time for Public Input

NDSP notes that in the 15-Day Changes, the proposed cap on vegetable oil was the first time stakeholders had any opportunity to review these provisions or its concept. Given the precedent-setting nature of this program in the U.S., and the potential for significant cost and compliance burden to stakeholders, NDSP requests that CARB, as it did on February 14, take additional time to allow stakeholders to properly vet the intent, impact, and implications of the proposed requirements.

181.18



181.18
cont. Specifically, NDSP recommends that CARB at a minimum both extend the period for written comments and hold another public workshop.

Conclusion

181.19 In conclusion, CARB analysis, market and scientific data collectively demonstrate that consideration of a cap or limitation on crop-based feedstocks is unwarranted and in fact contradict AB 32, the LCFS regulations, and other California laws. Further, doing so unexpectedly and contrary to the reasonable expectations of regulated parties would undercut the necessary investments that are being made to support low carbon feedstocks and further feedstock expansion.

181.20 NDSP also continues to encourage CARB to adopt a targeted, risk-based approach to implementing sustainability criteria under the LCFS. By accurately assessing deforestation risk, leveraging existing sustainability frameworks, and implementing targeted measures for high-risk regions, CARB can achieve its environmental objectives while also supporting a sustainable and resilient biofuels industry.

NDSP is eager to continue working with CARB to support the role of agriculture in diversifying the fuel supply through more sustainable feedstocks, thereby supporting cleaner fuel options in California and beyond. We appreciate this opportunity to comment and look forward to collaborating with CARB and other relevant stakeholders.

Sincerely,

Bill McBee
NDSP Commercial Manager



August 27, 2024

Liane Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: SUPPORT Proposed Amendments to the Low Carbon Fuel Standard Regulation

Dear Chair Randolph and Honorable Board Members,

EVCA is a not-for-profit trade organization of 22 leading EV charging industry member companies and two zero-emission autonomous fleet operators. The association was established in 2015 to comprehensively represent the entire EV charging value chain and provide a collective industry voice for decision-makers in California.

The Low Carbon Fuel Standard (LCFS) has been instrumental in supporting California's transition to low-carbon fuels, and we applaud the effort by the California Air Resources Board (CARB) to make modifications to the regulation to adapt to the changing needs of the market. While EVCA has separately submitted joint comments on various elements of the Proposed Regulation, this letter focuses on credits for non-residential chargers at multi-family properties, the auto-accelerated mechanism and site visits associated with CARB's proposed verification requirements for EV charging.

LCFS credits for non-residential chargers at multi-family properties.

EVCA supports the amendment proposal to expand eligibility for LCFS credits to non-residential charging stations at multi-family residences. The ability to claim credits will encourage multi-family properties to deploy chargers and create new financing opportunities that reduce the cost of charger deployment for property owners. This proposal presents a powerful new tool to offer the convenience of home charging for residents of multi-family housing and address the gap in charger access for these residents compared to Californians living in single-family homes.

EVCA appreciates expanding the eligibility of multi-family residences to claim LCFS credits, and respectfully encourages the proposal to also be inclusive of chargers serving dedicated parking spaces. Multi-family residences with dedicated parking arrangements face the same underlying barriers to charger deployment as properties with unassigned parking. Expanding eligibility works to alleviate challenges around property-owner and third-party owner-operator

management and maintenance costs, shared electrical infrastructure, and encourages the simplification of split decision-making authority amongst multiple stakeholders. EVCA applauds CARB's work to empower more multi-family residences to invest in charger access for use by residents. To further support this goal and minimize tracking and implementation challenges, EVCA recommends CARB allow all non-residential chargers at multi-family residences to directly claim credits from the LCFS program, regardless of parking arrangement.

Auto-Acceleration Mechanism Trigger

- 182.1 EVCA supports the Auto-Accelerated Mechanism (AAM) as a valuable tool to pull forward CI units from future years, helping to balance the market and prevent an excessive accumulation of credits. We recommend implementing the AAM in 2026, rather than 2027, to more effectively address near-term imbalances in the LCFS credit market and support the program's goals.

Third-party verification requirements and credit exemptions and deferred verification requirements.

- 182.2 In an effort to help streamline the verification process, EVCA suggests that CARB consider allowing for a desktop review process in lieu of requiring in-person site visits for annual verification services due to the large amount of charging infrastructure spread across the state. Moreover, unlike other fuel production facilities, EV chargers do not have data management systems and instead report fuel transaction data to a central charger management system - rendering site visits ineffective for assessing the accuracy of reported fuel transactions. Allowing for flexibility through a desktop review process both provides a more effective way to assess the risks of misreporting and allows for CARB to focus on the integrity of the data that is transmitted electronically. This would allow a focus on ensuring data integrity through matching reported data from charging networks.

Overall, EVCA supports CARB's proposed LCFS amendments which include expanding credit eligibility for non-residential chargers at multi-family properties, introducing the Auto-Accelerated Mechanism, and deferring verification for smaller entities. These changes will work to promote widespread electric vehicle adoption and help to enhance the effectiveness of LCFS.

Respectfully,

Reed Addis
Governmental Affairs
Electric Vehicle Charging Association



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August 27, 2024

Ms. Rajinder Sahota
Deputy Executive Officer - Climate Change & Research
California Air Resources Board
1001 I Street
Sacramento, California 95814

Re: California Bioenergy's Comments on the August 12, 2024 Low Carbon Fuel Standard Proposed Amendments

Dear Ms. Sahota,

Thank you for the opportunity to provide these comments to California Air Resources Board (CARB) relating to the Low Carbon Fuel Standard (LCFS) Draft Rulemaking Package released on August 12th, 2024. California Bioenergy LLC (CalBio) is appreciative of CARB's efforts over the past several years to develop the LCFS program into one of the most impactful policies to support the transition from fossil fuels to lower carbon alternatives. There are few programs in the world which can boast the significant decarbonization of the transportation sector through sound science and policy. We write these comments from the perspective that the climate emergency demands CARB strengthen the program to support achievement of California's legislatively-mandated greenhouse gas (GHG) reduction targets.

Founded in 2006, CalBio works closely with California dairy farm families, dairy co-ops and cheese producers, CARB, the California Department of Food and Agriculture (CDFA), the California Public Utility Commission (CPUC), the California Energy Commission (CEC), and the U.S. Environmental Protection Agency (EPA). We exist to reduce methane emissions and are committed to enhancing environmental sustainability for all Californians. CalBio's digester projects produce carbon-negative renewable natural gas and electricity, both used as a vehicle fuel to power low-emission trucks, buses, and cars.

In our comments below, we suggest practical and necessary revisions which serve to improve the LCFS program in its ambition to reduce GHG emissions and implement a successful program.

1. Establish a Temporary CI for Dairy Biogas to Electricity

183.1

It is of great concern to CalBio that no Temporary CI for Dairy Biogas-to-Electricity pathways has been established in the LCFS since the program's inception and that CARB has not sought to correct for this in the proposed amendments. CalBio presents below, a simple update to *Table 8 – Temporary Pathways for Fuels with Indeterminate CIs* which is to include an electric pathway with the same -150 CI score allowed for Dairy Biogas-to-RNG pathways:



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Table 8. Temporary Pathways for Fuels with Indeterminate CIs

<i>Fuel</i>	<i>Feedstock</i>	<i>Process Energy</i>	<i>CI (gCO₂e/MJ)</i>
Electricity	Dairy Manure and Swine Manure	Grid electricity/solar and wind electricity, natural gas, and/or parasitic load	-150

183.1
Cont.

CARB should correct this oversight given dairy biogas-to-electricity pathways fully reduce methane in the same manner as dairy biogas-to-RNG pathways which should be recognized. Project economics for dairy biogas-to-electricity are more challenging than RNG projects given they are currently not eligible to participate under the EPA's Renewable Fuel Standard program nor participate in the LCFS and BioMAT simultaneously. Providing a temporary pathway for dairy biogas-to-electricity is even more important now as California ramps up its transition to electrifying transportation. Doing so requires recognizing and supporting all strategies that support the unprecedented increase in electricity generation and related infrastructure that will be required.

CalBio is appreciative and commends CARB for proposing a credit True-Up back to the temporary CI, recognizing the actual GHG reductions that have occurred when a project's provisional CI score is certified. Unfortunately, with no temporary CI available for Dairy Biogas-to-Electricity, these projects are ineligible to be retroactively credited and are thus further disadvantaged. They are also exempt from the Tier 1 pathway approach since no Tier 1 GREET model was developed for electric projects as suggested by CalBio in an earlier comment letter.¹ This means they are subject to approximately two years of review time and therefore two years without credit generation.

It should be noted that CalBio has made significant financial investments in cleaner electricity generating technologies such as Bloom Fuel Cells and Mainspring Linear Generators which convert methane into electricity without combustion. These technologies should alleviate concerns around NOx emissions associated with internal combustion engines.

2. Allow for Book & Claim of RNG to Off-site Electric Generators

An important opportunity for CARB to incentivize additional GHG reductions is to expand the language in §95488.8(i)(2) to allow for the book-and-claim of pipeline-injected biomethane to be used to generate Low-CI electricity as a transportation fuel. Currently, CARB recognizes electricity as a transportation fuel in §95482(b) and moreover in §95488.8(i)(1) recognizes that "Low-CI electricity used as a transportation fuel can be indirectly supplied through a green tariff program...or other contractual electricity supply relationship." This is achieved by REC-matching, where the reporting entity must demonstrate that the

¹ [CalBio Comments 2-20-2024](#)



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low-CI electricity is supplied through book-and-claim accounting to electric vehicle charging provided “that any renewable energy certificates associated with the low-CI electricity were retired in the WREGIS for the purpose of LCFS credit generation” (see §95491(d)(3)). However, in the context of electricity derived from low-CI dairy biogas, this pathway requires the RECs to be created from a generator co-located with the digester.

183.2 Given the recognition CARB has for 1) book-and-claim of Low-CI electricity production to be matched to electric vehicles, and 2) RNG injected into the commercial distribution pipeline and withdrawn at a CNG station in California, CalBio argues that by the same logic, RNG injected and withdrawn via book-and-claim should qualify for the purposes of generating electricity. In this construct, RECs generated from an electric generator located off-site from the dairy powered by gas fed through the utility pipeline should similarly be allowed to match RECs to electric vehicles.

Please consider including the following edits in bold and underline to the draft LCFS regulation:

Section §95488.8(i)(2):

(2) *Book-and-Claim Accounting for Pipeline-Injected Biomethane Used as a Transportation Fuel or to Produce Hydrogen **or to Generate Electricity***. Indirect accounting may be used for RNG used as a transportation fuel or to produce hydrogen **or to generate electricity** for transportation purposes (including hydrogen that is used in the production of a transportation fuel), provided the conditions set forth below are met:

(A) RNG injected into the common carrier pipeline in North America (and thus comingled with fossil natural gas) can be reported as dispensed as bio-CNG, bio-LNG, or bio-L-CNG, or as an input to hydrogen production **or to electricity production**, without regards to physical traceability. Entities may report natural gas as RNG within only a three-quarter time span. If a quantity of RNG (and all associated environmental attributes, including a beneficial CI) is pipeline-injected in the first calendar quarter, the quantity claimed for LCFS reporting must be matched to natural gas sold in California as RNG no later than the end of the third calendar quarter. After that period is over, any unmatched RNG quantities expire for the purpose of LCFS reporting.

...

(C) To substantiate RNG quantities injected into the pipeline for dispensing as bio-CNG, bio-LNG, or bio-L-CNG or as an input to hydrogen production **or to electricity production**, the pathway application and subsequent Annual Fuel Pathway Reports must include the following documents linking the environmental attributes of RNG (in MMBtu or Therms) with corresponding quantities of natural gas withdrawn:

1. Unredacted monthly invoices showing the quantities of RNG (in MMBtu) sourced and the contracted price per unit;
2. Unredacted contract by which the fuel pathway holder obtained the environmental attributes.



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183.2
Cont.

This approach aligns with CARB's existing book-and-claim accounting framework and greater GHG reductions could be realized by making this targeted change to the regulatory text that is in keeping with CARB's objectives of supporting the transition to zero emission transportation. As noted, this recommendation is fully aligned with CARB's goals expressed in the Initial Statement of Reasons (ISOR), which seeks to ensure the LCFS program incentivizes "the production of low-carbon and renewable alternatives, such as low-CI electricity" and acknowledges that "biomethane can play a key role in decarbonizing stationary sources" and additional end uses such as electricity generation can displace the need for fossil gas.

CARB would be remiss to lose this opportunity to encourage and incentivize low-CI dairy biomethane to be used for electricity generation. This will create an additional market for RNG derived from dairy biogas, as CARB has signaled it is seeking to phase it out of combustion in CNG vehicles and "direct biomethane to sectors that are hard to decarbonize or as a feedstock for energy."² Directing RNG as a feedstock to electricity production is a readily available solution and further encourages grid resiliency which will be necessary as electric vehicle charging scales in the state.

3. Restore Avoided Methane Crediting Periods

183.3

In the latest staff proposal, CARB has reduced the crediting period from three 10-year crediting periods to only two. This is problematic for several reasons:

- **Increased Financial Uncertainty and Risk:** Methane reduction projects involving dairy manure management require significant upfront investment. Reducing the crediting periods decreases the expected financial return when these investments were made. This change in policy not only moves the goalposts on projects that have already committed capital, but it also creates significant increased financial uncertainty in any future investments in the program. This ultimately slows progress in methane emission reductions, undermines confidence in the regulatory framework, and discourages long-term investments in all renewable fuels.
- **Discouraging Technological Innovation:** Longer crediting periods provide more time for projects to adapt and incorporate new technologies that can enhance methane reduction. CARB has signaled a need to move dairy RNG towards other sectors such as electricity generation and hydrogen production. A shorter period limits the ability of project developers to invest in and deploy innovative technologies that require a longer horizon to become cost-effective.
- **Potential Negative Impact on Small-Scale Projects:** Smaller projects, which may have less access to capital, could be disproportionately affected by the reduction in crediting periods. These projects often rely heavily on the revenue generated from credits to remain financially viable. Reducing the crediting period reduces the potential for smaller projects to be built.

² <https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>



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183.3
Cont.

CalBio asks that the crediting periods be restored, recognizing it sets a bad precedent for projects seeking to capture and eliminate fugitive methane sources. Investments have already been made in recent years with the expectation that three crediting periods were available in the program. CARB should grandfather these projects by including a statement in Section 95488.9(f)(3)(A) clarifying that "Projects which have been certified prior to January 1, 2028 shall remain eligible for three 10-year crediting periods." Failing to address this establishes a negative precedent not only in the LCFS program, but also for future carbon programs that have yet to be established by other states and countries.

4. Preservation of the 9% CI stringency stepdown in 2025

183.4

In the latest draft LCS amendments, CARB is proposing a 9% stepdown in CI stringency beginning in 2025. In the interest of moving swiftly to a final rule that can be implemented, CalBio supports this stepdown. However, CARB should consider retaining the annual rate of CI reductions through to 2030 and beyond. By holding the CI reduction target to 30% CARB has made a shallower slope for year-over-year reductions by 2030. Instead, maintaining the slope already established in the proposal would result in a CI reduction target of ~34% by 2030, would create a path for greater emission reductions, reduce the uncertainty of whether the Automatic Accelerator Mechanism will kick in, and result in greater investment in renewable fuels.

CalBio thanks CARB for the opportunity to comment on the LCFS regulations and we look forward to further dialogue on these topics.

Sincerely,

Andrew Craig
Vice President, Greenhouse Gas Programs
California Bioenergy LLC



August 27, 2024

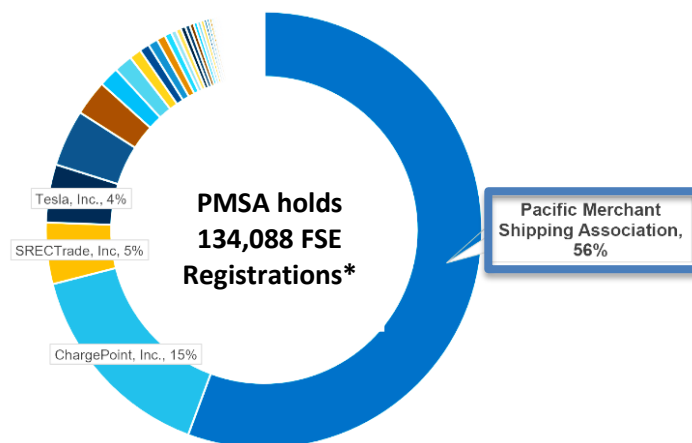
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Submitted electronically to: <https://ww2.arb.ca.gov/lispub/comm/bclist.php>

Comments: Low Carbon Fuel Standard Proposed Amendments 15-Day Notice (August 12, 2024)

On behalf of the members of the Pacific Merchant Shipping Association (PMSA), we appreciate the opportunity to provide comments on the proposed amendments to the Low Carbon Fuel Standard (LCFS) Program, as modified in the 15-Day Notice amendments published on August 12, 2024. PMSA represents ocean carriers and marine terminal operators at California's public ports. In this capacity, PMSA also directly participates in the LCFS program on behalf of its member companies, facilitating the implementation of credit generation resulting in the broad and comprehensive support of LCFS by the maritime industry.

PMSA is strenuously Opposed to the proposed third-party verification amendments. The proposed third-party verifications may trigger PMSA and PMSA-member companies to no longer participate in LCFS. Instead, we propose an Alternative Verification Process.

PMSA is the single largest program Fuel Supplying Equipment (FSE) registerer statewide. On behalf of our members, we hold over 134,000 individual registrations today, representing over half of all registrations. As the single largest LCFS program participant, we respectfully request due and proper consideration of the concerns regarding the impacts of the proposed amendments. Frustratingly, PMSA was unsuccessful in speaking with CARB staff on these specific concerns after many attempts to schedule a meeting at the publication of these latest 15-day amendments.



*134,088 FSE Registrations as of August 2024. Based on the latest publicly available FSE registration data (Q1 2022), PMSA holds the most FSE registrations in California, at approximately 56%. PMSA's registration percentage has very likely grown due to continued new registrations. PMSA may register 3,000 – 5,000 new FSEs every quarter.

As the single largest LCFS program FSE registrant, PMSA is committed to the success of LCFS. And, on behalf of the maritime industry, we remain eager to grow and expand our participation in the LCFS program. But, we cannot expand our participation if we lose member participation due to the costs and administrative constraints of the third-party verification.

Third-party Verification for eCHE, eOGV and eTRUs is Unnecessary, Potentially Unfeasible, and Diminishes Monetary Benefits

We cannot overstate how strongly we *Oppose the proposed Third-Party Verification requirements*.

184.1

As PMSA already utilizes the most accurate and reliable data sources for reporting electrical usage available, *third-party verification is simply unnecessary for eCHE, eOGV, and eTRU transactions*. PMSA is gravely concerned that the proposed third-party verifications for these specific transactions are still incorporated in the Amendments. These are wholly unnecessary, extremely expensive, wasteful, and counter-productive. These additions to the overhead cost of LCFS program participation and administration are significant, and will unduly impact the maritime sector, reduce the monetary benefit of participation in the LCFS program, and undermine the intent of the LCFS program itself.

Third-party verification would add unsurmountable new costs to program participants whilst *resulting in no emission reductions or any air quality benefits whatsoever*. The only parties which will benefit from this proposal are the consultants who will recognize a new business venture.

No clear and compelling justification exists for obligating third-party verification for these particular maritime categories because PMSA already utilizes the most accurate and reliable data sources for reporting electrical activity. In most instances, PMSA utilizes reliable meter readings for equipment on dedicated circuits provided by the utility. In the few instances where utility meter data is not available, PMSA collects power consumption data directly from on-board telematic systems. All data collected over the course of the program is always available, and always has been available for CARB audit and review upon request, at PMSA's expense. Third-party verification of these data sources would not improve the existing high level of data quality or unparalleled availability of original data CARB staff on demand or available for audit.

PMSA respectfully urges CARB not to place new overhead and administrative costs on its own successful program participants for no known purpose. No current program deficiencies have been identified that would have prompted this need and there is no justification made for the proposed third-party verification for this equipment. PMSA strongly urges the removal of the proposed third-party verification requirements for eTRU, eCHE, and eOGV activities.

While we are unaware of any benefits of this proposal, the proposed expansion of third-party verification requirements will result in significantly increased costs and administrative complexity for our participation in the LCFS program. Diminishing the benefits of program participation, without meaningfully improving the quality of the data gathered, is counter-productive. The eTRU, eCHE, and eOGV category third-party verification proposal specifically impacts the maritime sector, unreasonably targeting the one sector that generates the single greatest

source of credits, and which has an unblemished multi-year track record, as PMSA has complied and successfully participated in the program since its inception.

The activities for eCHE, eOGV, and eTRU can be considered a closed loop system, whereas the ownership and operator are one of two parties: the vessel carrier and the marine terminal, both being PMSA members. This equipment is used when a vessel arrives at berth and is plugged in by the marine terminal operator (eOGV), then electric cranes and cargo handling equipment moves the cargo on terminal (eCHE), and when the container is carrying perishable cargoes and food, they are kept cool by an attached transportation refrigeration unit that is immediately plugged in (eTRU). Exporting activities occur in the opposite direction. This practice is consistent and reliable. The electrical infrastructure is energized by a public utility powered by the grid, and measured on dedicated meters, which are captured on utility bills, and/or on-board telematics. Yet again, *PMSA utilizes the most accurate and reliable data sources available for electrical activity.*



Further, unlike eCHE and eOGV, the many thousands of pieces of eTRU equipment in the PMSA registry are not based at only one specific facility and must be individually registered for each use every quarter. In the case of eTRUs, they are generally owned by the vessel carrier, and operated and plugged into the grid by the marine terminal whilst onshore to ensure a proper temperature for vital commodities. To even be eligible to participate in our eTRU program, the equipment owner must be able to provide PMSA with access to the critical, complete, and precise telematics data. The LCFS regulation already requires a new registration with a unique identifier based on the location, in this case, which marine terminal that this piece of equipment is imported or exported through. Currently, *PMSA can register 3,000 – 5,000 new FSE every quarter*, mostly eTRUs, only because we can generate the immense amount of data necessary to participate in the program. These data could not be more accurate, thanks to telematics, and, due to their mobile nature, *third-party verification is not even possible for eTRU equipment*. For third-party verification site visits the accredited verifier could view nothing on a site visit but an empty plug and meter.

Similar concerns persist with eOGVs as well, as nothing but the shore power plug and meter could be viewed by a third-party verification site visit. The vessel that plugged-in and that generated the credit would be long gone and half a world away before a third-party verification site visit could occur.

No specific rationale for third-party verification is offered as justification in Appendix E, “Purpose and Rationale of Proposed Amendments for the Low Carbon Fuel Standard Requirements.” As no deficiency is identified with respect to existing eTRU, eCHE, and eOGV activities, which are not currently subject to third-party verification, no justification is asserted. The proposed amendments are seemingly based solely on the generic claim that CARB must ensure “...electricity and hydrogen associated transaction types are held to the same standard of data

quality through third-party verification.” (Appendix E, page 117). But eTRU, eCHE, and eOGV activities already exceed these data quality standards. While it is claimed that “data assurance needs” for these sources cannot be met with the staffing capacity of CARB (Appendix E, page 117), as noted, there is no current program defect compelling third-party verification for all transaction types, and if audits of existing program data is necessary, it would occur at PMSA’s expense.

Electricity activities as a whole only accounted for approximately one quarter of the total 2022 annual LCFS credits. Imposing additional burdens on future potential data needs is counter-productive to LCFS program goals because they impose outsized additional costs on current electrical uses of eTRU, eCHE, and eOGV. In fact, as the number of PMSA-registered electricity transactions continues to grow, the per unit costs of LCFS administrative burdens should actually *decrease* for participants and for CARB. But, as proposed, ironically, any increased administrative burden for CARB staff would only exist by CARB’s own making: by amending Section 95500(c)(1) to include the fuel transaction types in question. And, as a result, both the state and regulated, participating community would find their administrative costs increased. Unfortunately, the third-party verification proposal does nothing but increase the administrative burden and costs for participants. As far as we can ascertain, this proposal would only benefit consultants as accredited verifiers who would be exercising the verification effort. And CARB will be presented with no better data than it already receives now.

As such, PMSA proposes the following three small revisions to the proposed language to address this challenge:

§95500 c(1)E Verification of Quarterly Fuel Transactions Reports.

For the following electricity-based transaction types: [...]

2. eTRU Fueling;

3. eCHE Fueling;

4. eOGV Fueling;

No Clear Estimate of Total Third-Party Verification Expenses for Aggregated Participants is Provided

The regulated community and the Board should be provided some sense of the added costs to participating in LCFS as a result of these amendments. But, given the lack of specifics, neither the CARB Board nor the regulated community can reliably calculate the total cost and expense of third-party verification, because no estimates are provided. What all parties should be able to acknowledge is that it is certainly significant. *These unknown costs may reasonably prompt our member companies to no longer participate in LCFS; we appeal to CARB to not undermine its own highly effective program.*

Due to the many questions which remain as to what would be required for electrical transactional verifications, the costs to an FSE aggregator such as PMSA could be staggeringly high relative to the quantity and value of the credits generated. For instance, PMSA may register 3,000 – 5,000 new FSEs every quarter. Even if it were possible for every single one of these new registrations and the data generated to qualify for an LCFS credit to have third-party verification, and hypothetically if each third-party verification cost \$200, that would *increase our administrative costs as FSE registrants by up to \$1,000,000 per quarter*. This administrative overhead would eclipse the net value of participating in the program.

184.3

As PMSA works on behalf of its member companies to administer and aggregate credit generation at multiple facilities and seaport locations in California, these many unknown variations in site visits could significantly alter expenses incurred. For example, would a physical site visit to every terminal at the ports where a charger is installed to be required? Or, is a site visit to the company or administrator headquarters sufficient? The total cost per annual visit has been estimated at \$100,000 - \$150,000, not including plan preparation, review and other administration services required for verification. A \$150,000 expense per year and/or per visit, is also not insignificant and would render the LCFS program impractical for PMSA and its members, undermining the LCFS program's effectiveness.

These funds, which would otherwise be utilized for expanding electrical capacity and purchasing zero-emissions equipment and infrastructure, would instead either result in foregone participation in LCFS altogether, or be eaten up as overhead costs to administer the program. In practical terms, this \$150,000 per visit could instead fund approximately six heavy-duty eCHE chargers at the ports every year, directly championing the goal of 100% zero-emission cargo handling operations.

Eligibility for Less Intensive Verifications for the electrical transactions in question may be possible per Section 95500(h); however, questions remain on what these “less intensive verification services” even entail for the following two annual verifications. If site visits are still to be required, the expenses would not be reduced, regardless of “intensity.” While in some instances it might be reasonable to require one initial site visit to the company or administrator headquarters for the first annual electrical transaction verification, even in such a scenario, *no subsequent site visits should be necessary.*

Electrical Transaction Third-party Verifications Would be Challenging Timing Wise, and May Result in a Barrier to Credit Generation Altogether

184.4

PMSA also has concerns regarding the timing and the frequency of reviews, as they may restrict access to credit generation. The schedule of quarterly reviews as part of annual verification obligation remains unclear. And with the annual compliance reports due April 30th, it remains uncertain if the August 31st deadline for the Validation or Verification statements is feasible due to the availability of Accredited Verifiers that do not yet exist, or the immense amount of generated activity and registrations that PMSA experiences.

If quarterly reviews and site visits are to be required, there may very well be insufficient time for a third-party to complete their work to meet the deadlines for LCFS credit generation in a specific quarter. Third-party verification for eCHE, eOGV, and eTRU transactions may cause Annual and Fuel Transaction Reporting delays, thereby threatening credit generation and associated proceeds, further undermining the intent of the LCFS program.

Complicating matters even more, in many instances, utility data is already only made available with very limited time remaining prior to required submittal timelines to CARB. On several occasions, we find it already problematic to meet the quarterly deadlines – even before any introduction of an additional third-party into the mix. We know of no portion of the proposed amendments that would provide us with an additional grace period for the submission of potential credits beyond the deadline because of an inability of a third-party verification to be completed on time.

Once again, the practical considerations for eTRUs represent the biggest concern. Even if a Verifier could see an individual eTRU from time-to-time, the immense quantity of eTRU activity and continuous FSE registrations would make the timely verifications and submittal of these data for credits each quarter exceptionally problematic.

Alternative Verification Process Proposal for Maritime Credit Generating Activities

As noted, PMSA is already collecting immense volumes of accurate data that we process every quarter to demonstrate our industry's commitment to utilizing greener fuels and an effective LCFS program. We are very confident in our FSE registrations as well as the quarterly and annual fuel transactions and proceeds reporting. As such, and to demonstrate goodwill, PMSA proposes an *Alternative Verification Process* for eTRU, eCHE, and eOGV activity at publicly owned seaports.

Electrical transactions are already identified by CARB as needing less intensive checks, as outlined in §95501(h) *Eligibility for Less Intensive Verifications*, where those entities submitting only electricity transactions may obtain less intensive verification services for two annual verifications of their Quarterly Fuel Transactions Reports. The *Alternative Verification Process* fits with this policy, with less frequent verifications and site visits due to the high assurance of the data and collection process. As a matter of policy, subsequent site visits should not be required for any data collected via a meter, utility bill, and/or directly from on-board telematic systems.

This *Alternative Verification Process* would be similar to an initial in-depth audit, with additional site visits throughout program implementation, at the Executive Officer's discretion. Specifically, eTRU, eCHE, and eOGV activity at publicly owned seaports would be subject to one initial Planning Meeting, similar to §95501(b)(2), and one Site Visit, similar to §95501(b)(3), to view the meters and electrical plugs, as well as a document review at the administrator headquarters. A Validation or Verification Statement would be submitted by the Accredited Verifier, similar to §95501(c)(3), to the Executive Officer. The administrative costs of this program would be borne by PMSA, as the FSE registrant. PMSA proposes adding §95501(i) *Alternative Verification Process* describing this audit program.

184.5 As relayed previously, we are unaware of any specific data reliability or other issues that exist with the current process for eCHE, eOGV, and eTRU. CARB staff have not identified any deficiencies which necessitate amendments. PMSA welcomes a discussion of those issues, should they arise. PMSA is also always ready to host a specific tour or demonstration at any time for CARB staff at a marine terminal in order to demonstrate the industry's reliable data collection methods. FSE data will always remain available as needed, based on operations and the data collection mechanism utilized. Avoiding costly third-party verification, but creating new verification pathways, achieves this outcome.

This proposal would be circulated and adopted in this current rulemaking, as a component of the next 15-day comment period for this current rulemaking in which the Third-party Verification is removed for eCHE, eOGV, and eTRU. PMSA's proposal for the *Alternative Verification Process* would provide CARB with the assurance it seeks, while limiting program costs for the participating maritime community. We commit to collaborating with CARB staff on creating this program language.

In Future Amendments to LCFS, CARB Should Work With the Maritime Industry to Consider Alternative Transportation Fuels for Ocean-Going Vessels

The maritime industry seeks to decarbonize shipping; CARB should work with the maritime industry to assess how LCFS can support this endeavor. There are many green fuels of interest for maritime applications, including hydrogen, Bio- and e-methanol, E-ammonia, and Bio-LNG, among others. Adoption will ultimately depend on advances in fleet technology and the capacity to secure green fuels at a scale and cost that makes them competitive. (For example, see [Decarbonising Ocean Shipping | Maersk](#)) There have been recent California Green Corridor Pledges that may well catalyze the scalability of these green fuels; providing offtake certainty for fuel providers and vessel operators the assurance fuels will be available to power their vessel investments in key ports. These partnerships endeavor to decarbonize over the next 30 years and LCFS could provide an excellent opportunity to spur production and investments.

PMSA notes that hydrogen and Bio-LNG are already included as a transportation fuel to which LCFS applies (§95482 a(4) and (6)). The LCFS program could be amended to apply to Bio- and e-methanol, E-ammonia, and Bio-LNG. §95482 d(2) *Exemption for Specific Applications* would be required to be amended to specifically allow these fuels to be utilized by ocean-going vessels, as well as amended definitions under §95481 for Ocean-Going Vessels and Transaction Types.

184.6

Moreover, when CARB adopted the “Control Measure for Ocean-Going Vessels At Berth” in 2020 to “reduce oxides of nitrogen (NOx), reactive organic gases (ROG), particulate matter (PM), diesel particulate matter (DPM), and greenhouse gas (GHG) emissions from ocean-going vessels” (§93130.1), it opted to specifically endorse LCFS to apply to vessels utilizing alternative transportation fuels with low carbon intensities. The regulation includes this provision:

§93130.5 g (4) *CARB Approved Emission Control Strategy*. “Strategies that use a fuel with a CARB Low Carbon Fuel Standard certified pathway may apply a reduction to CO₂E by the factor of the carbon intensity of the fuel to the carbon intensity of the standard fuel [...]”

The vessel carriers of today have made transformative and novel sustainability pledges in the endeavor to decarbonize ocean shipping. Significant investments of capital in new vessels of the future to operate on new greener fuel options have been made. While not included in these 15-day amendments, California should partner with the maritime industry in future LCFS amendment rounds to adopt policies that support alternative fuel development efforts across the globe.

We appreciate the opportunity to provide comments regarding the LCFS 15-Day amendments. PMSA strongly urges CARB to reject the proposed third-party verification requirements for eTRU, eCHE, and eOGV transactions. Discussion of additional fuel types for oceangoing vessels with the maritime industry in future amendment rounds is also eagerly recommended. We welcome facilitating an ongoing conversation with CARB on these matters, especially as it relates to electric equipment activity by our members.

CARB
PMSA Comments on Proposed LCFS Amendments 15-Day Notice
August 27, 2024
Page 8

Please feel free to reach out to me at 562-432-4048 or by email at jmmoore@pmsaship.com should you have any questions.

Sincerely,

A handwritten signature in cursive script that reads "Jacqueline M. Moore". The signature is written in dark ink on a light-colored background.

Jacqueline M. Moore
Vice President

cc: Hon. Liane Randolph, Chair, Air Resources Board
Members, Air Resources Board
Steve Cliff, Executive Officer
Matthew Botill, Division Chief
Heather Arias, Division Chief



Low Carbon Fuels Coalition

August 27, 2024

The Honorable Liane M. Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Response to Proposed 15-Day Amendments issued August 12, 2024

Dear Chair Randolph,

The Low Carbon Fuel Standard (LCFS) has by all measures been a historically successful greenhouse gas (GHG) emissions reductions program. However, the accelerated pace of carbon intensity (CI) reductions signifying this success have resulted in a corresponding substantial oversupply of credits, creating a precipitous drop in the LCFS credit price, which has already stalled clean fuels and technologies investments.

The Low Carbon Fuels Coalition (LCFC) is submitting these comments in response to CARB's 15-Day Amendments released on August 12, 2024. These comments focus on the implications of key provisions within the latest amendments, within the context of the analytical work by ICF commissioned and previously submitted for the record to inform this rulemaking^{1,2,3}, as well as the analysis presented by CARB in conjunction with the April 10th workshop. The significance of the proposed 15-Day Amendments merits additional analysis; however, a 15-day comment period is insufficient to fully assimilate, analyze and provide resulting feedback. The following comments and recommendations are consequently limited in scope and detail by the abbreviated comment period.

- 185.1
- ***The LCFC commends CARB for increasing the Step-Down from 5% to 9%, and for maintaining the Auto-Acceleration Mechanism, to better rebalance the credit bank.*** The increase is supported by the Initial Statement of Reasons (ISOR) analysis by ICF, which indicated that achieving a target credit bank equivalent of 2-3 quarters worth of deficits requires a step down of 10.5% to 11.5% in 2025.
 - ***The LCFC again urges CARB to avoid selectively limiting or disadvantaging technologies or pathways that can reduce GHG emission reductions within the LCFS program.*** The principle of technology neutrality has allowed the LCFS program to

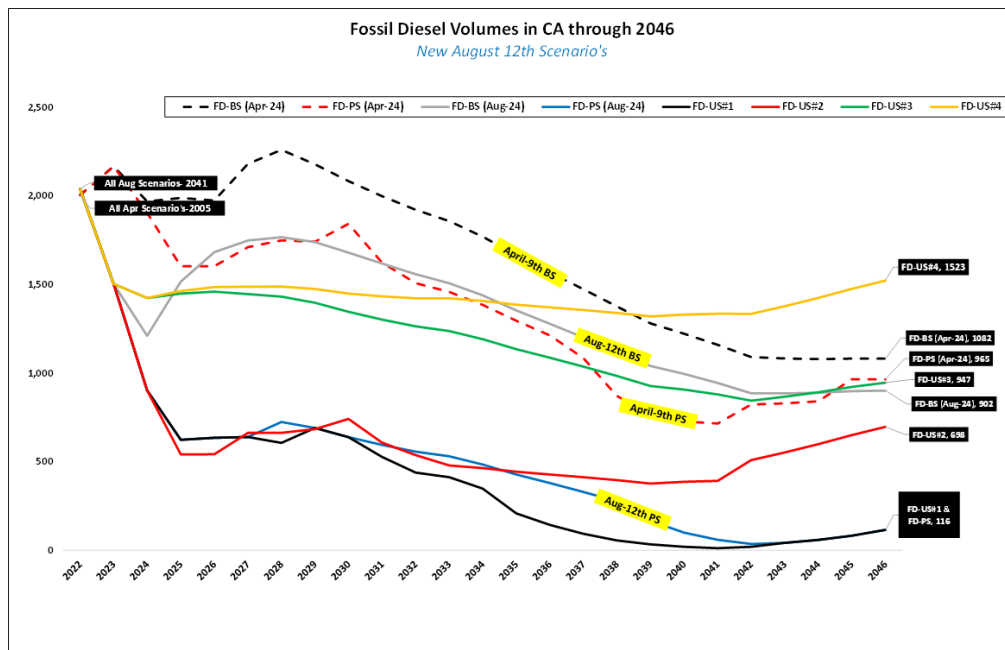
¹ See Comment of the Low Carbon Fuels Coalition and Supporting Companies and Organizations, September 28, 2023, at <https://www.arb.ca.gov/lists/com-attach/27-lcfsupdate2023-VWcGMwQ1VD5RZVJq.pdf>

² See Comment of the Low Carbon Fuels Coalition and Supporting Companies and Organizations, February 20, 2024, at <https://www.arb.ca.gov/lists/com-attach/7062-lcfs2024-BXAFcwFkWWsCcFA1.pdf>

³ See comment letter dated May 10, 2024, at https://ww2.arb.ca.gov/system/files/webform/public_comments/12071/240510%20LCFC%20comment%20letter%20to%20CA%20_.pdf

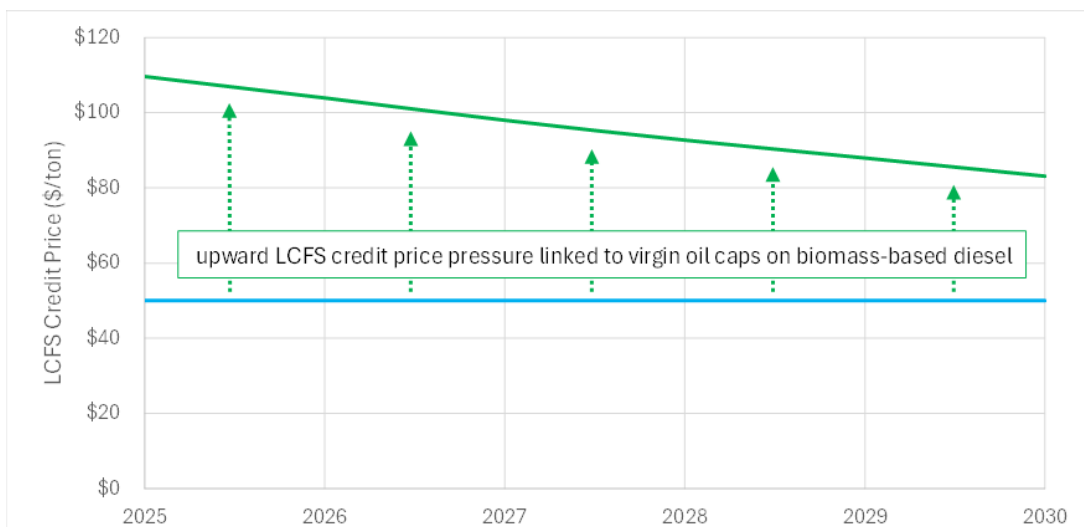
185.1 Cont. achieve GHG emission reductions more quickly and cost-effectively than anticipated, as reflected in the greater ambition proposed in this rulemaking. CARB's analysis presented at the April 10 workshop and included in Attachment D of the amendment package clearly reflects the risks of selective limitations. A more selective approach, including a biomass-based diesel cap as proposed in the amendments and reduction of the Avoided Methane Credit eligibility for dairy projects built pre-2030 from 3 to 2 crediting periods, results in fewer GHG emission reductions, more petroleum use, higher health costs, and higher LCFS program costs overall.⁴ Therefore, the 15-Day Amendments directly contradict CARB's own analysis by proposing a less favorable approach by all the analyzed measures. The anticipated higher program costs to achieve fewer GHG emission reductions, realize fewer health benefits and decrease petroleum reductions also reduces or reverses the overall benefits versus costs of the LCFS program.

- 185.2
- **Unexplained modifications in modeling and analysis.** Ultra-low sulfur diesel (ULSD) volumes have varied considerably across the various iterations of analysis supporting the rulemaking process. ICF and others have highlighted specific oddities that call into question some of the changes made in the 15-Day Amendments regarding the volumes of ULSD, and the implications for modeled outcomes of the LCFS program that inform this rulemaking. Specifically: 1.) the baseline ULSD consumption in the most recently published analysis has decreased substantially from what was presented in April 2024; 2.) there is also an unexplained substantial decrease in the ultra-low sulfur diesel in the proposed scenarios, thereby making the most recent Proposed 15-Day Amendments relatively more attractive; 3.) it is unclear why both the starting baseline and the expected market changes in the modeled scenarios have changed so much between iterations. The ULSD volume discrepancies are graphed below.



⁴ CARB Staff Presentation from April 10, 2024 workshop and Attachment D of 15-Day Amendment package

- ***The LCFC remains concerned that the four-to-one CI penalty is likely to have a dampening effect on project investments.*** The proposed regulation, which was not developed or vetted in a workshop, would apply a four-to-one CI penalty if it moves unfavorably to the credit-generating CI during the true-up. Operators will be forced to apply a very conservative margin of safety to the CI of projects, reducing its quarterly revenues. Entities that intend in good faith to comply with the true-up, but fall short, will be disproportionately penalized, resulting in a disincentive for investment when more investments are needed to achieve the LCFS program goals.
- ***The proposed individual company 20% virgin oil cap can create upward pressure on LCFS credit prices.*** ICF analysis found that the proposed caps and assigned CI scores for incremental volumes of virgin oil-derived on-road diesel above the cap “is more likely to increase the LCFS credit price in the market in ways that are not reflected in Staff analysis”. The following graphic is an illustrative example based on ICF’s analysis of potential upward pressure on LCFS credit prices relative to a theoretical constant credit price of \$50/ton.



Furthermore, while the proposed cap applies only to on-road diesel fuels, the provision is likely to dampen the investment and production prospects for renewable diesel-SAF projects by shrinking the value stream from incremental volumes.⁵

- ***CARB has the opportunity to refine the 15-Day Changes so that the LCFS program will disincentivize less-sustainable biofuels and incentivize more-sustainable biofuels by encouraging lower-CI practices.*** The proposed sustainability provisions increase compliance costs for biofuel pathways without providing any commensurate incentive for feedstock providers or producers to reduce CI, which would advance the underlying objective of the LCFS program to reduce GHG emissions. Rather than selectively disadvantaging biofuel CI scores, the LCFS program should adjust CI scores favorably or

⁵ See ICF comment letter in response to 15-Day Amendments

unfavorably depending on real-world performance, to better reflect the fundamental LCFS principles of technology-neutrality and science-based performance measurement. Such an approach can expand and enhance the global sustainable fuels market and minimize the risk of unintended consequences, and be in accord with the rapid phase down of petroleum-based fuels now codified into California law.

Maintaining a commitment to crediting GHG emission reductions from all sources and feedstocks related to transportation within the LCFS program will ensure that California continues to lead the world in addressing the climate crisis, at the lowest possible cost.

Sincerely,



Robin Vercruse
Executive Director
Low Carbon Fuels Coalition





CALIFORNIA ASSOCIATION of SANITATION AGENCIES

925 L Street, Suite 200 • Sacramento, CA 95814 • TEL: (916) 446-0388 • www.CASAweb.org

August 27, 2024

Matt Botill, Division Chief
Industrial Strategies Division

Cheryl Laskowski, Branch Chief
Transportation Fuels Branch

California Air Resources Board
1001 I Street
Sacramento, CA 95814

Submitted electronically via: <https://ww2.arb.ca.gov/lispub/comm/bclist.php>

Re: CASA Comments on the Low Carbon Fuel Standard Proposed 15-Day Regulatory Revisions

Dear Mr. Botill and Ms. Laskowski:

The California Association of Sanitation Agencies (CASA) appreciates the opportunity to provide comments on the proposed 15-day revisions to the Low Carbon Fuel Standard (LCFS) released August 12, 2024. CASA is an association of local California wastewater agencies, known as Water Resource Recovery Facilities (WRRFs), engaged in advancing the recycling of wastewater into usable water, as well as the generation and beneficial use of renewable energy, biosolids, fuel, and other valuable resources. Through these efforts we help create a clean and sustainable environment for Californians.

Our members are focused on helping the State achieve its climate change mitigation mandates and goals, which include:

- Reducing short-lived climate pollutant (SLCP) emissions by accepting and co-digesting diverted organic (food) waste from landfills pursuant to SB 1383
- Reducing carbon intensity of transportation fuel by using the biogas we generate
- Providing 100 percent of the state's energy needs from clean and renewable sources
- Increasing soil carbon and carbon sequestration by land applying biosolids and supporting the Healthy Soils Initiative, Climate Smart Strategy, and Wildfire and Forest Resilience Action Plan

186.1

CASA continues to urge CARB to carve out the wastewater sector to preserve the use of and credit for our non-fossil renewable wastewater-derived biomethane in the LCFS program indefinitely. The wastewater sector will continue to produce and capture biogas, as well as strive to beneficially use (not waste) it for as long as we are performing the essential public service of wastewater and solids treatment with anaerobic digesters. However, reducing the credit periods from three to two for the avoided methane credit will disincentivize co-digestion projects at WRRFs within California and unintentionally drive co-digestion projects out-of-state. We made similar arguments during the Scoping Plan Update and the Advanced Clean Fleet (ACF) regulations. In fact, the CARB Board included language in the last paragraph of the adopted [Resolution 23-13](#) accompanying the adoption of the ACF Regulations directing staff to work with sister regulatory agencies and CASA to ensure multiple long-term uses of wastewater-derived biomethane. We urge that the collaborative part of that process begin as soon as possible.

Since its inception, the wastewater sector has been aligned with the LCFS program goals, notably to diversify transportation fuels away from fossil fuel-based sources to both improve air quality and

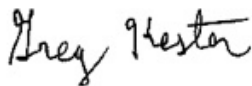
achieve carbon neutrality. The biogas generated at WRRFs not only provides a reliable low carbon fuel, but its use safeguards our communities by fueling vehicles that service infrastructure critical to protecting public health and the environment in all geographical dispositions and in response to major events, including planned power outages. Additionally, there is a need for immediate reductions from federal mobile (including aircraft) sources to meet State Implementation Plan (SIP) requirements in non-attainment zones for ozone (e.g., South Coast-LA Basin) as well as address the estimated 10% deficit in jet fuel. Utilizing WRRF biomethane as a low carbon fuel can meet the federal aviation needs and needed ozone reductions.

186.2 Additionally, we support CARB's proposed change to section 95488.3(d) (including Table 6) to account for land use changes related to crops grown for low carbon fuel production to more accurately represent its carbon intensity. To be consistent, CASA strongly recommends accounting for carbon
186.3 sequestration achieved in soils where biosolids (a byproduct of co-digestion) are land applied in the estimate of carbon intensity. This aligns with CARB's intention to account for life cycle emissions of each pathway, and supports each sustainability criterion required under subsection 95488.9(g).

186.4 **We strongly urge CARB to preserve the use of our biogas as a viable low carbon fuel in perpetuity or as long as feasible since it will always be produced and successful implementation of SB 1383 mandates hinges on its beneficial use.**

We appreciate this opportunity to comment and your willingness to consider our recommendations. We look forward to continued collaboration to develop pragmatic solutions to these issues. Please let me know if we can set a time to meet for discussion of our recommendations. I can be contacted at gkester@casaweb.org or at 916-844-5262 and Sarah Deslauriers can be reached at sdeslauriers@casaweb.org or at 925-705-6404.

Sincerely,



Greg Kester
Director of Renewable Resource Programs

cc: Adam Link, Executive Director, CASA
Sarah Deslauriers, Director of Air, Climate, & Energy Programs, CASA
Rajinder Sahota, CARB
Anil Prabhu, CARB
Charlotte Ely, SWRCB
Chris Hyun, SWRCB
Zoe Heller, Director CalRecycle
Mark de Bie, CalRecycle
Cara Morgan, CalRecycle



Par Pacific's Comments on the 15-Day Package

August 27, 2024

Mr. Matt Botill
Chief, Industrial Strategies Division
California Air Resources Board
1001 I Street Sacramento, California 95812

Ms. Rajinder Sahota
Deputy Executive Officer
Climate Change & Research
California Air Resources Board
1001 I Street Sacramento, California 95812

Dear Mr. Botill and Ms. Sahota,

We appreciate the opportunity to provide comments on the proposed modifications to the text of the LCFS amendment issued August 12, 2024 (the "15-Day Changes").

Par Pacific Holdings, Inc. (NYSE: PARR), headquartered in Houston, Texas, is a growing energy company providing both renewable and conventional fuels to the western United States. Par Pacific owns and operates 219,000 bpd of combined refining capacity across four locations in Hawaii, the Pacific Northwest and the Rockies, and an extensive energy infrastructure network, including 13 million barrels of storage, and marine, rail, rack, and pipeline assets. In addition, Par Pacific operates the Hele retail brand in Hawaii and the "nomnom" convenience store chain in the Pacific Northwest. Par Pacific also owns 46% of Laramie Energy, LLC, a natural gas production company with operations and assets concentrated in Western Colorado. More information is available at www.parpacific.com.

Par Pacific has announced a \$90 million investment at its Kapolei, Hawaii refinery to convert an existing distillate hydrotreater unit to produce renewable fuels. The 61 million gallon per year project is expected to produce renewable diesel, sustainable aviation fuel, renewable naphtha, and renewable light-end products. The project is expected to be completed during the second half of 2025.

The 2025 Step-Down and Auto-Adjustment Mechanism (AAM)

187.1 We support the increase in the step-down from 5% to 9% in 2025. We also support the inclusion of the AAM but are concerned that its first potential triggering remains, as in the 45-day package, with 2028 being the first year for which it can amend CI reduction targets. Instead, we recommend that 2025 performance should be able to trigger the AAM, which would then be able to impact CI targets in 2027.

187.2 In short, the AAM should be allowed to trigger as early as possible, to guard against the case where the step down is not sufficient to address the current credit bank oversupply. This is especially the case since CARB did not include the more aggressive step-down in 2025 as recommended by ICF and as advocated for by many stakeholders in comments on the 45-day package.

The Cap on Credits on Biomass-Based Diesel (“BBD”) from Soy and Canola Feedstocks

187.3

We were surprised and disappointed that CARB included major changes from the current regulation and the 45-day package in the 15-Day Changes related to caps on credits for soy and canola. We do not believe that it is appropriate to include impactful revisions without the supporting science and an adequate public process.

Caps on credits for BBD pathways with soybean oil and canola feedstocks were added in the 15-Day Changes despite these matters not being workshopped, and being contrary to CARB’s position as expressed in its April 10, 2024 workshop (the “Workshop”), including as set forth in staff’s presentation for it.

CARB has only provided stakeholders 15 days to submit comments on these major changes, however they include provisions that may cause some biofuels producers to go out of business and leave stranded assets. This potential outcome is inconsistent with CARB’s guiding principles for the LCFS and may result in reduced renewable diesel and biodiesel in the California fuel pool.

In short, to include such drastic changes at this juncture is bad public policy and is unfair to stakeholders, including those living in disadvantaged communities

187.4

1. The 20% cap on credits for BBD from soy and canola feedstocks is unnecessary and will result in higher GHG emissions and tailpipe emissions for Californians, especially those in disadvantaged communities.
 - a. As CARB made clear in the Workshop, soybean oil BBD will become deficit generating by 2033 at the latest and perhaps 2030 if the AAM mechanism is triggered twice. The use of soybean oil as a feedstock will then phase out, rendering the cap unnecessary.
 - b. Furthermore, as CARB explained in the Workshop, the science does not exist to justify a cap on crop-based biofuels at this time.
 - c. CARB also made clear in the Workshop, the LCFS already contains guardrails that disincentivize the use of crop-based feedstocks through the inclusion of an indirect land use change (“iLUC”) Carbon Intensity (“CI”) penalty and sustainability requirements. The amended LCFS will contain stringent sustainability requirements including certification by an internationally recognized body and third-party verification.
 - d. As the 2022 Scoping Plan sets forth, and CARB has reiterated in the amendment proceeding, including in the Workshop, internal combustion engines will be on California roads for years to come and the heavy-duty fleet is expected to transition slowly. Heavy-duty trucking is extremely difficult to electrify, and it is projected that there will not be enough hydrogen production or refueling infrastructure in the foreseeable future.

As the Scoping Plan noted, the answer in the transition period is the use of low carbon liquid fuels like BBD for the heavy-duty trucking sector.

187.4
cont.

The LCFS incentivizes the use of waste-based feedstocks to make BBD due to the iLUC penalty on crop-based feedstocks, however there are clear signs that there will not be enough of these feedstock streams by 2030 to supply the market. This will be especially true as renewable diesel production continues to grow.

187.5

The EPA recently announced that it is investigating at least two biofuel producers amid concerns they are using virgin palm oil disguised as used cooking oil (“UCO”) as feedstocks to generate RINs. The EU is also investigating the same issue. Without valid Chinese UCO, there will not be sufficient feedstocks for the necessary RD production unless producers can generate LCFS credits on the crop-based RD they produce. In addition, we expect the unintended consequence of more Chinese UCO being imported into the US to meet the CARB requirements and further incentive to blend virgin palm oil into the UCO pool, running counter to CARB’s intentions.

187.6

2. **The possible end of BBD fuel pathways.** We were also surprised by the inclusion of a provision in the 15-Day Changes allowing for the possibility of CARB not accepting fuel pathway applications for BBD starting on January 1, 2031. This provision was not workshopped or discussed before the 15-Day Changes.

If CARB insists on this provision, the triggering mechanism should be limited to the number of ZEV or near-ZEV classes 7 & 8 vehicles, i.e., the heavy-duty trucking categories, since these are the vehicles that are difficult to electrify.

3. **The 15-Day Changes reflect out-of-date databases to determine iLUC**

On p. 10 of the Notice, CARB describes its proposed changes to Table 6, Land Use Change Values for Use in CI Determination as follows:

187.7

In section 95488.3(d), Table 6, staff proposes to add specification of the geographic region to Table 6, identifying where land use change (LUC) carbon intensity was modeled for specific feedstock/fuel combinations. **Table 6 LUC values were estimated through the GTAP and AEZ-EF modeling framework developed by CARB with input from an expert working group in 2010 and were updated during CARB’s re-adoption of the LCFS program in 2015.** [Emphasis added.]

It was at this time that CARB assessed the iLUC for soy BBD at its current value of 29.1. However, as Dr. Farzad Taheripour et al explain in their June 2023 report entitled *Biodiesel induced land use changes: An assessment using GTAP-BIO 2014 data base*, appended hereto and incorporated by this reference, CARB’s assessments of LUC value were made using an earlier version of the GTAP-BIO model than is used today, as well as a 2004 database. However, the 2004 database has been updated twice since then, once in 2011 and again in 2014. In addition to updating the database, the Purdue GTAP team has also greatly improved the GTAP-BIO model to take into account intensification due to multiple cropping and/or conversion of idled land to crop production.



Par Pacific

187.8

Therefore, the 2004 data base and model CARB has been using was out-of-date, and CARB will be compounding the issue in the upcoming amendment by continuing to use them. The Scoping Plan requires CARB to use “the best available science” when computing emissions from crop-based feedstocks. Therefore, we request that CARB use the current GTAP-BIO model and 2014 database to calculate iLUC for such feedstocks.

187.9

Furthermore, we request that CARB continue to accord an equivalent iLUC value to Argentine soybean oil as the iLUC value for US soybean oil-based BBD. In addition to the same iLUC value, we also request that CARB continue to accord Argentine soy farming emissions an equivalent value to those of US soy.

187.10

4. **Eliminating fossil jet fuel as a deficit generator.** In the 45-day text, fossil jet from in-state jet fueling was added as a deficit generator. Again, without prior discussion, CARB removed the provision from the 15-Day Changes.

187.11

In closing, we note that there is sufficient time before the November Board meeting for CARB to issue a second 15-day package. We urge CARB to do so.

Sincerely,

Par Pacific Holdings, Inc.

**Biodiesel induced land use changes: An assessment using GTAP-BIO 2014
data base**

By

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**Department of Agricultural Economics
Report: June 2023**

This research was funded by Clean Fuels Alliance America

Biodiesel induced land use changes: An assessment using GTAP-BIO 2014 data base

Farzad Taheripour, Omid Karami, and Ehsanreza Sajedinia

1. Introduction

Biofuel production and policy may Induce Land Use Change (ILUC) emissions. However, the extent to which these emissions may occur needs more attention. Biofuel production started to grow in the early 2000s for several reasons, including but not limited to: major surpluses in crop markets leading to low crop prices, high crude oil prices, and environmental concerns about the expansion in consumption of fossil fuels (Taheripour et al., 2022). In the late 2000s, in the absence of actual observations, some papers argued that biofuel production will largely increase demand for new cropland, generate major deforestation, and cause large GHG emissions (Tilman et al., 2006; Fargione et al., 2008, Searchinger et al., 2008; Plevin et al., 2010). Since then, major efforts have been made to re-evaluate these early assessments. These efforts have concluded that the early research in this area had significantly overstated the land use implications of biofuels (Zilberman et al., 2018). Some of these efforts are highlighted in the following.

More than a decade ago, Searchinger et al. (2008) used the CARD/FAPRI model and argued that producing corn ethanol in the U.S. will generate more than 100 grams of CO₂ emissions equivalent per megajoule (gCO₂e/MJ). Over time, this model has been modified and improved by various authors. As an example, in a more recent paper, Carriquiry et al. (2019), using an improved version of this model, have estimated that the land use emissions associated with U.S. corn ethanol could vary between 9.7 gCO₂e /MJ and 23.9 gCO₂e/MJ. These values are substantially lower than the estimated ILUC value by Searchinger et al. (2008).

In the late 2000s, the GTAP-BIO model was developed at Purdue University to assess the economic and environmental impacts of biofuels production and policy. Since then, this model has been frequently improved and used to evaluate the land use emissions due to biofuels. In the earlier stages of this process, the California Air Resources Board (CARB) adopted and used this model to assess ILUC emission values for various biofuel pathways. The early improvements in this

model were made based on a set of recommendations suggested by an expert group assembled by CARB. Using the improved model, CARB (2015) has assessed that corn ethanol and soybean biodiesel generate about 19.8 gCO₂e/MJ and 29.1 gCO₂e/MJ emissions, respectively. Those assessments were made using the GTAP-BIO model and its 2004 benchmark data base.

In addition to the improvements mentioned above, several new efforts have been made to further improve the GTAP-BIO model since 2015. Taheripour et al. (2017) made two lines of modifications in this model. They first used an updated benchmark data base. Unlike the CARB assessment that was based on benchmark data for 2004, Taheripour et al. (2017) used a newer GTAP-BIO data base to represent the global economy in 2011. In addition, they improved the model to take into account intensification due to multiple cropping and/or conversion of idled land to crop production. They also made it possible to take into account the fact that yield to price response varies by region. With these modifications, Taheripour et al. (2017) have shown that induced land use emissions due to corn ethanol and soybean biodiesel would be about 12 gCO₂e /MJ and 18.3 gCO₂e /MJ emissions, respectively.

The estimated ILUC values for corn ethanol and soybean biodiesel have generally followed declining trends over time. For example, Figure 1 provides an overview of several estimated ILUC emissions for soybean biodiesel obtained from various modeling approaches.

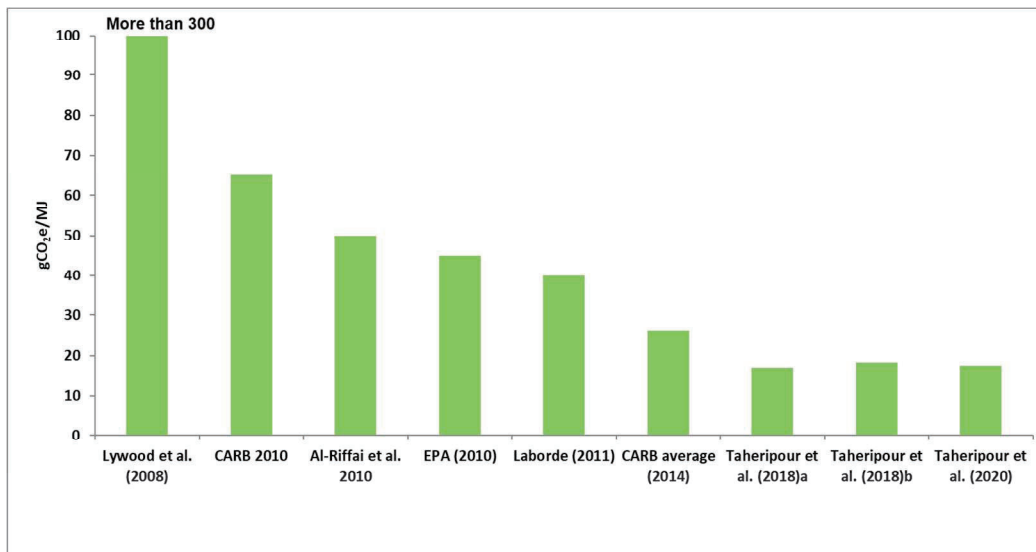


Figure 1. Some estimated ILUC values for soybean biodiesel.

As shown in Figure 1, the estimated ILUC values for soybean biodiesel has declined over time from more than 300 gCO₂e/MJ (estimated by Lywood et al., 2008) to 17.5 gCO₂e/MJ (estimated by Taheripour et al., 2020). Various factors, including model and data improvements, productivity increases, intensifications, and tuning modeling practice to actual observations, explain the observed declining trend in ILUC emissions for soybean biodiesel.

In a recent effort, a new data base has been developed for use in the GTAP-BIO data base. This new data base represents the global economy in 2014. This research uses this new data base and provides new assessments for ILUC emissions values for the U.S. soybean biodiesel and rapeseed biodiesel pathways. This report uses the modeling framework developed and reported by Taheripour et al. (2017) to provide these assessments. The rest of this research report provides the following sections. First, the 2014 GTAP-BIO data base is introduced. Then a brief summary of the GTAP-BIO model used in this study is provided. The examined scenarios are outlined in the next section. The last section provides the results.

2. 2014 GTAP-BIO data base

The standard GTAP data bases which trace production, consumption and trade of all goods and services by country at the global scale do not explicitly represent biofuels and their by-products. In a pioneer practice and for the first time, Taheripour et al. (2007) introduced biofuels into the 2001 GTAP data base and generated the first GTAP-BIO data base. In 2001, only a few countries (mainly Brazil, U.S., and some EU members) were producing limited amounts of biofuels. The global biofuel production was about 5 billion gallons in 2001. Since then, major efforts have been made to provide GTAP-BIO data bases for 2004 (Taheripour and Tyner, 2011) and 2011 (Taheripour et al., 2016). However, as the number of biofuel-producing countries and quantities of biofuels produced in each country grew over time, introducing biofuels into GTAP data bases turned to a challenging and time-consuming task. For example, it took a long time to introduce about 23 billion gallons of ethanol and 6 billion gallons of biodiesel produced from different feedstock across the world into the 2011 GTAP-BIO data base.

While introducing biofuels into a new version of GTAP-BIO data bases is an important task to accomplish, more steps are required to develop one of these data bases. In addition to biofuels, these data bases trace land cover, land use, harvested area, and crop production across the world. Furthermore, compared to the standard GTAP data bases, the GTAP-BIO data bases split various original GTAP sectors to better understand and establish the links between biofuels, agricultural, non-agricultural, and energy sectors. For additional steps needed to generate a new GTAP-BIO database, see Taheripour et al. (2016).

During the past three years, major efforts have been made to update the GTAP-BIO data base to represent the global economy in 2014. This data base is developed based on the standard GTAP data base for this year (Aguilar et al. 2022). To accomplish this task, data on biofuels produced and consumed around the world by feedstock were collected and introduced into the Input-Output table of each biofuel-producing country. The monetary values for crops and food products for each country are matched with the corresponding data provided by the Food and Agricultural Organization (FAO). Following Taheripour et al. (2016), the following standard GTAP sectors are divided into new sectors:

- Coarse grains (gro) is divided into: corn and other coarse grains,
- Oilseeds (osd) is divided into: Soybeans, rapeseed, palm, and other oilseeds,
- Vegetable oil (vol) is divided into: vegetable oil soy, vegetable oil palm, vegetable oil rapeseed, vegetable oil other, and their corresponding meals,
- Food (ofd) is divided into: Food and feed,
- A dummy sector is introduced for cropland pasture (this version includes cropland pasture for all countries around the world).

In addition to the above changes, a new sector is added to blend biofuels with conventional transportation fuels. Furthermore, following Baldoset al. (2020), land cover, land use, and crop production by Agro Ecological Zones are added to the data base for 2014.

In what follows, we compare a few key differences between the 2011 and 2014 GTAP-BIO data bases. Figure 2 compares ethanol and biodiesel produced across the world in these two data bases. The global supplies of ethanol and biodiesel were about 22.8 billion gallons and 6.1 billion gallons

in 2011, respectively. The corresponding figures in 2014 were about 24 billion gallons for ethanol and 5.6 billion gallons for biodiesel. The largest ethanol producers in these two years are the U.S. and Brazil at the global scale. The EU region is the largest biodiesel producer in both years. In general, ethanol production has increased in most regions across the world in 2014 compared to 2011. However, in the case of biodiesel, the global supply has declined in 2014 compared to 2011 with some fluctuations across the world.

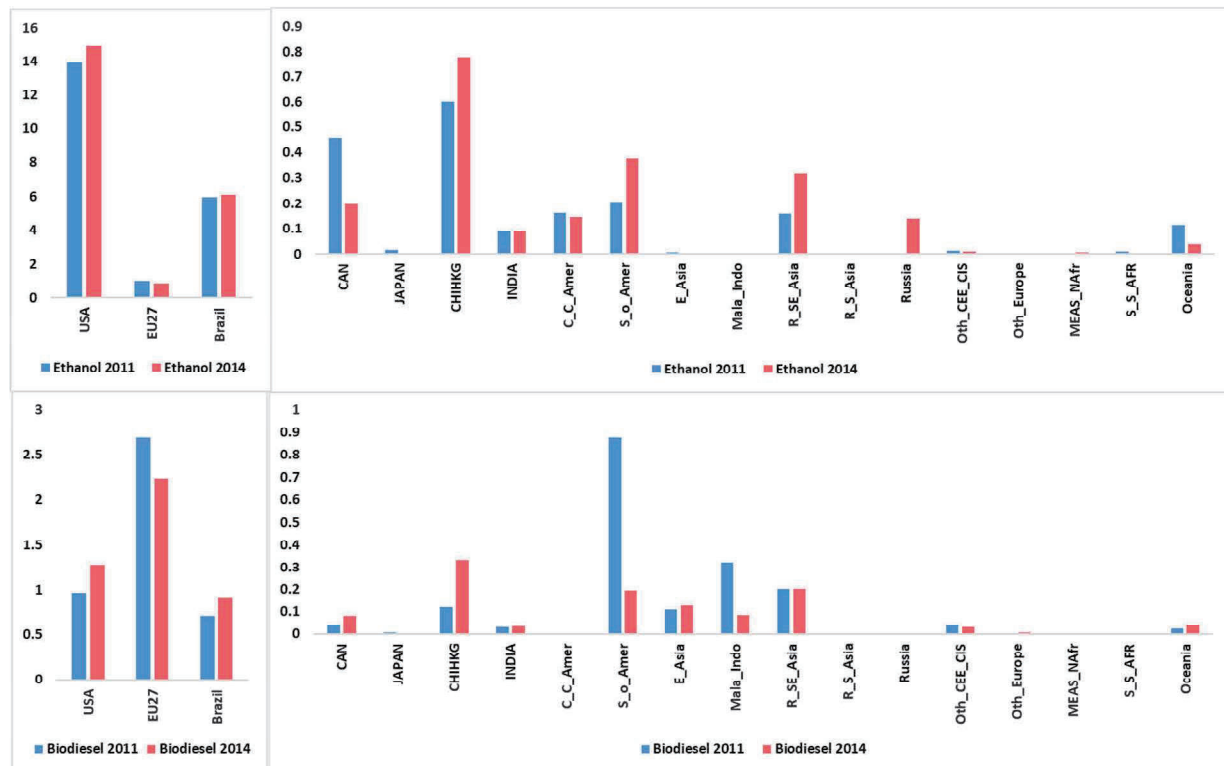
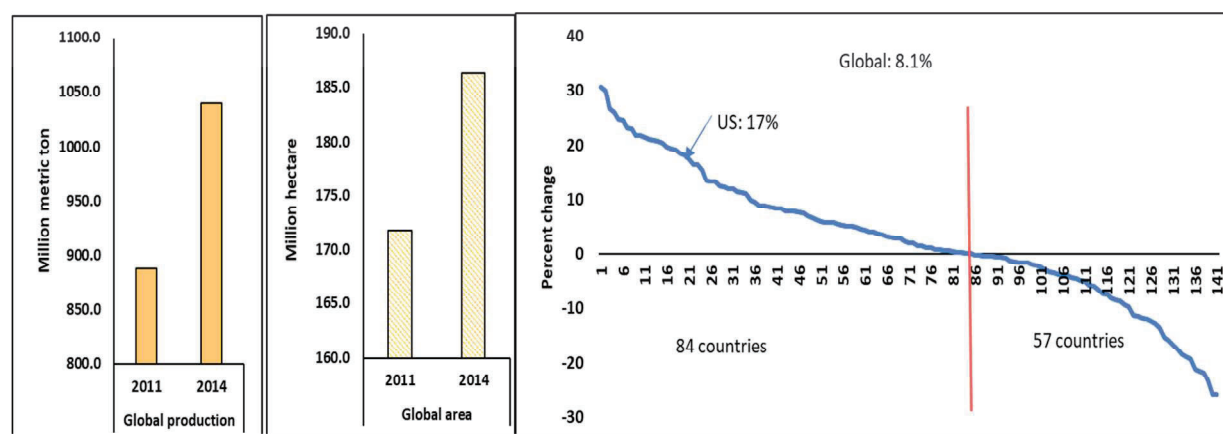


Figure 2. Biofuels produced across the world: 2011 and 2014 GTAP-BIO data bases

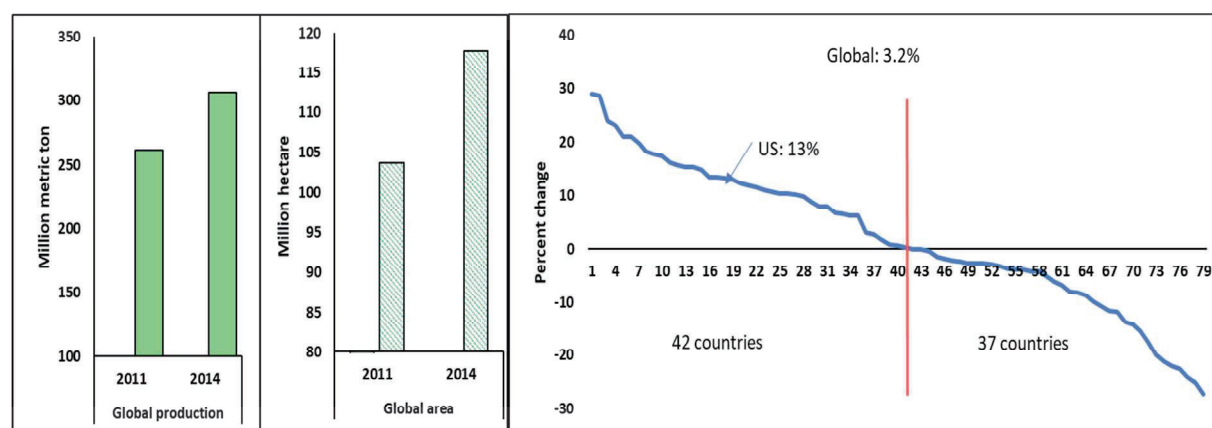
Figures 3 and 4 highlight a key difference between the 2011 and 2014 data bases. These figures mainly compare changes in corn and soybean yields by country between 2011 and 2014. For example, Figure 3 shows that between 2011 and 2014 the area of corn and its production have increased at the global scale. In addition, this figure shows that between 2011 and 2014 corn yield has increased in 84 countries and decreased in 57 other countries with an average increase of 8.1% at the global scale. The corresponding yield increase for U.S. corn was about 17%. Figure 4 provides a similar pattern for the case of soybeans between 2011 and 2014. For the case of soybean, yield has increased in 42 countries and declined in 37 countries, with an average increase of 3.2% at the global scale. Between 2011 and 2014, the U.S. soybean yield has increased by 13%. In

general, crop yields were higher in 2014 compared to 2011 in many countries because in this year drought conditions occurred in many countries.



Panel A: Area Panel B: Production Panel C: Yield

Figure 3. Global corn area and production in 2011 and 2014 and regional percentage changes in corn yield between these years



Panel A: Area Panel B: Production Panel C: Yield

Figure 4. Global soybean area and production in 2011 and 2014 and regional percentages change in soybean yield between these years

The differences between the 2011 and 2014 data bases go beyond the differences just between the biofuel and agricultural sectors. Rather, they cover a wide range of changes across many economic activities that could directly or indirectly affect the biofuel analyses. While any element of the new

data base is different from its older version, reflecting the state of the global economy in that year, the extent to which any of these differences could affect the ILUC results could be insignificant.

3. Implemented GTAP-BIO model

We use the GTAP-BIO model developed and reported by Taheripour et al. (2017). Compared to the earlier version of this model used by CARB, this version takes into account multiple cropping and conversion of unused cropland to active cropland. This model has been adopted by the Carbon Offset and Reduction Scheme for International Aviation (CORSIA) of the International Civil Aviation Organization (ICAO) of the United Nations (Zhao et al., 2021) as well. However, this is the first research that uses the 2014 GTAP-BIO data base in combination with this model.

In summary, this model includes and carries all properties and developments made in the GTAP-BIO model to date. The implemented modifications are augmented in this model to take into account market-mediated responses that occur in real world due to biofuels. Among these market-mediated responses are interactions between agricultural (crops and livestock), forestry, biofuel, and energy sectors with other industries and services. For example, it takes into account land transition among land cover items considering opportunity costs of land conversions. It also allows crop switching among alternative crops due to changes in relative crop prices. Endogenous yield improvements due to higher crop prices are included as well. It also considers yield differences between the new and existing croplands. In addition, it allows conversion of cropland pasture (a sub-category of cropland used by livestock) to cropland. The model also takes into account multiple cropping and the use of unused cropland for crop production. Lastly, the model considers substitution among animal feed rations and allows substitution between conventional transportation fuels and biofuels. As noted in the data base section, unlike the earlier versions, the model now incorporates land classified as cropland pasture for all regions.

We use the AEZ-EF emission module Plevin et al. (2014) to convert the estimated GTAP-BIO land conversions to land use emissions. Note that currently the AEZ-EF module follows the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. An update in this module according to the new IPCC 2019 refinement could alter the ILUC results provided in this report.,

4. Examined scenarios

In this research, we assess ILUC emission values for the following various soybean biodiesel demand shocks to evaluate the extent to which ILUC values may respond to shock sizes:

- i) An expansion in soybean oil biodiesel by 1.05 billion gallons off of 2014
- ii) An expansion in soybean oil biodiesel by 1.35 billion gallons off of 2014
- iii) An expansion in soybean oil biodiesel by 1.81 billion gallons off of 2014
- iv) An expansion in soybean oil biodiesel by 2.22 billion gallons off of 2014
- v) An expansion in soybean oil biodiesel by 2.51 billion gallons off of 2014
- vi) An expansion in soybean oil biodiesel by 3.22 billion gallons off of 2014

In addition, we calculate ILUC emission values for the following shocks in rapeseed biodiesel:

- i) An expansion in rapeseed oil biodiesel by 0.06 billion gallons off of 2014
- ii) An expansion in rapeseed oil biodiesel by 0.47 billion gallons off of 2014
- iii) An expansion in rapeseed oil biodiesel by 0.03 billion gallons off of 2014

5. Results

5.1. ILUC values

Figure 5 shows the ILUC emission values for the implemented soybean biodiesel shock sizes. This figure shows an ILUC value of 9.11 gCO₂e/MJ for an increase in soybean biodiesel by 1.05 billion gallons. The ILUC value slightly increases to 9.78 gCO₂e/MJ for the largest implemented shock size of 3.22 billion gallons. The results presented in Figure 5 suggest that the soybean ILUC values do not significantly change with shock size. That basically shows that the model results are linear and are not sensitive to the shock size of soybean biodiesel.

As noted in the introduction section, using the 2011 GTAP-BIO data base, Taheripour et al. (2017) estimated an ILUC value of 18.3 gCO₂e/MJ for soybean biodiesel. However, the results provided in Figure 5 indicate that the 2014 data base provides a significantly smaller ILUC value than using the 2011 data base for this type of biodiesel, even with the largest implemented shock size (9.78 gCO₂e/MJ for 3.22 billion gallons). Three factors mainly contribute to this result: (1) Higher soybean yields in 2014 than 2011; (2) including cropland pasture in all regions of the model, and (3) a larger crop production base in 2014 compared to 2011. Regarding the first factor, *ceteris paribus*, the higher the yield, the lower the ILUC value. The second factor helps to use cropland pasture across the world instead of higher demand for conversions of pasture and forest to

cropland, leading to lower land use emissions. Finally, the last item refers to saving in the existing uses of various related items due to biofuel demand. For a given change in demand for soybean biodiesel, a portion of the additional demand will come from the savings in current consumptions of oilseeds, vegetable oils, tallow, and animal fats. Hence, ceteris paribus, the larger uses of oilseeds and vegetable oils in the 2014 data base (compared to 2011) provides more savings in the existing uses of oilseeds, vegetable oils, tallow, and animal fats, leading to less demand for land conversions and hence a lower ILUC value. Also, it is important to note that the 2014 area of soybeans provides more feedstock due to yield improvements, which leads to lower demand for land conversion.

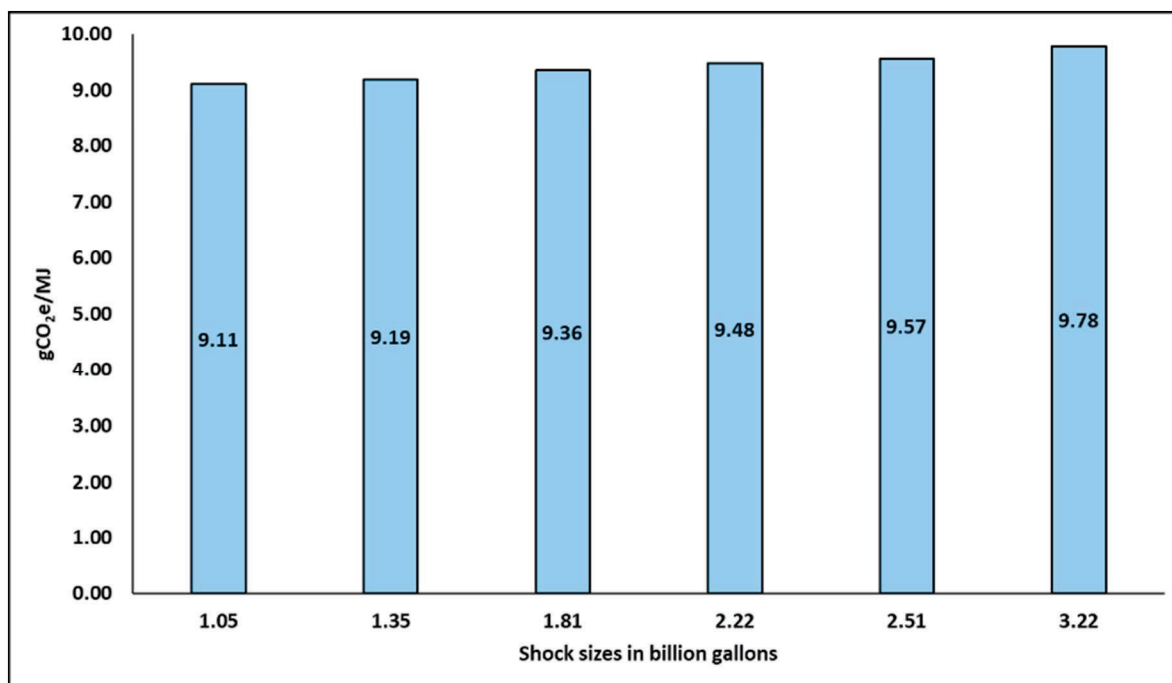


Figure 5. Soybean biodiesel ILUC emission values for various levels of shock sizes using the GTAP-BIO 2014 data base.

Figure 6 shows the ILUC values for the three examined small levels of increased rapeseed biodiesel demand. This figure shows that an increase in this type of biodiesel by 0.03 billion gallons generates an ILUC emission value of 14.07 gCO₂e/MJ. The ILUC emission value for this biodiesel increases to 14.22 gCO₂e/MJ for a shock size of 0.06 billion gallons and to 15.06 gCO₂e/MJ for a shock size of 0.47 billion gallons. These results suggest that the size of ILUC grows slightly as the shock size grows for this type of biodiesel. That is because the U.S. rapeseed and rapeseed oil sectors are small, so yield increases result in relatively less increased supply of

rapeseed oil than would occur in the case of soy. Increases in demand for this biofuel necessitate either domestic land conversion or increased imports of imported feedstock which can trigger land conversion in other rapeseed-producing countries.

Note that, regardless of the shock size, the rapeseed ILUC value is larger than the soy ILUC value. Several factors explain this observation. Unlike soybean biodiesel, a big portion of feedstock for rapeseed biodiesel comes from other countries. The nature of land use and land cover and their corresponding emissions factors in countries that produce rapeseed are different from the U.S. The markets and uses of rapeseed and rapeseed oil are different from soybeans and soybean oil markets. As an example, implementing a similar shock in soybean biodiesel and rapeseed biodiesel will generate different responses in the oilseeds and oil market at the global scale. Compared to the cases of soybean biodiesel, since a big portion of feedstock for rapeseed biodiesel comes from other countries, a shock in this biofuel will generate more effects (e.g., substitutions among oilseeds and oils) outside the U.S. Substitutions among oils in many countries are significantly higher than the U.S. Yield responses are different across the two crops. It is also important to note that the links between rapeseed and palm markets are different than the links between soybeans and palm markets. An expansion in rapeseed demand could relatively induce more land use changes (adjusted to the shock size) in Malaysia and Indonesia than an expansion in soybeans demand.

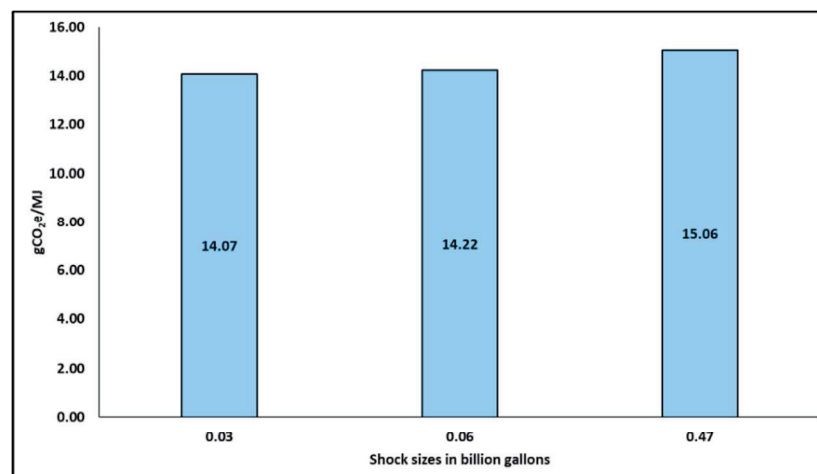


Figure 6. Rapeseed biodiesel ILUC emission values for various levels of shock sizes using the GTAP-BIO 2014 data base.

5.2. Land use changes

Figure 7 shows the global changes in land cover items (forest pasture and cropland for the smallest (1.05 billion gallons in panel A) and largest (3.22 billion gallons in panel B) shock sizes in the soybean biodiesel examined in this research. The largest shock size represents larger land conversion in panel B, following in a linear scale. Regardless of the shock size, Figure 7 shows that the examined expansion in soybean biodiesel generates the largest land conversions in Sub Saharan Africa. This region is a large producer of various grains, oilseeds, and many other crops at the global scale. It is also a U.S. trade partner in several agriculture markets. Cropland has historically increased in this region due deforestation as well. According to these actual observations, which are embedded in the model data base, the model projects that this region provides land conversion to satisfy the increased feedstock demand and/or demand for soy oil substitutes in other markets. After that, more land conversions occur in the main oilseed producers' regions, such as Malaysia-Indonesia, Brazil, and Central and South America.

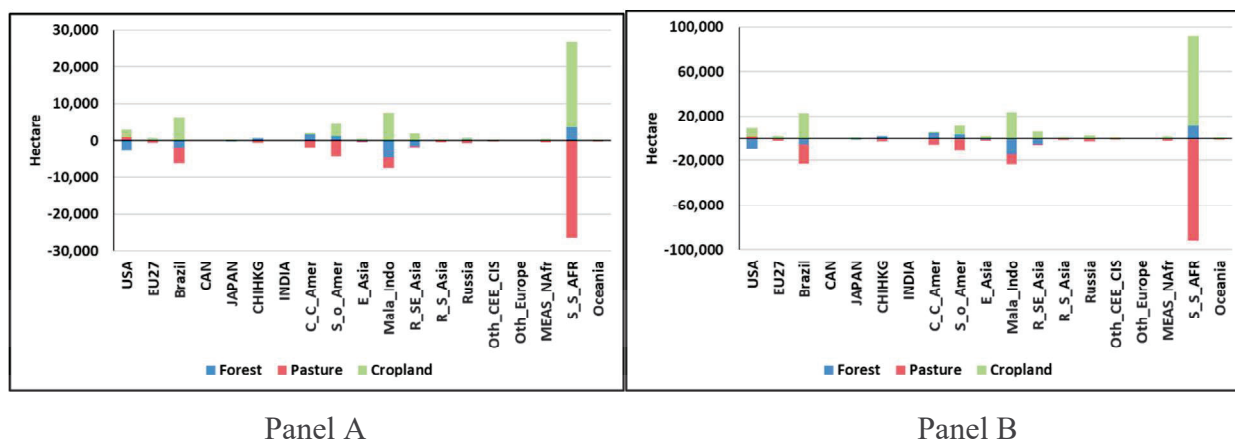


Figure 7. Land conversion due to soybean biodiesel shocks: Panel A for 1.05 billion gallons shock and Panel B for 3.22 billion gallons

In addition to the land conversion among land cover items, expansion in soybean biodiesel provides incentives to convert cropland pasture from livestock use to crop production across the world, as shown in Figure 8. The conversion of cropland pasture for the smallest and largest shocks are presented in panels A and B of Figure 8.

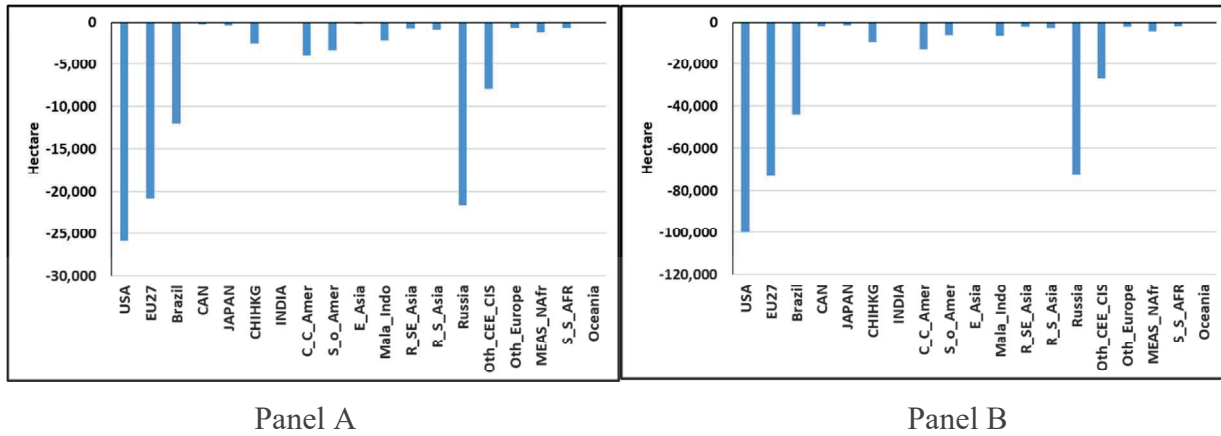


Figure 8. Conversion of cropland pasture from the use by livestock to crop production due to soybean biodiesel shocks: Panel A for 1.05 billion gallons shock and Panel B for 3.22 billion gallons

Finally, Figure 9 illustrates land conversions due to the largest shock (0.34 billion gallons) in rapeseed biodiesel. As shown in this figure, expansion in this type of biodiesel (as for the case of soybean biodiesel) causes larger land conversions in Sub-Saharan Africa relative to other regions. However, for this pathway, land conversion occurs in more regions than in the cases of soybean biodiesel. That said, given the implanted small shocks in rapeseed biodiesel, the scale of land conversion for this pathway is relatively small compared to all soybean biodiesel shocks which are significantly larger. As shown in Figure 10, the expansion in rapeseed biodiesel triggers the conversion of cropland pasture from livestock to crop production as well.

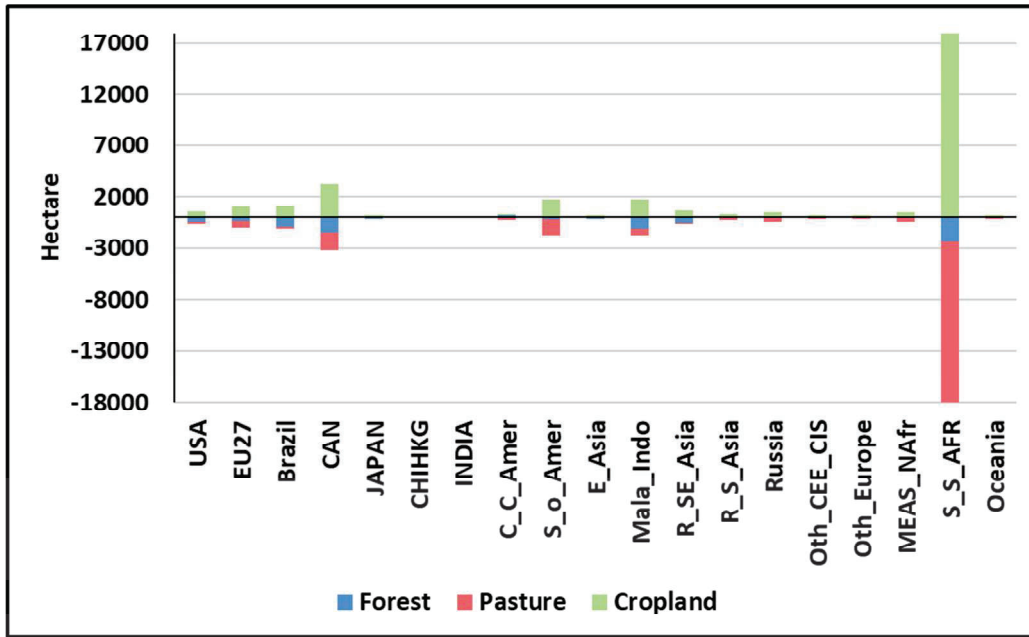


Figure 9. Land conversion due to rapeseed biodiesel shock by 0.47 billion gallons shock

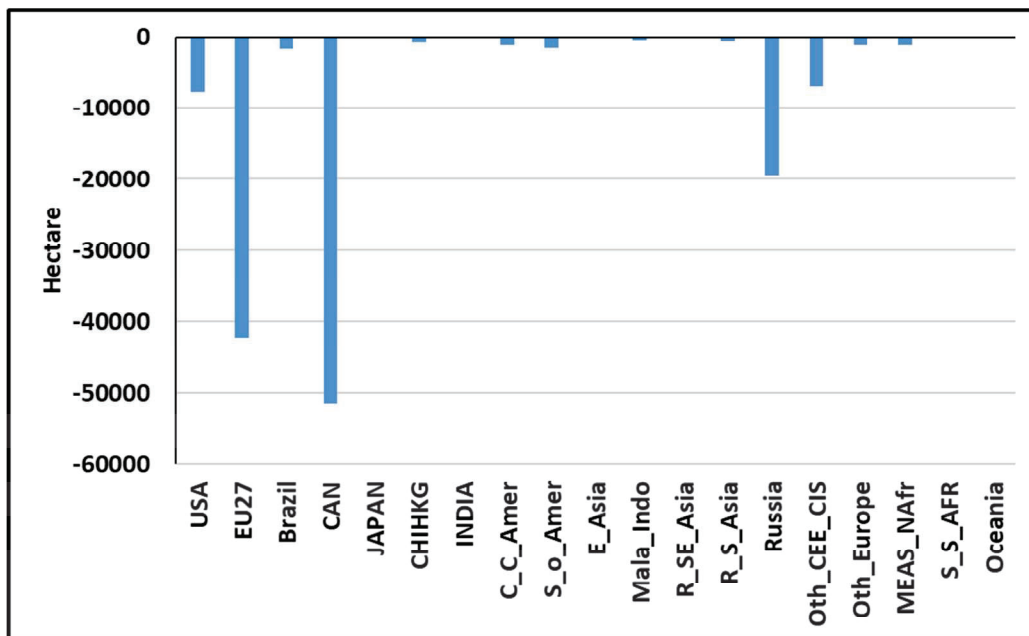


Figure 10. Conversion of cropland pasture from the use by livestock to crop production due to rapeseed biodiesel shock by 0.47 billion gallons shock

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August 27, 2024

The Honorable Liane Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Comments on Proposed Changes to the Low Carbon Fuel Standard

Dear Chair Randolph:

I am writing on behalf of Yosemite Clean Energy, a renewable hydrogen company utilizing agricultural and forest wood waste biomass to produce carbon-negative fuels. Yosemite Clean Energy applauds CARB's commitment to increasing carbon reduction targets and promoting the adoption of alternative fuels.

188.1 However, we strongly oppose the inclusion of particular language within these proposed amendments that would severely limit the viability of the hydrogen industry, specifically in **Section 95488.8(g)**, which describes **"Specified Source Feedstocks."** The changes made to the requirements for forest biomass waste in **subsection A3**, while acknowledging the need for proper forestry management, are still too restrictive to generate the necessary support for biofuels investment that will incentivise the reduction of hazardous forest fuels, which has increasingly had the most detrimental impact on both CO2 emissions in California and the Western USA, and the release of particulate emissions through wildfires. Over the past decade, over 12 million acres have burned in California alone, with overgrown forests continuing to stretch across Federal USFS, industrial and non-industrial forest lands.

188.2 As such, we strongly advocate for all wood biomass feedstocks, whether from forest thinning and biomass residuals, ecosystem restoration work or salvage harvest, no matter the ownership category, to not be restricted beyond current federal and California state laws, and should therefore be acceptable for use under the LCFS. To achieve this, we propose specific amended language that would instead state that:

"Forest biomass waste from non-**merchantable trees** industrial forestland removed for the purpose of wildfire fuel reduction, to reduce the risk to public safety or infrastructure, to create defensible space, or for forest restoration **or salvage operations**; and from a ~~treatment in which no clear cutting occurred~~ and that was performed in compliance with all local, State, and federal rules and permits."

While we understand that other states may not have as stringent forest practice protection laws and regulations as CEQA, NEPA legislation already prevents the abuse of federal forestlands, so a blanket restriction aimed at other states should be outside CARB's purview. Further, forest practices across the US are increasingly concerned with wildfire hazard reduction and biomass removal, as it is the quintessential factor to mitigate the risk of catastrophic wildfires, which a recent [US Senate Report](#) on wildfire estimated to cost between \$394 and \$893 billion per year¹. States are likely to implement their own legislation to reduce the frequency of these wildfires, making CARB's involvement now redundant.

¹ US Senate Joint Economic Committee – Chair, The Hon. John Heinrich (D-NM)
Yosemitclean.com



188.3 **Section 95488.9(g)**, creates a further concern for our company and the wider industry. While initially only applying to crop-based biomass, these restrictions have been extended to cover all biomass. This is unworkable for companies like Yosemite that utilize waste products from both agricultural and forest sources, because the waste is a byproduct and the fuels producer has no control over the crop growing practices. For example, Yosemite is exploring the use of almond shells as a feedstock, but has no control over how almond farmers use pesticides or erosion control methods while growing the crop. Applying the same standards to agricultural or forest residues as to purpose grown crops will prevent the use of waste biomass that will otherwise decompose or burn, releasing carbon into the atmosphere. As such, Yosemite proposes that this section focus solely on purpose grown crops, reading:

188.3 Cont. (g) Sustainability Requirements for **Biomass-Purpose Grown Crops**.

(A) **Biomass Purpose Grown Crops** used in fuel pathways must only be sourced on land that was cleared or cultivated prior to January 1, 2008 and actively managed or fallow, and non-forested since January 1, 2008. **Biomass-Purpose Grown Crops** may not be sourced from land that is covered under international or national law or by the relevant competent authority for nature protection purposes.

(B) **Biomass-Purpose Grown Crops** must be produced according to best environmental management practices that reduce GHG emissions or increase GHG sequestration, including but not limited to:

Yosemite Clean Energy appreciates CARB's continued work, and hopes that these amendments will help achieve CARB's stated goals.

Kind regards,

A handwritten signature in dark ink, appearing to read "Thomas Hobby", with a stylized, flowing script.

Thomas Hobby - MBA, MA, MSc. P. Ag
Chief Executive Officer



August 27, 2024

Submitted electronically at:
<https://ww2.arb.ca.gov/applications/public-comments>

California Air Resources Board
1001 I Street
Sacramento, California 95814

Re: Airlines for America® Comments on Proposed Low Carbon Fuel Standard
Amendments posted August 12, 2024

I. Introduction

Airlines for America® (A4A), the principal trade and service organization of the U.S. airline industry,¹ appreciates the opportunity to provide comments to the California Air Resources Board (CARB) following the posting of Modified Text and Availability of Additional Documents and/or Information Proposed Low Carbon Fuel Standard Amendments.² A4A supports CARB's withdrawal of the proposal to eliminate the jet fuel exemption and its retention of the existing opt-in approach for SAF under the CARB LCFS Program.

These comments supplement our statements provided in written comments on the proposed amendments submitted on February 20, 2024. In those comments we stated that a different approach is necessary for CARB and the aviation industry to achieve our mutual objectives to expand SAF use in California.

189.1 The U.S. airline industry is committed to reducing its climate impact and achieving net zero carbon emissions by 2050. Transitioning to SAF is core to this commitment, and we have pledged to work with governments and other stakeholders to make three billion gallons of SAF available in the United States by 2030. Individual airlines have also adopted specific SAF targets and goals to send a clear market signal for affordable SAF.. Achieving these goals requires new and additional policy incentives, streamlined permitting processes, and close collaboration among airlines, the fuels industry, manufacturers, environmental organizations and governments, among others.

With respect to SAF, California has established itself as an early leader in attracting investment, production, and use of SAF through the existing LCFS Program, which provides an opt-in credit for SAF that not only incentivizes SAF production but also helps reduce the price difference

¹ A4A's members are: Alaska Airlines, Inc.; American Airlines Group Inc.; Atlas Air, Inc.; Delta Air Lines, Inc.; Federal Express Corporation; Hawaiian Airlines, Inc.; JetBlue Airways Corp.; Southwest Airlines Co.; United Airlines Holdings, Inc.; and United Parcel Service Co. Air Canada, Inc. is an associate member.

² These comments supplement and incorporate A4A's comments on the LCFS submitted on January 7, 2022, August 8, 2022, March 15, 2023, February 20, 2024, and May 10, 2024.

between SAF and conventional jet fuel. We look forward to working with CARB on measures that will rapidly expand availability and deployment of SAF in California.

Aviation accounts for 2.6% of the U.S. greenhouse gas emissions but 5% of U.S. Gross Domestic Product (GDP) and 4.1% of California's GDP, thus having an outsized economic impact relative to its share of emissions. There are more than 380,000 employees of U.S. commercial aviation firms based in California, with an overall economic impact of \$194 billion³. Aviation is critical to driving California's economy and its rank as the fifth largest economy in the world, enabling \$114 billion in annual trade flows and underpinning many of the rest of California's biggest economic drivers such as agriculture, tourism, manufacturing, banking, technology and small business. Ensuring a healthy and vibrant aviation industry is essential to California's future, and leveraging CARB's early leadership on SAF can enable California leadership in the emerging SAF production industry, creating new jobs and economic development opportunities.

II. Discussion

189.1 cont. 1. Comments on Modifications to Section 95482. Fuels Subject to Regulation

A4A supports the revised proposal that does not add jet fuel to the list of regulated fuels under the LCFS program. In our prior comments to the initial December 19, 2023 Proposed Amendments to the CARB LCFS Program we expressed concerns with CARB's proposal to remove the exemption for jet fuel under the program. CARB's Initial Statement of Reasons (ISOR) stated the purpose and intent of was to increase the production and use of SAF in California. We disagreed with the assessment that the proposal would achieve the desired result, and asserted that making jet fuel an obligated fuel under the LCFS program would not, by itself, result in increased SAF production, availability and use in California. We are pleased that after further analysis CARB has reached a similar conclusion.

As we stated in prior comments, the primary impediment to increased SAF production and availability in California and elsewhere remains the higher cost of SAF for producers and buyers relative to conventional jet fuel and renewable diesel. Because of the relative economic advantages of renewable diesel compared to SAF, fuel producers will continue to prioritize renewable diesel production instead of SAF. We share CARB's objective to increase the use of alternative jet fuel in the State. To significantly increase SAF production, availability, and use of SAF in California, one must address the economic disadvantages of SAF production relative to Renewable Diesel. We look forward to opportunities to work together with CARB and other SAF stakeholders to explore policy and non-policy interventions that have the potential to achieve this mutual objective.

2. Comments on Modifications to Section 95483. Fuels Reporting Entities.

As noted in the summary of modifications, removing fossil jet fuel from the list of liquid fuels for reporting is necessary for consistency for removing fossil jet fuel from the list of regulated fuels. A4A supports this proposal.

³ [The Economic Impact of Civil Aviation on the U.S. Economy, State Supplement, US Department of Transportation, November 2020](#)

3. Comments on Modifications to Section 95488.8. Fuel Pathway Application Requirements Applying to All Classifications.

189.2 While CARB made some changes in its consideration of the matching period for Low-CI electricity, CARB did not change its proposal regarding deliverability of Low-CI electricity when applied to the production of SAF. As stated in our prior comments, we continue to believe that our mutual interests in SAF would be best served by CARB preserving its existing policy allowing use of indirect accounting mechanisms for low-CI electricity that is used for hydrogen production where that hydrogen is then used in the production of another transportation fuel. We also recommended that CARB expand the use of its existing indirect accounting mechanisms to extend the use of book-and-claim (e.g. RECs) to facilitate sourcing power to produce SAF (including biomass SAF and PtL SAF) and other alternative fuels. The revised proposal does not address the issues underlying these recommendations, and is counter to California's priorities ("California prioritizes waste feedstocks and advanced decarbonization technologies") as stated by CARB in this current proposal

189.3 CARB's proposal will severely inhibit the growth of Power to Liquid (PtL) SAF production, availability and use in California. PtL is a promising fuels pathway that has the potential to provide very low CI SAF. Other jurisdictions (e.g. European Union and United Kingdom) have policies in place to promote and attract PtL SAF fuels, and CARB's proposal will encourage PtL SAF producers that utilize indirect accounting for the sourcing of low-CI electricity used in their PtL SAF production processes to sell their fuels into those other jurisdictions. Absent CARB's allowance of indirect accounting for low-CI electricity, PtL SAF producers that wish to participate in the LCFS Program will effectively have no choice but to co-locate their facilities with or otherwise ensure a direct connection to a renewable energy source, which is often impractical and infeasible. Again, the likely effect of this will be to discourage PtL SAF production in California and to discourage delivery into California of PTL SAF produced elsewhere. For other types of biomass based SAF utilizing indirect accounting for use of low-CI electricity in their SAF production will have their CI scores lowered accordingly, which may make markets in other jurisdictions more attractive.

Due to the vital importance of Low-CI Electricity to the production of PtL fuels, and the importance of PtL fuels to meeting both California's 2045 carbon neutrality goal and California's specific goals to displace fossil jet fuel with SAF, we respectfully recommend that CARB modify the proposed LCFS amendments such that SAF fuel production facilities (PtL and other SAF production pathways) are authorized to procure Low-CI Electricity for electrolytic hydrogen production and their other energy needs via Book-and-Claim Accounting.

A4A supports the revised proposal for the inclusion of forest waste biomass feedstocks as a specified source feedstock.

4. Comments on Modifications to Section Modifications to Section 95488.9. Special Circumstances for Fuel Pathway Applications.

A4A appreciates the proposed revisions to the proposal that provide more specific definitions, and additional time and flexibility to allow fuel producers to comply with the new biomass supply chain 3rd party sustainability certification requirements.

- 189.4 A4A and its member airlines support the use of 3rd party sustainability certification systems (SCSs) and 3rd party audits of compliance with sustainability requirements by fuel producers. Airlines and their fuel producer partners have growing experience with SCSs through voluntary SAF purchases, in addition to having been directly and extensively involved in the definition of the CORSIA Eligible Fuels sustainability certification requirements. From this experience base we offer the following observations and recommendations:
- a. There are only two established third-party SCSs generally relevant to biofuels and both have been developed through Europe-based organizations. Both SCSs have requirements that have limited experience in being applied to U.S. agricultural feedstocks, supply chains and business practices.
- 189.5
- b. Third, the existing SCSs are struggling with capacity constraints in providing certifications under already established voluntary certification programs, EU RED, and ICAO CORSIA. Burdening the existing SCSs with an additional requirement for the CARB LCFS program could create an administrative bottleneck on qualifying feedstocks and supply chains for the LCFS program that would otherwise be qualified. This would have the adverse impact of slowing down supply growth, which for the still emerging SAF market is a constraint that must be avoided.
- 189.6
- c. As part of the SCS acceptance process defined in the revised LCFS Program proposal, we recommend CARB consider adopting an existing U.S. government standard, such as controls incorporated into the EPA Renewable Fuel Standard, with 3rd party audit verification as an equivalent 3rd party SCS.
 - d. In order to minimize the administration burden on and prevent duplication of efforts by the biofuels supply chain, in its implementation plan CARB should include cross recognition of sustainability certifications and certification audits obtained for other programs (e.g. EPA RFS, EU RED, CORSIA, voluntary certifications).

CONCLUSION

189.1 cont.

A4A supports the withdrawal of the proposal to eliminate the jet fuel exemption and retain the existing opt-in approach for SAF under the CARB LCFS Program.. The existing opt-in crediting model under the LCFS, combined with U.S. federal incentives provides the foundation for an effective approach for increasing SAF production, use and availability in California. With further collaboration and partnership, we see the potential to dramatically increase the production and use of SAF in California and other jurisdictions and are interested in identifying new opportunities to work together. A4A offers its technical and operational expertise to work together with CARB and other stakeholders in better understanding the challenges and opportunities for promoting the production, availability and use of SAF in California to achieve CARB's objectives of a sustainable and workable reduction of carbon emissions in the transportation sector.

Thank you for your consideration of our comments. Please do not hesitate to contact us if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Kevin Welsh", with a long, sweeping horizontal line extending to the right.

Kevin Welsh

Vice President, Environmental Affairs and Chief Sustainability Officer

kwelsh@airlines.org



August 27, 2024

Liane Randolph
Chair, California Air Resources Board
1001 I St
Sacramento, CA 95814

**Re: Comments on Proposed 15-Day Changes to Proposed Low Carbon Fuel Standard Amendments,
posted August 12, 2024**

Submitted via CARB's online Comment Submittal Form

Dear Chair Randolph:

Clean Air Task Force (CATF) is pleased to submit comments on CARB's proposed amendments to California's Low Carbon Fuel Standard (LCFS), as posted on August 12, 2024.

CATF is a global nonprofit organization working to safeguard against the worst impacts of climate change by catalyzing the rapid development and deployment of low-carbon energy and other climate-protecting technologies.

190.1 We greatly appreciate the time and consideration CARB staff have invested in these proposed changes. Strengthening the 2030 carbon intensity benchmarks and adding benchmarks out to 2045 improves the potential of the LCFS to set California's transportation sector on a trajectory towards zero emissions by mid-century.

190.2 Most of the proposed 15-day changes are improvements to the regulatory amendments in the 45-day rulemaking package. We support CARB's proposal to limit the eligibility of vegetable oil fuel for generating credits on a percentage basis as an *interim measure*. However, we are very concerned about the decision to reverse course and exempt fossil jet fuel from inclusion under the standard. As discussed
190.3 in a recent CATF analysis, the aviation sector will be difficult to decarbonize and the market for alternative jet fuel needs a performance-based economic policy such as the LCFS to scale in the magnitude and timeframe necessary.¹

190.4 Furthermore, to be effective, the proposed vegetable oil cap needs to cover all bio-oil-based fuels (including alternative jet fuel) and all crop seed oil feedstocks. By applying the limit only to diesel fuel made from soy and canola oil, fuel producers could circumvent the limit by allocating surplus vegetable oils to other fuels (like alternative jet fuel or renewable gasoline) or by using other crop seed feedstocks. Additionally, if the proposed limit on vegetable oil feedstocks were extended to alternative jet fuel, it would help minimize the unintended indirect land use change consequences from including aviation fuel in the LCFS.

To address these concerns, we recommend CARB take the following actions in this rulemaking:

- 190.5
- Include fossil jet fuel, or commit to a public process for developing policies to prioritize the use of low-carbon aviation fuel in California;

¹ [Decarbonizing Aviation: Enabling Technologies for a Net-Zero Future, CATF, April 2024](#)

- 190.6 • Expand the 20 percent credit cap on soy and canola oil diesel to all bio-oil-based fuels made from any crop seed oil²;
- 190.7 • For crop oil-based fuels in excess of the 20 percent credit cap, set their carbon intensity (CI) to that of the relative fossil fuel benchmarks to avoid incentivizing excessive use of vegetable oil fuels; and,
- 190.8 • Require third-party certification of waste oils and assess and report on the aggregate sustainability impacts of all certified bio-oil fuel pathways by feedstock and region of origin.

California must meaningfully address aviation emissions by regulating fossil jet fuel under the LCFS

190.9 CATF strongly supports removing the fossil jet fuel exemption and regulating aviation fuel under the LCFS. California’s aircraft activity is projected to grow by two-thirds by 2050.³ Low-carbon alternative jet fuel is available and deployable, but without a performance-based economic incentive, such as the LCFS, its production and use cannot meaningfully or sustainably scale. Increasing the use of alternative jet fuel could also result in health benefits by reducing soot emissions now adversely affecting communities around airports, and airport workers. Furthermore, alternative jet fuel would impart climate benefits resulting from reduced contrail formation, especially on long, high-altitude flights.⁴

In its Summary of Modifications, CARB offers only a partial justification for excluding fossil jet fuel, citing comments that “aviation fuel suppliers who would generate deficits under the initial proposal could simply acquire credits to meet that compliance obligation” rather than directly reducing the carbon intensity of their fuels by blending alternative jet fuel.⁵ Buying credits is, of course, part of the design of the LCFS. Nevertheless, including fossil jet fuel under the LCFS would incentivize alternative jet fuel production and sales in California, supported by federal tax credits like sections 40B and 45Z, as CARB modeled and presented in April.⁶

As a result, CATF strongly recommends that CARB obligate jet fuel in this round of amendments. Absent this outcome, CARB staff should commit during the November 8th hearing to developing policies for prioritizing the use of low-carbon alternative jet fuel in California.

CARB’s proposed limited eligibility of diesel made from soy and canola oil in section 95482(i) should be expanded to all crop seed oils and to all bio-oil-based fuels

190.10 CATF supports incorporating prudent and firm limits on fuels made from vegetable oils. As we have commented previously,^{7,8} the use of vegetable oil feedstocks poses significant indirect land use change

² Crop seed oil is bio-oil from seeds that are otherwise grown for food and personal care products.

³ [California Aircraft and Airports Fact Sheet - July 2024 0.pdf](#)

⁴ [Non-CO2 Climate Impacts of Aviation: Contrails, CATF, 2023](#)

⁵ [Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information \(ca.gov\)](#)

⁶ [Recirculated Draft Environmental Impact Analysis for the Proposed Low Carbon Fuel Standard Regulation, CARB, August 16, 2024.](#)

⁷ CATF 45-Day Comment Letter, Submitted February 20, 2024. <https://www.arb.ca.gov/lists/com-attach/6878-lcfs2024-UzAGYVAIBzIBWFlx.pdf>

⁸ CATF Comment Letter for CARB’s Low Carbon Fuel Standard Workshop, Submitted April 10th. https://www2.arb.ca.gov/system/files/webform/public_comments/11366/CATF%20LCFS%20Comments%20April%2010%20Workshop%20051024.pdf

risks because of substitution effects in global markets that often result in deforestation and/or expanded palm oil production.

Given the current structure of the LCFS, we also support, on an interim basis, the proposed approach to limit the eligibility of vegetable oil fuel to generate credits on a percentage basis as a first step towards a comprehensive approach to minimizing the LCFS' impacts on food markets and ecosystems. However, in this rulemaking, we strongly recommend that the 20 percent credit cap apply to all bio-oil-based fuels and crop seed oil feedstocks that are otherwise grown for food markets. Otherwise, bio-oil fuel producers could exceed the limit by allocating surplus vegetable oil feedstocks to renewable gasoline and alternative jet fuel production. Similarly, limiting the credit cap to only soy and canola oil feedstocks would enable fuel producers to shift to alternative crop seed oil pathways, with potential market substitution effects and a net increase in deforestation and/or palm oil production.

Renewable diesel production continues to grow rapidly, underscoring the importance of limiting demand for all vegetable oil feedstocks. The process of hydrotreating vegetable and waste oils and fats (HEFA) can generate diesel fuel, alternative jet fuel, and renewable gasoline (as a byproduct) in adjustable proportions.

Accordingly, CATF suggests the following modifications to section 95482(i):

- Replace "Biomass-based diesel produced from soybean oil and canola oil" with "Fuels produced from crop seed oils";
- Replace "biomass-based diesel" with "bio-oil-based fuel" in "total ~~biomass-based diesel~~ bio-oil-based fuel annual production reporting";
- Replace "soybean oil and canola oil" with "crop seed oils" throughout the section;
- Replace "diesel" with "fuel" in "biomass-based ~~diesel~~ fuel pathways"; and,
- Replace "biodiesel and renewable diesel" with "bio-oil-based fuel" in "combined reported ~~biodiesel and renewable diesel~~ bio-oil-based fuel quantities".

In conjunction with the above changes, CATF suggests adding the following definitions to section 95481:

- "Bio-oil-based fuel" means biodiesel, renewable diesel, renewable gasoline and opt-in alternative jet fuel.
- "Crop seed oils" means first-generation vegetable oils pressed from seeds that are otherwise grown for food markets.

Because a percentage-based limit on credit generation will continue to allow substantial growth in the use of crop oil-based fuels and because of the potential for wide-spread substitution effects of using bio-oil feedstocks to make fuels, the risk of indirect impacts on food markets, land use change and associated emissions will remain. And while the proposed discretion for the Executive Officer to stop accepting new biomass-based diesel pathways beginning in 2031 could be helpful, a comprehensive framework of safeguards will be needed. Accordingly, CATF continues to recommend that CARB:

- Initiate a regulatory amendment process within one year of CARB board adoption of LCFS regulatory amendments in this rulemaking that focuses on developing a comprehensive set of safeguards;
- Design an overall limit on all bio-oil-based fuels in the LCFS;
- Analyze the impact of the CA LCFS on the global crop-oil markets, incorporating available data pathway applications and reports; and,

190.11
cont.

- Based on this analysis, develop criteria for suspending bio-oil-based fuel pathways based on adverse impacts to food markets and ecosystems and removing high-risk feedstocks from LCFS eligibility (as CARB has already proposed to do with palm oil).

CARB should require third-party certification of waste oils and assess and report on the aggregate sustainability impacts of the bio-oil-based fuel pathways that are certified in Sections 95488.8(g) and 95488.9(g)

190.12

As CATF has previously commented, CARB should require third party verification of waste oils listed in Section 95488.8(g)(1)(A)1., due to potential market substitution effects resulting in similar land-use change risks to those discussed above, as well as the potential for fraud. To ensure the efficacy of these requirements as well as additional requirements and limitations on biomass-based fuels, CARB should assess and report on the aggregate sustainability impacts by feedstock and region of biomass-based fuel pathways certified in Sections 95488.8(g) and 95488.9(g).

With great appreciation for the tremendous effort CARB staff have invested in developing and proposing important revisions to California's LCFS, we thank you for your consideration of these recommendations and would be glad to elaborate or discuss these issues further.

Jonathan Lewis
Director, Transportation Decarbonization
Clean Air Task Force

Ashley Arax
Senior California Policy Manager
Clean Air Task Force

Submitted electronically at:
<https://ww2.arb.ca.gov/applications/public-comments>

August 27, 2024

Clerks' Office
California Air Resources Board
1001 I Street
Sacramento, California 95814

Re: Support for California Air Resources Board Proposal to Retain Jet Fuel Exemption in Low Carbon Fuel Standard Program

We are writing in response to the revised Proposed Low Carbon Fuel Standard Amendments posted August 12th, 2024 by the California Air Resources Board (CARB). As members of the aviation industry, we support the withdrawal of the proposal to eliminate the jet fuel exemption and to retain the existing opt-in approach for SAF under the CARB Low Carbon Fuel Standard (LCFS) Program.

191.1

Aviation accounts for 2.6% of the U.S. greenhouse gas emissions but 5% of U.S. Gross Domestic Product (GDP) and 4.1% of California's GDP, thus exerting outsized economic impact relative to its share of emissions. U.S. civil aviation firms employ more than 380,000 California-based employees, with an overall economic impact of \$194 billion.¹ Aviation is critical to driving California's economy and its rank as the 5th largest economy in the world, enabling \$114 billion in annual trade flows and underpinning many of California's other significant economic drivers such as agriculture, tourism, manufacturing, banking, technology and small business.

The aviation industry is committed to reducing its climate impact and achieving net zero carbon emissions by 2050, and transitioning to SAF is core to this commitment. We have long recognized that scaling up the supply of SAF and achieving net-zero carbon emissions by 2050 can only happen by working collaboratively with governments and other stakeholders across sectors. The US airlines and the rest of the aviation industry have clearly demonstrated a strong, enduring market signal for affordable SAF through individual and collective commitments. Achieving this ambition for SAF will require new and additional policy incentives, streamlined permitting processes, and close collaboration among governments, the aviation industry, the fuels industry, environmental organizations and others.

California has established itself as an early leader in attracting investment, production, and use of SAF through the existing LCFS Program, which provides an opt-in credit for SAF that helps reduce the price difference between SAF and conventional jet fuel. Ensuring a healthy and vibrant aviation industry is essential to California's future, and leveraging CARB's early leadership on SAF can further enable California leadership in the emerging SAF production industry, creating new jobs and economic development opportunities.

We strongly believe that maintaining the existing exemption for jet fuel along with the opt-in model for SAF provides a strong foundation to achieve our mutual objectives. The primary impediment to increased SAF production and availability in California remains the higher cost of SAF for producers and buyers relative to conventional jet fuel and renewable diesel. Eliminating the exemption on jet fuel would have no material impact on the availability or use of alternative jet fuel in California, but would raise the price of jet fuel.

¹ [The Economic Impact of Civil Aviation on the U.S. Economy, State Supplement, US Department of Transportation, November 2020](#)

The aviation industry shares your strong commitment and focus on increasing SAF production, availability, and use, and the most effective way to accomplish this is to continue the positive, collaborative approach represented by the existing “opt-in” mechanism developed by CARB and the aviation community. We support CARB’s decision to withdraw the proposal to remove the exemption for jet fuel for intrastate flights, preserve the existing opt-in approach for SAF. To further that collaboration, we recommend that CARB establish a joint CARB-industry working group with stakeholders across the emerging SAF ecosystem to explore alternative policy and voluntary proposals to rapidly increase SAF production, availability and use in California. We look forward to working with CARB on such measures to accelerate SAF deployment.

Sincerely,





2490 Junction Place, Suite 200, Boulder, CO 80301

California Air Resources Board

1001 I Street

Sacramento, CA 95815

RE: Proposed 15-Day Changes to California LCFS

Dear California Air Resources Board,

Thank you for the opportunity to provide input regarding the 2024 California Low Carbon Fuel Standard (LCFS) 15-Day changes. We appreciate the complicated nature of any adjustment to such a vastly impactful and crucial policy to state decarbonization goals, and thank the staff for their tireless efforts soliciting and integrating feedback from stakeholders.

RMI is a global non-profit organization that focuses on deep decarbonization of the world's most polluting sectors, leading sustainability programs across four geographies: the U.S., India, China, and the Global South. RMI has a 40-year history of advancing low and zero-carbon transportation solutions and transforming global power systems to support modern, low-carbon economies.

The full comments below will be limited to addressing two primary topics in the proposed changes: book and claim electricity for hydrogen, and biomethane. However, we would like to note that while we were in favor of the initial proposal to include intrastate jet fuel on the mandated fuels list, we appreciate that despite removing that proposed change, CARB staff remains committed to reducing aviation emissions in California, whether or not that is via LCFS or another policy mechanism. We offer our support and deep background in aviation policy as a resource to CARB as it looks to support the decarbonization of California's aviation sector.

Please find our extended comments below, and please do not hesitate to reach out with any questions or comments in return.

Sincerely,

Jane Sadler

Senior Associate, Clean Industrial Policy

Book and Claim Electricity

As the proposed rules stand, hydrogen that is used as a feedstock *in the production of* transportation would not be eligible to use book-and-claim accounting to certify its CI score under California's LCFS. This will limit such projects to relying on on-site, "behind the meter" clean electricity to certify their CI score; as grid electricity used to make hydrogen without the option of a well-regulated book-and-claim option will not result in clean hydrogen.

192.1

Limiting the end uses for hydrogen that is produced using grid-connected electrolysis would limit the amount of hydrogen produced in California, impede effective decarbonization of heavy transportation, and undermine the state's decarbonization goals as stated in the 2022 Scoping Plan.

Hydrogen can be used to directly power fuel cell electric vehicles (FCEVs) but [RMI analysis](#) shows that direct electrification of light duty vehicles results in 0.41 kg CO₂e/kWh *more* reduction than using zero emissions hydrogen. As such, hydrogen should be directed to transportation end uses that cannot be electrified, like aviation, where it can be combined with renewable electricity and efficient supplies of carbon dioxide to yield a liquid synthetic "e-fuel" through ASTM-certified pathways. E-fuels, despite being the least technologically mature pathway for SAF, have the greatest potential for meeting the gap between scaled demand in 2050 and potential scale of biobased SAF pathways. **By essentially preventing their use in California's LCFS, CARB risks setting back the in-state clean aviation industry, sending e-fuel SAF producers to other Clean Fuel Standard states to make and sell their fuels.** E-fuels are not the only forms of SAF that require hydrogen as a feedstock. Other forms of SAF—including those derived from waste fats, oils, and greases as well as biofeedstocks like corn, soy and canola—all require hydrogen in the process of production, albeit at much smaller volumes than e-fuel SAF.

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Furthermore, [only 10% of the clean hydrogen capacity planned by 2030 has currently identified a buyer](#). **At a time when hydrogen hubs across the country are searching for stable offtake agreements, preventing specific industries from offtaking certain types of clean hydrogen could have a serious cooling effect on the hydrogen economy in California, and could disadvantage ARCHES hydrogen producers.** According to [RMI analysis](#), heavy duty transport—aviation, shipping, and trucking—will drive most of the demand for hydrogen in California. Scaling up demand for SAF is paramount as shipping fuel is not included in LCFS and trucking demand will ramp up slowly.

Allowing electrolytic hydrogen used as a feedstock to use book-and-claim electricity would afford hydrogen producers flexibility in finding offtakers while still benefiting from LCFS and

192.2
Cont. decarbonizing priority offtake sectors, and is in alignment with California's Climate Change Scoping Plan.

Biomethane

Deliverability

In subsection 95488.8(i)(2), staff proposed to add the ability for the Executive Officer to require deliverability requirements for book-and-claim accounting for biomethane by 2038 if there is an approved gas system map that identifies interstate pipelines and their majority directional flow based on specified flow date. Before then, or if the Executive officer does not approve a gas system map, biomethane injected into the common carrier pipeline in North America can be reported as dispensed as bio-CNG, bio-LNG, or bio-L-CNG, or as an input to hydrogen production, without regards to physical traceability.

While the addition of the potential for deliverability requirements for biomethane is a step in the right direction, RMI believes that this does not go far enough. If CARB wishes to more **Deliverability requirements should be phased in as soon as possible for biogas and biomethane certification.** Any biomethane claimed indirectly under the LCFS program for use as bio-CNG, bio-LNG, or bio-L-CNG in CNG vehicles or as an input to hydrogen should be physically deliverable to the hydrogen production plant or to the California gas system to ensure a robust book and claim system with climate integrity. While much of the North American gas system is considered connected, there are key considerations to consider when designing rules for qualifying gas pathways for LCFS crediting:

- 192.3
- Local air quality and environmental justice concerns when trading gas attributes across significant distances
 - For instance, if a dairy digester in the Midwest can transfer its emissions attributes to a blue hydrogen facility in California, it is the communities in California that will be adversely impacted by the combustion and fossil-gas hydrogen production taking place. And the reverse is also true – communities in the Midwest must suffer the air pollution and health hazards of largescale dairy digesters maintaining economic viability due to sales of environmental attributes without the local economic or decarbonization benefits of producing and using hydrogen nearby.
 - Gas system deliverability is dynamic: LCFS regulations should plan for a time when gas infrastructure may be coming offline and is less interconnected than it is today. Finally, when considering deliverable gas over long distances, there is bound to be greater leakage along the transmission and distribution networks. CARB would need to use a granular leakage certification method for biogas transportation for the

192.3 Cont. deliverability issue becomes less critical from an emissions accounting perspective. But if that is not considered, a requirement of deliverability will help mitigate leakage that occurs as gas is “delivered” over longer distances.

Biomethane Crediting for Hydrogen Production

Currently, LCFS calculates the carbon intensity (CI) of dairy biomethane between -102.79 and -790.41 grams of carbon dioxide emissions per megajoule (gCO₂e/MJ), with an average of -269 gCO₂/MJ. When dairy farmers across the county use anaerobic digesters to capture their biomethane and inject it into natural gas pipelines, these intensely negative scores allow them to generate tradeable LCFS credits. These credits can then be used to offset the emissions of things like hydrogen production that uses fossil fuels as a feedstock. **As a result, dairy biomethane contributed almost 20% of the credits in the LCFS program according to recent LCFS data yet provided less than 1% of energy used for transportation under the program.**

The reason for these negative CI scores is the assumption that dairy biomethane would have been vented into the atmosphere otherwise. This is despite the fact that for many sources, methane generation could have been avoided in the first place through alternative practices – such as organic waste diversion from landfills or alternative manure management – and would likely have been captured and put to another productive use regardless. Furthermore despite the negative scores that biomethane receives under current LCFS rules, the real emissions from biomethane use are *not* negative. Dairy biogas burned in natural gas pipelines still releases emissions upon use, and traditional LCAs often exclude the impact of potent fugitive emissions from the carbon intensity score of dairy biogas.

192.4 The true emissions intensity of biogas and biomethane sources is very dependent on fugitive methane, which when released into the atmosphere has roughly 80 times the near-term warming power of carbon dioxide. As EPA acknowledges in its RNG Operations Guide, “fugitive emissions of methane, depending upon their magnitude, can negate the climate and environmental benefits of RNG projects.” The IPCC also references multiple studies (Scheutz and Fredenslund 2019; Bakkaloglu et al. 2021) that show how fugitive emissions can make biogas production emission intensive.

Furthermore, the gray and black hydrogen producers that purchase credits from dairy biomethane producers in order to qualify under LCFS *also* heavily emit CO₂—but via current LCFS crediting math this whole process is considered ‘zero emission’.

At the least, CARB should set guardrails so that any negative CI scores are not used to offset a fossil facility’s real emissions in lieu of actual reductions at the facility. CARB

could create no-blending safeguards, whereby any biogas or biomethane used must supply the full share of fuel consumed.

192.5

LCAs should be based on a counterfactual scenario that reflects the most climate beneficial outcome. At minimum, any methane that can be captured should be assigned a baseline counterfactual of capture and flare, which acknowledges the cost of methane pollution, the urgent need for controls, and the other economic and regulatory factors already driving abatement. In most scenarios, a more appropriate counterfactual would be diversion from productive use (e.g., another biogas/biomethane energy project) or the complete avoidance of methane creation via alternative management practices (e.g., waste prevention, composting, or alternative manure management).

Additionally, there should be feedstock eligibility requirements in place to ensure this program doesn't perversely lead to additional waste/methane generation by expanding operations. Qualifying sites should be required to monitor for fugitive emissions and demonstrate they are collecting methane and co-pollutants at the source to the maximum extent possible.



North Dakota
Soybean Processors, LLC

August 27, 2024

Carolyn Lozo
Chief, Transportation Fuels Branch
California Air Resources Board
1001 "I" Street
Sacramento, CA 95814

Via electronic submission

Transportation Fuels Branch Chief Lozo:

Thank you for the opportunity to comment in response to the California Air Resources Board's (CARB) proposed 15-Day Changes to the Proposed Amendments to the Low Carbon Fuel Standard (LCFS) Regulation (15-Day Changes or Proposal). North Dakota Soybean Processors (NDSP) appreciates the opportunity to provide additional insights.

NDSP is a joint venture between CGB Enterprises, Inc and Minnesota Soybean Processors and is building a state-of-the-art soybean processing plant in Casselton, ND. CGB and MnSP made this significant investment to help meet the need for additional feedstock for the biofuel industry.

NDSP strongly encourages CARB to follow its own modeling and conclusions CARB presented in its workshop on April 10, 2024, which show that an artificial cap on vegetable oil feedstocks is unwarranted and would only increase fuel prices and harm air quality. With the implementation of a cap on biomass-based diesel (BBD) feedstocks, a phaseout of BBD pathways, and even more restrictive and costly traceability and verification system, this proposal will only lead to more combustion of fossil diesel fuel, higher fuel prices at the pump, and poorer air quality. It may also lead to a surge of more imported foreign feedstocks such as Used Cooking Oil (UCO) and tallow - some of which may not be legitimate - being used to fuel California instead of local U.S. grown options - all at the expense of U.S. farmer, the U.S. crusher and the California taxpayer.

CARB should therefore reject the imposition of a vegetable oil cap and adopt a targeted, risk-based approach to sustainability requirements which does not penalize sustainable U.S. fuels and feedstocks at the expense of foreign imports which may not be legitimate.

At a minimum, CARB should take additional time and effort to more fully consider the important issues involved and give parties the chance to more fully respond to the proposal. While NDSP has endeavored to identify all of the issues to date in this comment letter, 15 days is not a sufficient amount of time to fully address CARB's proposed vegetable oil cap and other significant and unexpected changes in the proposal. NDSP therefore strongly recommends that CARB extend the comment period and hold an additional public workshop on these potential changes.



Background

NDSP's oilseed processing operations yield protein-rich meal for human and animal nutrition, as well as vegetable oil that is used as an ingredient in food manufacturing and as a feedstock for renewable fuels such as biodiesel, renewable diesel and sustainable aviation fuel (SAF). These sustainably produced biofuels help reduce carbon dioxide equivalent (CO₂e) greenhouse gas emissions and the carbon intensity of transportation fuels in use today.

CARB's Own Analysis Supports the Elimination of a Cap on Vegetable Oils

While the intention behind CARB's proposal is to diversify feedstock sources and promote sustainability, it will have the opposite effect, outweighing its potential benefits. First and foremost, capping the use of vegetable oil will significantly increase fuel costs. Because vegetable oil is currently one of the most efficient fungible, and cost-effective feedstocks, limiting their use will constrain the supply of renewable diesel. Renewable diesel and biodiesel are crucial components of California's efforts to reduce greenhouse gas emissions and transition to cleaner energy sources and this artificial limitation will create a supply-demand imbalance, driving up the costs of renewable diesel production and, consequently, the price at the pump for California consumers.

Moreover, CARB's goal of 100 percent renewable liquid fuels with the proposed feedstock constraints in place is unrealistic and impractical. The renewable diesel industry is still developing, and waste feedstocks are not available in sufficient quantities to meet the state's ambitious targets. By capping vegetable oil usage, the proposal risks stalling the progress made to reduce carbon emissions by creating a bottleneck in renewable diesel production. In fact, CARB's own analysis supports this assessment.

NDSP strongly supports CARB's findings presented at the April 2024 workshop that renewable diesel and biodiesel have a positive impact on both consumers and the environment. CARB's "Staff Report: Initial Statement of Reasons" (ISOR) specifically modeled an alternative (Alternative 1) which "includes several policy mechanisms that have the effect on limiting the number of credits created from existing low-CI pathways" including "a limit on total credits from diesel fuels or sustainable aviation fuel produced from virgin oil feedstocks." The report's impacts are glaring – and each of them are attributed to more fossil diesel use in lieu of renewable diesel:

- **Increased Fuel Costs:** Alternative 1 had total costs of \$162 billion, 1 percent more than the scenario without a vegetable oil cap and similar policies. According to CARB, "The main reason is that diesel fuel is a larger part of the fuel mixture and continues generating large amounts of in-state deficits through 2046. This is because renewable diesel produced from virgin oil feedstock is phased out...and more fossil diesel is needed to fuel the remaining vehicles with internal combustion engines."
- **Increased Emissions:** Alternative 1 had greater emissions of greenhouse gases, particulate matter (PM_{2.5}) and nitrous oxide (NO_x) than the baseline. The higher NO_x and PM_{2.5} emissions in particular were attributed specifically to reduced renewable diesel—CARB found that "Alternative 1 increases NO_x emissions by an additional 10,981 tons and increases PM_{2.5}



emissions by 2,773 tons. Alternative 1 has more NOx and PM2.5 emissions than the proposed amendments because this scenario uses less renewable diesel than the proposed amendments."

- **Fewer Health Benefits:** In line with its higher emissions, Alternative 1 also had correspondingly lower health benefits. CARB found that "Alternative 1 has a valuation of health benefits at \$1.58 billion compared to the proposed amendments with a valuation of \$4.98 billion, a difference of \$3.4 billion less in health benefits. The lower avoided health impacts of Alternative 1 are primarily associated with increases in PM2.5 over the baseline due to lower utilization of renewable diesel."

CARB Staff justifiably rejected Alternative 1, citing the fact that it "relies more heavily on fossil fuels...than the proposed amendments. As a result, [Alternative 1] does not achieve the same level of NOx and PM2.5 emissions reductions as the proposed amendments and potentially exacerbates existing air quality challenges in the State."

Additionally, the ISOR included an analysis, and the rejection, of another proposal by CARB's Environmental Justice Advisory Committee which included a cap on vegetable oils set at 2020 levels. CARB found that "due to limitations on lipid biofuels and dairy biogas, the Comprehensive EJ Scenario results in higher volumes of fossil diesel being used than any of the other scenarios evaluated."

However, despite the demonstrated negative economic and health impacts of a vegetable oil cap, CARB's 15-Day Changes seek to accelerate those adverse impacts through additional regulatory requirements and market limitations on crop-based feedstocks. The additional restrictions will effectively create a decreasing volumetric cap as the price of compliance to maintain market access becomes cost prohibitive.

CARB's analysis therefore appears to be at odds with its own prior findings. The ISOR concludes that just the imposition of a cap on vegetable oil feedstocks will increase fossil diesel use. Yet, CARB's proposal summary states that "this [vegetable oil cap] allows for California to displace up to 100 percent of the State's fossil diesel demand with cleaner alternative diesel." This will not be possible with the combined establishment of a cap on feedstocks, a phaseout of new BBD pathways, and the imposition of even more costly traceability and verification measures. CARB has not explained why it is rejecting or ignoring its prior conclusions in the ISOR.

The proposed phasing out of new BBD pathways by 2031 is also concerning and unwarranted. CARB has a stated goal to achieve 100 percent renewable diesel, and phasing out new pathways would be unnecessary at best and counterproductive at worst. If the market becomes saturated, new pathways would no longer be needed and applications for new pathways will stop on their own. If the market has not yet achieved 100 percent saturation, then additional pathways are likely to be needed to achieve CARB's goal. The inclusion of this provision only serves to send a market signal that will limit both near and long-term supplies of feedstocks and fuel necessary to achieve the climate goals of the LCFS.

Making these significant policy adjustments without more solid footing sends the wrong signal to the market that the LCFS program is subjective and unpredictable, particularly at a time when the fuel supply chain works toward to goal the California has set decarbonizing the transportation fuel supply. As



a result, this proposal could impact investments from the same companies who have committed to climate smart agricultural practices and invested in dedicated energy crops like pennycress, camelina, carinata and winter canola. These investments represent a new wave in renewable energy production, based on the promise of a predictable market which rewards sustainability and carbon reduction – not artificial caps and arbitrary prohibitions which would stymie innovation.

NDSP urges CARB to eliminate the proposal's cap on vegetable oil feedstocks. In its place, we continue to recommend implementing policies that encourage the responsible production and use of renewable feedstocks while addressing concerns about deforestation through targeted risk-based measures.

The Proposal Contradicts the Requirements and Purposes of AB 32, the LCFS, and other California Laws

CARB's proposal to minimize biomass-based diesel used to comply with the LCFS flies in the face of the purposes of AB 32 and is inconsistent with several of its explicit requirements. To begin with, AB 32 requires that CARB design its LCFS regulations in a way that "maximizes benefits for California's economy, improves and modernizes California's energy infrastructure and maintains electric system reliability, maximizes additional environmental and economic co-benefits for California, and complements the state's efforts to improve air quality." Cal Health and Safety Code § 38501(h). But by minimizing RD and biodiesel production through a vegetable oil cap and related proposals, CARB would reduce environmental co-benefits and harm air quality. Because RD achieves significant NOx and PM2.5 reductions relative to fossil diesel, a cap that artificially reduces RD in the market will reduce the environmental benefits of the LCFS. As discussed above, that is borne out by CARB's own modeling in its ISOR.

AB 32 also requires CARB to meet GHG emissions limits in a way that "minimizes costs." A cap that artificially distorts the market inherently increases costs because regulated parties cannot choose the economically optimal way to comply with the obligations of the program. Again, this is supported by CARB's analysis in its ISOR that found increased costs in a scenario with a vegetable oil price cap.

AB 32's purposes are further embodied by its explicit requirements to minimize costs and maximize the total benefits to California. Cal Health and Safety Code § 38562. *See also id.* (requiring CARB to "Consider cost-effectiveness" and "minimize the administrative burden of complying with its regulations"); *id.* § 38560 (requiring CARB to issue "regulations in an open public process to achieve the maximum technologically feasible and cost-effective greenhouse gas emission reductions"). And CARB has designed its LCFS regulations accordingly by focusing solely on reducing the "carbon intensity of the transportation fuel pool," and taking a technology-neutral approach that allows various compliance mechanisms in order to maximize carbon intensity reduction. *See* 17 CCR §§ 95480, 95484. A vegetable oil price cap and freeze of vegetable oil pathways do the opposite – they create inefficiencies in the LCFS that add costs without corresponding improvements in GHG reductions. Indeed, without a vegetable oil cap, the market is optimally incentivized to comply in a way that both lowers costs and maximizes greenhouse gas reductions. A vegetable oil cap artificially skews that incentive, so the program will



either need to be more costly to achieve the same level of GHG reductions or achieve less GHG reduction at the same cost.

CARB's proposal provides little basis or explanation for its abrupt shift in policy. To the extent there is any, it is CARB's statement that it expects that ZEVs will reduce diesel demand in "coming decades." But that speculative assertion is unsupported and ignores technical challenges with electrifying the heavy-duty sector. It also ignores another instruction in AB 32 to for CARB to design its regulations in a manner that "encourages early action to reduce greenhouse gas emissions." Cal Health and Safety Code § 38562. Biodiesel and renewable diesel are available to decarbonize trucks and other heavy-duty vehicles *now*, and it is illogical and arbitrary for CARB to miss out on those benefits in favor of speculative benefits in the future.

Finally, the proposal is inconsistent with other California laws designed to improve air quality and the environment, including California's State Implementation Plan ("SIP") under the Clean Air Act. In CARB's most recent SIP submission, it reiterated the imperative of reducing NOx and PM2.5. CARB, Proposed 2022 State SIP Strategy (Aug. 12, 2022). CARB noted in particular the impact of PM2.5 emissions from mobile sources on environmental justice communities and found that it is "imperative that we optimize our control programs to maximize emissions reductions and provide targeted near-term benefits in those communities that continue to bear the brunt of poor air quality." *Id.* at 2. CARB's proposal to eliminate a source of near-term PM2.5 improvement for the *possibility* of greater future electrification runs directly counter to the SIP's objectives.

CARB Should Take a Targeted Risk-Based Approach to Sustainability Requirements While Increasing Scrutiny on Waste Feedstocks

NDSP appreciates CARB's continued recognition that some geographic regions carry a higher risk for deforestation. However, the proposal doubles down on a one-size-fits-all approach which, according to CARB's Recirculated Draft Environmental Impact Analysis (EIA), would "create an even stronger incentive to utilize waste feedstocks," without any additional analysis of direct or market-mediated effects from such a policy, nor any additional proposed compliance requirements to ensure waste feedstocks are not fraudulent.

Moreover, CARB's proposal would further disadvantage regions of crop-based feedstock production with low-risk of deforestation (U.S. and Canada) that are already subject to multiple compliance programs, thereby favoring feedstocks produced in regions with a significantly higher risk of fraud or deforestation.

At CARB's April workshop, staff noted additional measures which were under consideration to address potential fraud in sourcing waste feedstocks, including "additional detailed traceability, verification and/or enforcement of waste feedstocks to avoid fraud." Yet, despite additional proposals that would accelerate waste feedstock demand, the 15-Day Changes inexplicably included none of those measures.



NDSP strongly supports heightened scrutiny, oversight, and traceability to ensure the integrity of imported feedstocks for the CARB LCFS. NDSP recommends stepped up enforcement laws for imported feedstocks while exploring all possible viable options in the long term to ensure the origin and content of imports are legitimate. NDSP supports paperwork and in-person audits, potential testing, and stronger attestations which will ensure the continued integrity of low carbon fuel programs. NDSP strongly urges CARB to include increased measures into its final rule to ensure foreign feedstocks are in fact legitimate and traceable. CARB should work in close coordination with federal officials who all touch imported feedstocks in some capacity such as the U.S. Department of Agriculture, Environmental Protection Agency (EPA), U.S. Trade Representative and U.S. Customs and Border Protection. NDSP also encourages CARB to work with other countries who have experienced their own instances of fraudulent activity as it relates to imports in their own low carbon fuel programs such as the European Commission.

Further, implementing a targeted, risk-based approach to the proposal's sustainability criteria offers several advantages. It allows CARB to prioritize resources and regulatory efforts where they are most needed, ensures that sustainability criteria are effectively applied without imposing unnecessary burdens on low-risk regions or established sustainability programs, and ensures sufficient supplies of low-carbon fuels for the California market.

CARB appears eager to incorporate an EU policy paradigm without accounting for the risks brought upon the EU market. In the wake of EU policy to limit crop-based feedstocks and increase crediting for waste feedstocks under the Renewable Energy Directive (RED II), policymakers have struggled to address concerns about fraudulent waste feedstocks,¹ while significant imports of Chinese biodiesel recently led the Commission to place substantial provisional import duties² of up to 36.4 percent.

NDSP encourages CARB to not outsource sustainability certifications to the European Commission. CARB should recognize U.S. national, state, industry programs that meet the same intended goal of stopping deforestation and conversion. It is critical that CARB provide a tiered approach to feedstocks, fuels, and regions based on risk.

Regions identified as having the lowest risks of deforestation associated with crop-based feedstocks, such as the United States and Canada, crop-based feedstocks should be deemed to be in compliance with CARB's proposed sustainability criteria.

In the event CARB is unwilling to deem U.S. and Canadian feedstocks compliant, for regions where crop-based feedstocks comply with another established sustainability system, such as the Renewable Fuel Standard (RFS) Canada's Clean Fuel Regulation (CFR), or energy tax credit provisions in the Inflation Reduction Act (IRA), CARB should permit some level of aggregate compliance. These programs offer established frameworks for verifying sustainable practices and are a practical and effective way to achieve CARB's environmental goals without sacrificing any sustainability gains.

¹ Kelly Norways, "[New biofuel data triggers fresh fraud concerns over EU imports](#)," S&P Global, December 14, 2023

² Kelly Norways, "[EU imposes anti-dumping duties targeting cheap Chinese biodiesel imports](#)," S&P Global, August 16, 2024



Further it is critical to note that planting decisions for crops to be harvested in late 2025 are happening now and will be made prior to CARB's proposal being finalized which means the timeline to begin implementing the sustainability certification criteria which specifically calls for "geographical shapefiles or coordinates of plot boundaries" by 2026 is simply not possible based on how the agriculture supply chain and crop harvest cycle works. Because of this NDSP respectfully submits that a deadline beyond 2027 is more reasonable for the first phase of compliance should CARB determine to go down this path.

While biofuels represent one significant market for vegetable oil, they are by no means the sole destination for these products. Given the diverse end uses of vegetable oil and meal, oilseed processors must carefully evaluate the return on investment when considering participation in an expensive sustainability certification program like the one CARB is proposing. California represents an important market for biofuels, but it may constitute only a fraction of the overall market for oilseed products. In this context, the costs associated with obtaining and maintaining sustainability certifications for a market that CARB seems intent on phasing out, may outweigh the benefits for many processors, particularly those with limited exposure to the California market.

For these reasons, NDSP continues to urge CARB's inclusion of enhanced traceability and enforcement measures on waste feedstock imports and maintains that a targeted, risk-based approach would streamline compliance requirements while ensuring that sustainability criteria are met, and recognizing biofuels produced in compliance with existing U.S. programs is a practical and effective way to achieve this goal without sacrificing any sustainability gains. Should CARB proceed down a path to implement sustainability criteria, ample time to implement and comply beyond 2027 is essential.

Land Use Change (LUC)

While NDSP strongly supports free trade and open markets, currently the CARB LCFS are driving demand for imported waste feedstocks. These programs are built on carbon intensity modeling that considers feedstocks such as used cooking oil (UCO), tallow, and greases as "waste." NDSP believes there is room for improvement when it comes to modeling waste feedstocks. In most instances the waste feedstock lifecycle begins when it is deemed "waste," however key factors are not considered such as was that waste initially from a product that was grown on deforested land, for example. NDSP notes that the environmental impacts of a product's entire life cycle for waste feedstocks should be considered.

Imported feedstock volumes into the U.S. have skyrocketed in 2023 and 2024, displacing domestically produced feedstocks. One pound of imported feedstock displaces one pound of domestically produced soybean oil or 5 pounds of soybeans. From Jan 1, 2023- June 30, 2024 - the US imported a total of 7.9 billion pounds of UCO and tallow. Those 7.9 billion pounds of imported feedstocks displace the soybean oil crushed from an equivalent of over 650 million bushels of soybeans.³

³ USDA GATS/US Census Bureau



As CARB noted at its April workshop and again in its recirculated EIA, “waste-based feedstocks, like UCO and animal fat, do not have additional LUC scores that are added to their CI value and made up 84% of all biomass-based diesel in the program from 2011 through 2022.”

However, non-waste feedstock carbon intensity modeling already includes direct and indirect land-use change values and CARB notes that existing modeling “may not be accurate for applicants sourcing feedstocks from outside 2015 analysis area.”

NDSP appreciates CARB consideration of assigning more conservative land use change values for high-risk feedstocks in regions with higher LUC risk than, for example, North American feedstocks currently modeled in Table 6 of the LCFS regulation. However, as the science on LUC continues to evolve, CARB should recognize that there are instances in which LUC should be reduced, not just the instances where LUC should be increased. In CARB’s proposal the regulatory flexibility and updated scientific modeling is afforded only to feedstock/fuel combinations not listed in Table 6. Further, the proposal only permits an increase in the LUC penalty. The final regulation should permit the flexibility to reflect when the science shows the penalty should be decreased, in addition to when LUC should be increased.

NDSP requests CARB to reassess its LUC model, particularly regarding soybean oil, given the evolving data from models like Argonne GREET’s Carbon Calculator for Land-Use and the Land Management Change from Biofuels Production (CCLUB) Model. CARB’s most recent modeling of LUC for BBD was done almost a decade ago, and produced a score of 29.1 gCO₂/MJ, which is significantly higher than the more recent findings from the 2023 R&D Argonne GREET Model with CCLUB and the 2024 40B SAF GREET model with CCLUB which estimate a value of 12.5 and 12.2 gCO₂/MJ for soybean oil – a nearly 60% decrease from CARB’s current value.

AB 32 requires CARB to use the “best available economic and scientific information” in designing its LCFS regulations. Cal Health and Safety Code § 38562. CARB should therefore utilize the most recent science for all feedstock/fuel pathways and should not limit modeling updates to carbon intensity values only when the scores are worse, not better. To do so would undermine the scientific integrity underlying the basis of the entire LCFS program – to achieve the greatest carbon reductions based on unassailable science.

NDSP encourages CARB to update its LUC model with the latest science for all feedstock/fuel pathways. This adjustment would not only ensure that CARB’s regulations remain grounded in the latest science but would also promote fairness and consistency within the industry.

Request for Additional Time for Public Input

NDSP notes that in the 15-Day Changes, the proposed cap on vegetable oil was the first time stakeholders had any opportunity to review these provisions or its concept. Given the precedent-setting nature of this program in the U.S., and the potential for significant cost and compliance burden to stakeholders, NDSP requests that CARB, as it did on February 14, take additional time to allow stakeholders to properly vet the intent, impact, and implications of the proposed requirements.



North Dakota
Soybean Processors, LLC

Specifically, NDSP recommends that CARB at a minimum both extend the period for written comments and hold another public workshop.

Conclusion

In conclusion, CARB analysis, market and scientific data collectively demonstrate that consideration of a cap or limitation on crop-based feedstocks is unwarranted and in fact contradict AB 32, the LCFS regulations, and other California laws. Further, doing so unexpectedly and contrary to the reasonable expectations of regulated parties would undercut the necessary investments that are being made to support low carbon feedstocks and further feedstock expansion.

NDSP also continues to encourage CARB to adopt a targeted, risk-based approach to implementing sustainability criteria under the LCFS. By accurately assessing deforestation risk, leveraging existing sustainability frameworks, and implementing targeted measures for high-risk regions, CARB can achieve its environmental objectives while also supporting a sustainable and resilient biofuels industry.

NDSP is eager to continue working with CARB to support the role of agriculture in diversifying the fuel supply through more sustainable feedstocks, thereby supporting cleaner fuel options in California and beyond. We appreciate this opportunity to comment and look forward to collaborating with CARB and other relevant stakeholders.

Sincerely,

Bill McBee

Bill McBee
NDSP Commercial Manager



August 27, 2024

Chair Liane Randolph and Members of the Board
Chief, Transportation Fuels Branch
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Via electronic submission

Re: Proposed 15-Day Changes to the Proposed Regulation Order

Dear Chair Randolph and Members of the California Air Resources Board,

On behalf of Ag Processing Inc (AGP) and its cooperative members, representing 200,000 farmers across the country, we appreciate the opportunity to provide feedback on the proposed 15-day changes (15-Day Changes) to the Low Carbon Fuel Standard (LCFS) program. AGP is a leading agribusiness with primary operations as a soybean processor and refiner, producing and marketing soybean meal, refined soybean oil (for food and fuel applications), and biodiesel. Alongside our farmer owners, we are deeply committed to advancing public policies that support sustainable agricultural practices and promote the effective use of soy biomass-based fuels.

AGP is concerned with the significant modifications introduced in the proposed 15-Day Changes, which diverge from the Initial Statement of Reasons (ISOR) and the discussions held during the April 10 public workshop. Among our primary concerns is the introduction of a cap on the use of soybean oil as a feedstock for biofuels, limited to 20 percent by company. This proposed restriction, coupled with the newly introduced sustainability guardrails, could undermine the environmental and economic goals of the LCFS program.

Key Concerns

Vegetable Oil Feedstock Cap

We urge CARB to base its decisions on up-to-date scientific evidence and to ensure alignment with the requirements of AB-32. The shift from opposing a feedstock cap to recommending one without clear justification appears inconsistent with both scientific consensus and the goals of AB-32. This inconsistency may lead to increased greenhouse gas emissions (GHGs) and unintended market distortions.

Moreover, some interpret the cap to effectively lock out the producers of the lowest cost, lowest carbon intensity (CI) soybean oil-based biofuel, specifically soy methyl esters. These biofuels, often produced at biodiesel plants adjacent to soybean processing facilities, are a critical component of the renewable fuel industry. However, many

194.1 Cont. companies like AGP operating these soybean processing plants are not involved in the procurement and processing of non-crop-based oils, such as UCO and tallow, and focus exclusively on biofuels derived from soy. This cap could therefore disadvantage these producers, leading to higher fuel prices, poorer air quality, and an increased reliance on less sustainable feedstocks.

The proposed cap could inadvertently promote greater fossil fuel use and undermine the progress achieved in reducing carbon emissions and other pollutants through biomass-based fuels such as biodiesel and renewable diesel.

Sustainability Requirements & Guardrails

194.2 AGP recommends a more nuanced, risk-based approach to sustainability requirements, utilizing existing frameworks like the Renewable Fuel Standard (RFS). This approach would ensure that low-carbon feedstocks continue to play a significant role without hindering the growth and sustainability of the biofuels industry. U.S. farmers, who have been instrumental in displacing a substantial portion of California's fossil diesel with biodiesel and renewable diesel, would be adversely affected by these restrictions, potentially stalling the progress made in carbon reduction and air quality improvements.

194.3 We also express concern over the proposed traceability requirements for land use change and deforestation. In the U.S., where the risk of deforestation from crop-based feedstocks is virtually non-existent, we urge CARB to consider these feedstocks compliant with the proposed sustainability criteria without additional certification. Recognizing established sustainability systems like the RFS or the Soybean Sustainability Assurance Protocol (SSAP) would streamline compliance and align with existing regulations, maintaining high environmental standards while simplifying the process.

Outdated Scoring Methodology

194.4 AGP urges CARB to modernize its outdated scoring methodology for crop-based biofuels, particularly soy-based feedstocks, within the LCFS. Despite consistent advocacy from stakeholders up and down the supply chain, CARB has yet to revise the Global Trade Analysis Project model for biofuels (GTAP-BIO). This model does not reflect the significant advancements in sustainable farming practices, such as improved soil management, reduced water usage, and lower on-farm emissions, that have dramatically reduced the CI score of soybeans. Continued reliance on outdated data could lead to the premature phase-out of soy-based biofuels from LCFS credit generation, undermining the program's goals.

194.5 CARB's plan to update all major lifecycle emissions models except GTAP-BIO disregards the substantial progress made by the soy industry over the past two decades. The existing model assigns an inaccurate indirect land use change (ILUC) impact of 29.1 gCO₂e/MJ to soy biomass-based diesel, while more recent data suggests a much lower value between 9 and 10 gCO₂e/MJ. Additionally, the 40BSAF-GREET 2024 model used in federal programs indicates an ILUC score of 12.2 for soy-based sustainable aviation fuel (SAF). To ensure the LCFS delivers on its environmental promises, it is crucial that CARB updates its

modeling to reflect current data, particularly if it is serious about enforcing stringent sustainability guardrails and capping virgin vegetable oil feedstocks based on land use concerns. Accurate CI values are essential for realizing the full benefits of the LCFS.

Key Requests

194.6

1. Reconsider the proposed cap on vegetable oil as a feedstock, ensuring decisions are based on current scientific evidence and consistent with AB-32 requirements.
2. Adopt a more nuanced, risk-based approach to sustainability requirements, leveraging existing frameworks like the RFS and SSAP to streamline compliance.
3. Update the GTAP-BIO model to reflect current sustainable farming practices and accurate CI scores, ensuring soy-based biofuels are fairly evaluated within the LCFS.

Collaboration and Moving Forward

AGP's operations support over 1,100 employees and approximately 200,000 U.S. farmers across five states. While our soybean processing and biodiesel production footprint does not extend into California, our products significantly contribute to the state's biofuel supply chain and support employment throughout the region. Our commitment to sustainability is evident in the practices adopted by our cooperative members and their farmer owners, including climate-smart techniques that have helped reduce the carbon footprint of U.S. soybeans by 19% from 2015 to 2021.

We are eager to work collaboratively with CARB to ensure that American farmers, feedstock processors, and biomass-based diesel producers are recognized as valuable partners in California's LCFS program. To this end, we invite you and your team to visit one of our ten soybean crush facilities to experience firsthand the sustainable production and processing of U.S. soybeans. This visit could serve as a valuable opportunity to discuss how AGP and CARB can work together to enhance the effectiveness of the LCFS in achieving its environmental objectives through biomass-based fuels.

Thank you again for the opportunity to provide input and for considering our perspectives. We look forward to continuing this dialogue and working toward outcomes that expand the use of soy-based biofuels while supporting California's environmental and economic goals.

Sincerely,



Chris Schaffer
Chief Executive Officer and General Manager
Ag Processing Inc

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Comment 195 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

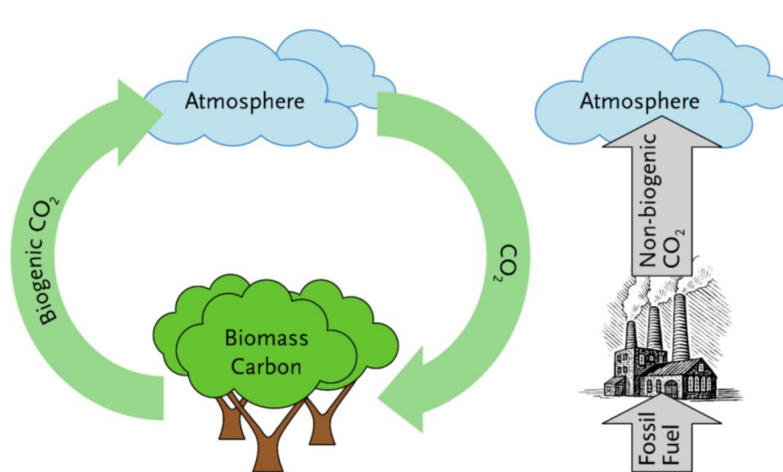
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Subject	Biomass and Biogenic Carbon Accounting and Verification
Comment	<div>The attached report addresses issues related biomass, including biogenic carbon accounting and biomass verification. Thank you for your consideration.</div>
Attachment	www.arb.ca.gov/lists/com-attach/7530-lcfs2024-VDcHY1MzAj0CZVA+.pdf
Original File Name	CBalance Report_LCFS_comment.pdf

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Biomass – Accounting Principles, Alternative Fates, and Verification

LCA.8192.224.2024
August 27, 2024

Prepared by:
Life Cycle Associates

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TERMS AND ABBREVIATIONS

ABA	Annual Basis Accounting
ANL	Argonne National Laboratory
AR	As Received, weight includes moisture
ARB	Air Resources Board
BD	Bone dry
Btu	British Thermal Unit
BUC	Biogenic Uptake Credit
CA	California
CA PUC	California Public Utilities Commission
CARB	California Air Resources Board
C-BREC	California Biomass Residue Emissions Characterization
CCS	Carbon Capture Sequestration
CEMS	Continuous Emissions Monitoring Systems
CFS	Clean Fuel Standard
CHP	Combined Heat and Power
CI	Carbon intensity
CNG	Compressed Natural Gas
CO	Carbon monoxide
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CORRIM	Consortium for Research on Renewable Industrial Materials
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
CPUC	California Public Utilities Commission
ECCC	Environment and Climate Change Canada
EF	Emission Factors
EISA	Energy Independence and Security Act
EPA	U.S. Environmental Protection Agency
FAO	Food and Agriculture Organization
FSC	Forest Stewardship Council
g CO ₂ e	Grams of carbon dioxide equivalent
GHG	Greenhouse Gas
GPS	Global Positioning System
GREET	The Greenhouse gas, Regulated Emissions, and Energy use in Transportation Model
GTAP-BIO	Global Trade Analysis Project- Biofuels
GWP	Global Warming Potential
HF	Hydrogen Fluoride
HHV	Higher Heating Value
ICAO	International Civil Aviation Organization
IEA	International Energy Agency
iLUC	Indirect Land Use Change



IPCC	Intergovernmental Panel on Climate Change
ISCC	International Sustainability and Carbon Certification
LCA	Life Cycle Analysis or Life Cycle Assessment
LCI	Life Cycle Inventory
LCFS	Low Carbon Fuel Standard
LHV	Lower Heating Value
LPG	Liquified Petroleum Gases
LUC	Land Use Change
MC	Moisture Content
MJ	Megajoule
MMBtu	Million Btu
MSW	Municipal Solid Waste
MW	Mega Watt
mw	Molecular Weight
NG	Natural gas
NMHC	Non-methane Hydrocarbons
NPP	Net Primary Productivity
N ₂ O	Nitrous oxide
NO _x	Oxides of nitrogen
NWL	Natural Working Lands
NZ ETS	New Zealand Emission Trading Scheme
OR CFS	Oregon Clean Fuel Standard
PCDD/F	Polychlorinated dibenzo-p-dioxin / Furan
PM	Particular Matter
RIA	Regulatory Impact Analysis
RFS	Renewable Fuel Standard
RSB	Roundtable on Sustainable Biomaterials
SAF	Sustainable Aviation Fuel
SFI	Sustainable Forestry Initiative
SOC	Soil Organic Carbon
UCO	Use Cooking Oil
USDA	United States Department of Agriculture
UWW	Urban Wood Waste
VOC	Volatile Organic Compound
WA CFS	Washington Clean Fuel Standard
WWF	World Wildlife Foundation



EXECUTIVE SUMMARY

The California Air Resources Board's failure to provide adequate guidance on the treatment of waste and residual biomass under the Low Carbon Fuel Standard (LCFS) undermines efforts to utilize natural and working lands effectively, hindering climate goals and wildfire risk mitigation. This includes guidance on the both biogenic carbon accounting for biomass and the characterization of biomass types and certification schemes. Clear guidance and support for waste biomass utilization can unlock substantial opportunities to reduce emissions, promote sustainable land management, and mitigate wildfires, advancing California's climate agenda.

This paper explores the challenges and opportunities associated with waste biomass under the California LCFS, and presents a comprehensive framework for determining appropriate accounting methods based on specific types of biomasses, conversion processes, and end-uses.

Five distinct categories of biomass are analyzed: energy crops, crop wastes, forest residues, urban landscaping residues, and construction and demolition waste. Each category exhibits unique characteristics and alternative fates that significantly impact carbon exchanges throughout the biomass lifecycle. Understanding these implications proves crucial for accurately representing the greenhouse gas (GHG) emissions reductions linked to biofuel production and utilization.

				
Energy Crops Crops that are grown specifically for their energy content. <ul style="list-style-type: none">○ Switchgrass○ Miscanthus○ Willow	Crop Wastes Residues from agricultural crops. <ul style="list-style-type: none">○ Corn stover○ Wheat straw○ Rice straw	Forest Residues Waste materials from forestry operations. <ul style="list-style-type: none">○ Tree trimmings○ Slash○ Stumps	Urban Landscaping Residues Waste materials from urban landscapes. <ul style="list-style-type: none">○ Grass clippings○ Yard waste	C&D Waste Waste materials from construction and demolition activities.

Figure S.1. Biomass Categories and Examples

To overcome the multifaceted challenges tied to waste biomass, the paper proposes a series of immediate actions that the CARB can take to advance the utilization of biomass-derived fuels under the LCFS. These actions are as follows:

Action 1: Develop a Near-Term Solution for Biogenic Carbon Accounting

CARB should actively develop a near-term solution for biogenic carbon accounting that enables future development. This solution should apply to biomass from forest residues, crop residues, forest slash, and thinnings. CARB should adhere to the carbon-neutral framework provided by the GREET modeling system, ensuring that these biomass sources contribute to California's carbon neutrality goals.

Action 2: Create a Tier 1 Calculator Framework

CARB should establish a Tier 1 calculator framework specifically designed for converting biomass into synthetic fuels, ethanol, hydrogen, and compressed natural gas (CNG). This framework will provide a standardized approach to accurately account for the carbon emissions associated with different conversion processes.

Action 3: Establish a Temporary Fuel Pathway Code for Carbon Neutrality

To support carbon neutrality, CARB must set up a temporary fuel pathway code with a safety margin. This code should apply to biomass fuels derived from different sources and conversion technologies. By setting a safety margin, CARB allows for any uncertainties in measuring carbon neutrality while still ensuring rigorous emissions reductions. This temporary code provides a flexible and adaptive approach to incentivize the use of biomass-derived fuels.

Action 4: Introduce a Temporary Fuel Pathway Code for Biomass Fuels and CCS

To further support carbon neutrality, CARB should introduce a temporary fuel pathway code tailored to biomass fuels and their production in conjunction with carbon capture and storage (CCS) technologies. This code would enable the inclusion of biomass-derived fuels that have undergone CCS, ensuring their emissions are effectively reduced or even sequestered. By incorporating CCS into the fuel pathway code, CARB can promote the deployment of advanced technologies that maximize carbon mitigation potential.

Action 5: Provide an Initial 10-Year Implementation Period

CARB should offer an initial 10-year implementation period based on carbon-neutral biomass, allowing for a safety margin. This implementation period accounts for the complexities and uncertainties surrounding biomass utilization and ensures a smooth transition for stakeholders. By providing a reasonable timeframe, CARB fosters confidence and stability in the biomass-derived fuels market, encouraging investment and innovation.

Action 6: Establish Biomass Verification Guidelines

In the latest proposed changes to the LCFS regulation, CARB has taken steps to explicitly include certain waste biomass categories. However, changes were made without stakeholder engagement and an understanding of the nuances in the waste biomass industry. CARB should undertake the following actions to develop comprehensive biomass verification guidelines:

1. Define categories of biomass feedstocks, including thinnings and slash, agricultural residue, energy crops, and urban waste. This clear categorization enables accurate



assessment and consistent monitoring of different biomass sources, ensuring transparency and reliability in the verification process.

2. Review existing verification protocols and align them with the requirements of the LCFS program. CARB should conduct a thorough evaluation of current verification protocols, considering factors such as the inclusion of thinning and slash materials and the compatibility with relevant regulatory frameworks like the RFS. Additionally, alignment with recognized forestry certification schemes, such as the Sustainable Forestry Initiative (SFI) and the Forest Stewardship Council (FSC), should be ensured to enhance the credibility and integrity of the verification process.

In addition to these immediate actions, the paper highlights the importance of organizing workshops to enhance understanding and collaboration on biogenic carbon neutrality issues and residual biomass utilization. CARB should coordinate a residual biomass to energy/LCFS workshop, bringing together key stakeholders, such as academic institutions like UC Davis, state agencies, forestry development companies, environmental groups, and verification bodies. Additionally, CARB should actively participate in a third-party/wood utilization workshop, held in Sacramento, to foster collaboration and knowledge sharing among relevant experts.

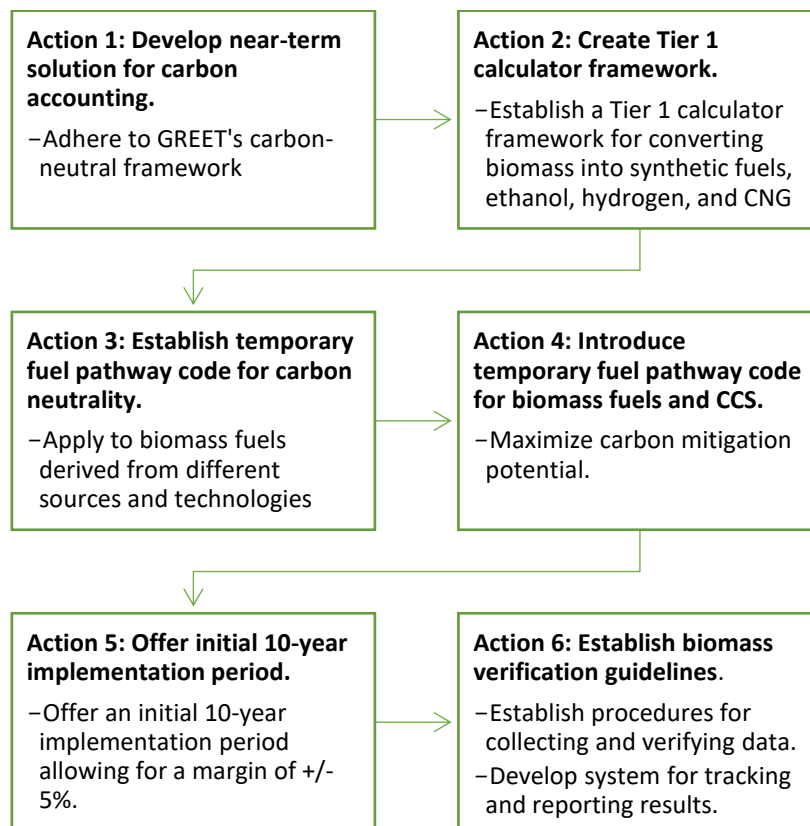


Figure S.2. Summary of Action Items



The following review supports these recommended action items through a comprehensive overview of the literature on biomass to energy. The review includes information on the properties of biomass, the alternative fate of biomass, biomass conversion processes, biogenic accounting in other regulated programs, and data sources for biomass emissions factors. This review provides a foundation for the development of policies and regulations for the utilization of biomass-derived fuels under the California LCFS.



1. INTRODUCTION

Achieving the State of California's goal¹ of carbon neutrality by 2045 requires a multifaceted approach to minimize greenhouse gas (GHG) emissions from sources and maximize their removal in sinks. Potential scenarios to accomplish this are described in reports (Baker, et al., 2020), and are under development through efforts including the California Air Resource Board's 2022 Scoping Plan (CARB, 2022a; CARB, 2022b). The transformation of energy systems and management of natural and working lands (NWL) is critical to reducing GHG emissions and mitigating the effects of climate change under these scenarios.

The California Air Resources Board (CARB) has the opportunity to bolster the effectiveness of its climate policies by aligning the goals of its scoping plan with existing policies, namely the California Low Carbon Fuel Standard (LCFS), and by providing clear guidance to developers on policy implementation. The LCFS is a powerful tool for reducing greenhouse gas (GHG) emissions in California's transportation sector. It incentivizes the consumption of low-carbon alternative fuels while reducing the use of conventional gasoline and diesel through the generation of billions of dollars' worth of credits and deficits each year. Alternative fuels producers receive credits under the LCFS based on the GHG reductions they achieve, as determined by a life cycle assessment (LCA) and verified by third-party reviewers.

CARB has fallen short of aligning the goals of the scoping plan with LCFS regulation and guidance in one key area: next-generation biomass-derived fuels. While CARB's 2022 scoping plan aims to mobilize private finance to invest in biomass management to reduce wildfire threats and spur innovation, the agency has failed to provide developers with guidance on how biomass feedstocks will be verified and accounted for under the LCFS. As a result, developers face obstacles when attempting to utilize biomass feedstocks in their fuel production processes.

To mobilize private finance, developers need clarity on how carbon emissions from biomass-derived feedstocks will be accounted for and verified under the LCFS. Biomass feedstocks differ fundamentally from fossil feedstocks in their ability to sequester CO₂ on time scales relevant to global climate change (EPA, 2011). However, when biomass or biologically based materials combust or decompose, carbon dioxide (CO₂) and other gases are released. Therefore, accounting for CO₂ emissions originating with biomass feedstocks – referred to as biogenic CO₂ – requires a framework for considering the scientific and technical issues surrounding tracking emissions through the biomass carbon cycle (EPA, 2011).

The lack of guidance on biogenic emissions is not without cause. Since the emergence of biomass-derived fuels, scientists have debated how carbon sequestered through photosynthesis and burned during combustion should be accounted for in well-to-wheels (WtW) life cycle assessments. Despite this debate, regulations in the US and abroad have defined accounting and verification frameworks for biomass-derived fuels, allowing their

¹ Established by California Executive Order, B-55-18, signed by former Governor Jerry Brown.



proliferation under policies aimed at reducing GHG emissions. This paper aims to review the current biogenic carbon accounting approaches and provide a framework for determining appropriate accounting methods for specific types of biomass, conversion processes, and end-uses.

To facilitate this, the paper examines five categories of biomass: energy crops, crop wastes, forest residues, urban landscaping residues, and construction and demolition waste. Each category of biomass has unique properties, alternative fates, and uses that significantly impact carbon exchanges throughout its lifecycle. Understanding these implications is critical to accurately represent biomass feedstocks' GHG emissions reductions associated with biofuel production and use. In the next section, we'll provide examples of each biomass category, and their respective properties and uses, as shown in Figure 1.1.



Figure 1.1. Examples of biomass types by category

The report is structured into multiple sections, each of which explores a different aspect of biomass and its conversion into energy. The initial section provides a comprehensive overview of biomass, including its sources, composition, and properties. Subsequently, various methods for assessing the impact of biomass on greenhouse gas emissions are discussed. This is followed by an exploration of alternative applications of biomass. Additionally, the report examines the emissions generated during biomass collection and presents different approaches for verifying the sustainability of biomass. The report further provides recommendations for accounting for biogenic emissions and offers specific suggestions for policymakers. For a visual representation of the paper's organization, refer to Figure 1.2.



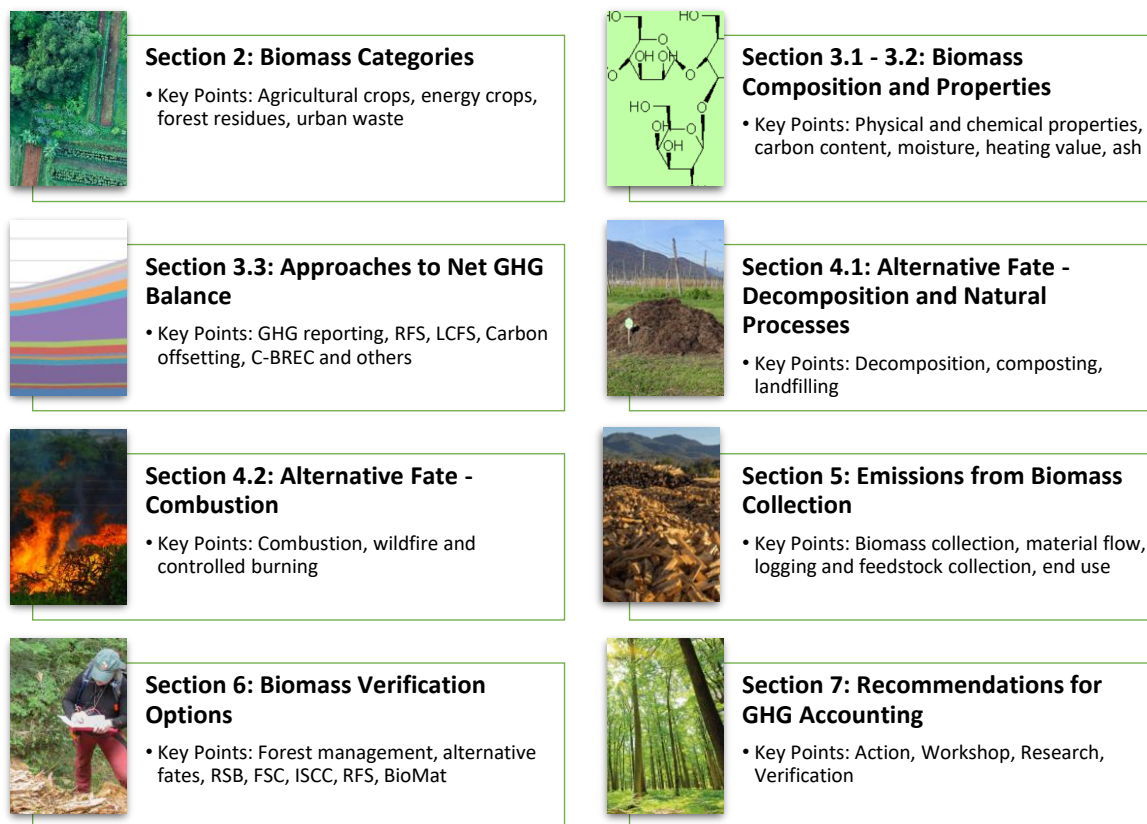


Figure 1.2. Organizational structure of the report

1.1 Objectives

Developers seeking to invest in infrastructure and technology for producing low-carbon next generation biomass-derived fuels face several significant challenges. These include a lack of guidance on how the net carbon balance of biomass will be assessed under California's LCFS regulation, the need to educate CARB staff on the specific alternative fate of their particular biomass feedstock, and the uncertainty around what CARB will require for verification of biomass-derived feedstocks.

This paper aims to address each of these challenges by:

- 1) Providing insights into the net carbon balance of different types of biomass
- 2) Describing the alternative fates of biomass based on category, location, and collection practices
- 3) Reviewing current verification schemes and options for each biomass category and location.
- 4) Recommending actions that would provide an immediate path forward for developers seeking to invest in low-carbon next-generation biomass derived fuels.



The following subsections further describe each of these objectives.

1.1.1 Addressing the net carbon balance of biomass

The net carbon balance of biomass refers to the difference between the amount of carbon emitted by biomass feedstocks and the amount of carbon sequestered through photosynthesis. It is a critical factor that must be considered when assessing the environmental impact of biomass-derived fuels.

The absence of a defined policy by CARB addressing the net carbon balance of biomass feedstocks under the LCFS has significant implications for developers of biomass derived fuels. When seeking funding for their projects, developers must provide financial projections that include expected credit generation under the LCFS. Under the LCFS, credit generation is directly linked to GHG emission reductions, which are determined by CARB-approved accounting principles. However, with no clear guidelines on accounting for biomass, developers cannot accurately project credit generation and may find it challenging to secure funding for their projects.

To address this challenge, we aim to provide insights on the net carbon balance of biomass, including its full lifecycle from production, processing, to end use. Given the complex nature of the issue, we have conducted an extensive literature review to gather information from a range of sources, including academic papers, policy documents, and industry reports. We have also reviewed the approach to net carbon balance in regulated programs, such as those used to certify the sustainability of bioenergy products. By examining the factors that can affect the net carbon balance of biomass, including biomass type, production and processing methods, and end use of the bioenergy product, we aim to provide a comprehensive understanding that could help CARB make a policy decision on this critical issue.

1.1.2 Describing the alternative fate of biomass derived feedstocks

The counterfactuals or alternative fates of biomass are the potential outcomes for a particular biomass type if it were not used for bioenergy. These alternative fates, such as food production for energy crops, are essential in determining the effect of a biomass feedstock on the net carbon balance. It is important to compare a bioenergy system to scenarios that would have occurred had the biomass not been utilized, as a bioenergy system does not exist in a vacuum.

CARB needs to provide a framework for understanding the alternative fates of specific biomass categories in order to facilitate investment in low-carbon next-generation biomass-derived fuels. The alternative fate of a biomass feedstock is highly dependent on factors such as biomass type, location, and farming or collection practices. For instance, woody biomass feedstocks collected from California forests to mitigate forest fire risk would have otherwise emitted carbon during a wildfire event, while woody biomass feedstocks collected from managed The South Eastern U.S. forests could increase net carbon sequestration by diverting resources to healthy trees.



To understand the alternative fates of different biomass types, we have conducted a literature review and interviewed biomass-derived fuel developers. Our findings provide generalizations that could be helpful for CARB in understanding the alternative fate of various biomass categories and locations.

1.1.3 Verification Schemes for Biomass-Derived Feedstocks

Verification of biomass-derived feedstocks is critical to ensuring that they meet sustainability standards and are aligned with the alternative fate framework. To comply with LCFS regulations, CARB will require verification of all steps in the supply chain, from cultivation to processing, trade, and transport of biomass-derived fuels. However, the lack of guidance from CARB on how biomass-derived feedstocks will be verified poses a significant hurdle for developers seeking to invest in low-carbon next-generation biomass-derived fuels.

Fortunately, several certification schemes currently exist that allow for the certification of the complete supply chain of biomass-derived fuels. Many foresters in the U.S. are already required to gain certification under one or more of these schemes. For example, the Forest Stewardship Council (FSC) and the Sustainable Forestry Initiative (SFI) offer certification programs for sustainable forestry practices. The Programme for the Endorsement of Forest Certification (PEFC) is a global certification scheme that recognizes sustainable forest management.

In addition, the U.S. Renewable Fuel Standard (RFS) has worked with developers to certify biomass-derived feedstocks. The RFS requires that renewable fuel producers register with the Environmental Protection Agency (EPA) and provide documentation showing that their feedstocks meet the greenhouse gas (GHG) reduction and sustainability criteria set by the EPA. The strategies used under the RFS may inform possible strategies under the CA LCFS.

This paper aims to provide detailed descriptions of current biomass verification schemes, including a comparison of different aspects of each certification scheme. By examining existing certification programs, the paper aims to help developers navigate the complex landscape of biomass verification and provide recommendations for CARB on how best to verify biomass-derived feedstocks under the CA LCFS.

1.1.4 Providing a Path Forward for Investment in Low-Carbon Biomass-Derived Fuels

The issues surrounding biomass-derived fuels are complex and have been the subject of ongoing scientific and policy debate. However, it is essential to address these issues in order to promote the development of alternative fuels and support California's goals for reducing greenhouse gas emissions and mitigating the risks of wildfires and natural resource loss.

Inaction on the part of CARB and other stakeholders could hinder progress in this area, which would ultimately undermine efforts to achieve important environmental goals. Given the urgency of the situation, it is critical that CARB take immediate steps to address the challenges related to biomass-derived fuels.



The paper concludes by offering recommendations that are designed to provide a practical and actionable path forward for developers seeking to invest in low-carbon next-generation biomass-derived fuels. By taking these steps, CARB can remove barriers for developers seeking to invest in low-carbon alternative fuels.

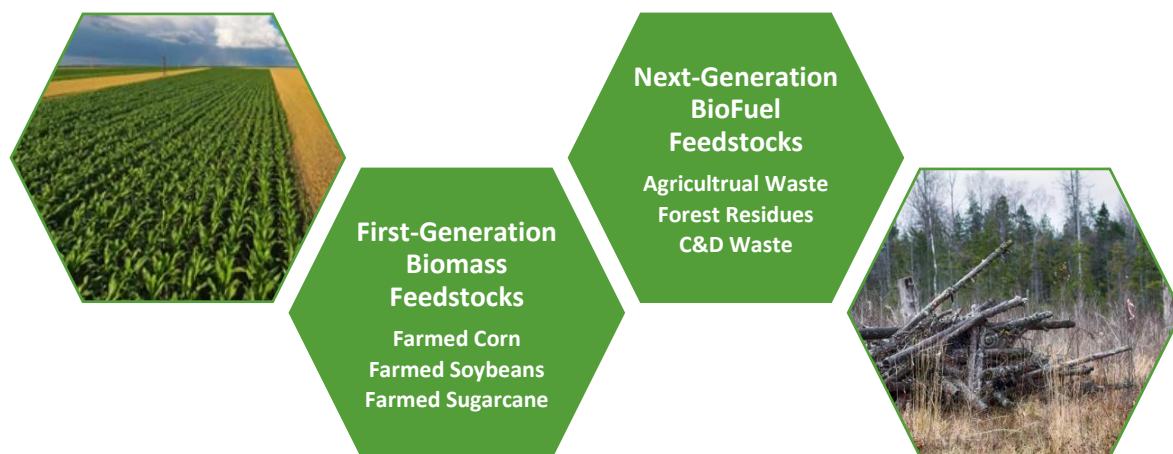


2. BACKGROUND

Biomass-derived fuel has a long history, with roots dating back to ancient civilizations' use of vegetable oils for lighting. The interest in using biomass feedstocks for transportation fuel resurged in the 1970s during the energy crisis, with countries like Brazil and the US investing in biofuels as a way to reduce their dependence on foreign oil.

Today, biofuels are an essential part of the renewable energy mix in the United States. Both federal and statewide policies exist to incentivize biofuel production. For instance, the Renewable Fuel Standard (RFS) is a national policy that requires a specific volume of biofuels to be blended into the transportation fuel supply each year. Additionally, statewide programs like California's Low Carbon Fuel Standard (LCFS) require a certain reduction in greenhouse gas emissions from transportation fuels each year. Biofuels are an important way to achieve this reduction, with alternative fuels producers receiving credits for GHG reductions based on a life cycle assessment (LCA).

First-generation biofuels were made from crops like corn and soybeans, but there has been a significant shift towards next-generation biofuels that use non-food feedstocks like agricultural waste and forest residues. This shift is due to concerns about using food crops for fuel and the need to reduce the carbon intensity of transportation fuels. Using agricultural waste and forest residues to produce biofuels can create a more sustainable and circular supply chain. Additionally, it reduces the amount of waste sent to landfills, creates new revenue streams for farmers and foresters, and helps to mitigate the risk of wildfires by removing excess biomass from forests.



2.1 The Carbon Cycle & Biomass-Derived Feedstocks

Understanding the carbon cycle is crucial in developing an accounting framework for both first-generation and next-generation biomass-derived fuels. Biogenic and non-biogenic greenhouse gas (GHG) emissions are key components in this accounting framework. While both bio-based and fossil-based materials emit CO₂ during combustion, bio-based materials also remove CO₂



from the atmosphere through photosynthesis (Figure 2.1). Carbon sequestration is the process of capturing and storing carbon from the atmosphere, and it can occur through natural or artificial processes such as biological, geological, or technological carbon sequestration.

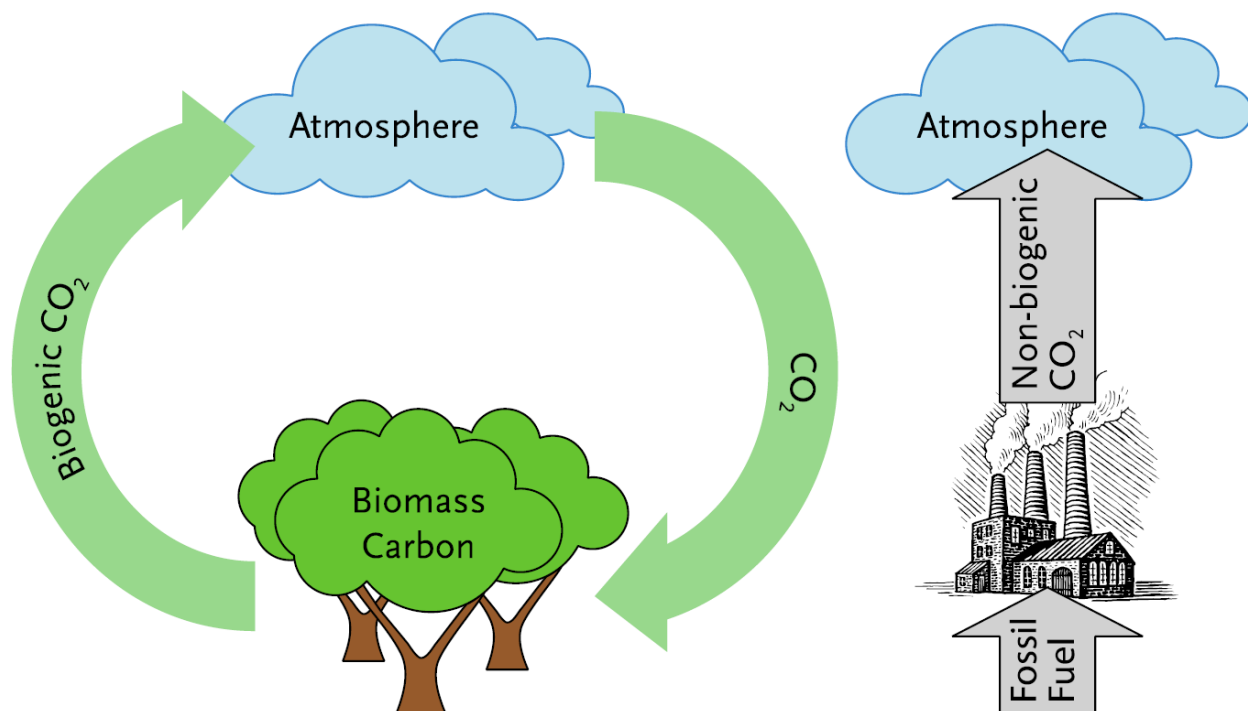


Figure 2.1. Biogenic and Non-biogenic Sources of CO₂ to the Atmosphere.

Source: IEA, 2018²

During the growth phase of vegetation, a certain amount of biogenic carbon is taken up from the atmosphere. The sequestered carbon is distributed in the soil, soil ecosystem, and various parts of the plant or tree. However, some of this carbon is also released back into the atmosphere through respiration and other interactions. Figure 2.2 illustrates the major exchanges of biogenic carbon that take place during plant growth. The carbon sequestered in the form of soil and underground biomass is assumed not to change considerably over longer time-periods. The aboveground biomass left on the field is assumed to subsequently decompose aerobically, releasing roughly the same amount of carbon back into the atmosphere as was absorbed (some of which may be converted into microbial biomass).

² IPCC distinguishes between the slow domain of the carbon cycle, where turnover times exceed 10,000 years, and the fast domain (the atmosphere, ocean, vegetation and soil), vegetation and soil carbon have turnover times in the magnitude of 1– 100 and 10– 500 years, respectively. Fossil fuel transfers carbon from the slow domain to the fast domain, while bioenergy systems operate within the fast domain.



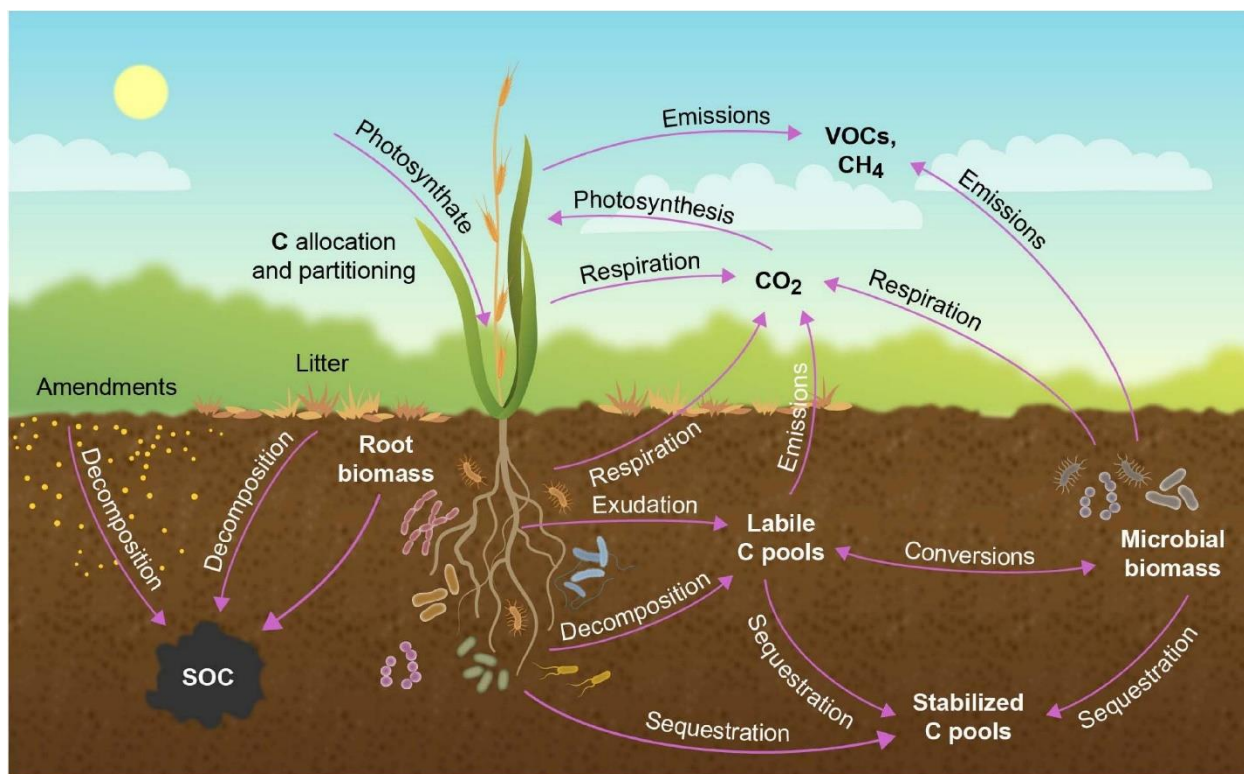


Figure 2.2. Carbon flux during crop farming.

2.1.1 Time Accounting

Time accounting for biomass feedstocks is particularly important because of the difference between biogenic and fossil CO₂ emissions. Fossil fuels were formed over millions of years and are extracted and consumed in a single pulse, resulting in a large and immediate release of carbon into the atmosphere. In contrast, biomass feedstocks can be grown and harvested on much shorter timescales, and carbon sequestration and emissions are distributed over time.

Different types of biomass feedstocks have different growth and harvesting cycles, which also affects the timing of carbon emissions and sequestration. For example, corn can be grown and harvested on an annual cycle, while woody biomass harvested from managed forests may take 20-50 years to regrow. Waste biomass feedstocks may have a timing related to the seasonality of harvesting a food crop, but the alternative fate of decomposition may take place over months or years.

In order for CARB to accurately account for the carbon emissions and sequestration associated with biomass-derived feedstocks, it is important to take into account these different timeframes and understand how they relate to global warming potential (GWP).

Global Warming Potential (GWP) Time Horizon

Global Warming Potential (GWP) is a measure of the potential of a gas to have an effect that could lead to climate change due to prolonged residence time in the atmosphere. The GWP can



be used to quantify and communicate the relative and absolute contributions to climate change of emissions of different GHG (Myhre, et al., 2013) and of emissions from countries or sources.

Table 1 The United Nations Framework Convention on Climate Change uses the 100-year GWP. The United States primarily uses the 100-year GWP for reporting of GHG emissions. The State of Washington Greenhouse Gas Reporting program (Washington Administrative Code, 2022) also uses the 100-year GWP. The 20-year GWP is sometimes used as an alternative to the 100-year GWP. The 20-year GWP prioritizes gases with shorter lifetimes, because it does not consider impacts that happen more than 20 years after the emissions occur. Because all GWPs are calculated relative to CO₂, emission calculations based on a 20-year GWP will be larger for gases with lifetimes shorter than that of CO₂, and smaller for gases with lifetimes longer than CO₂ (EPA).

Table 1 shows the GWP values from the Intergovernmental Panel on Climate Change (IPCC), an international body founded by the United Nations for the 100-year and 20-year time horizons from the two latest IPCC Assessment Reports, (AR4 and AR5), about the state of scientific, technical and socio-economic knowledge on climate change. (IPCC AR4, 2007; IPCC AR5, 2013).

Table 1. Global Warming Potential of GHG Pollutants

IPCC Assessment	AR6 ^c		AR5 ^a		AR4 ^b	
GWP Time Horizon	100	20	100	20	100	20
CO ₂	1	1	1	1	1	1
CH ₄	30	83	30 ^a	85	25 ^a	72
N ₂ O	273	273	265	264	298	289

^a IPCC Fifth Assessment Report 5 (AR5) published in 2014 includes a GWP of 28 for biogenic CH₄. Since the biogenic source would be emitted either as CO₂ or CH₄, the difference between the GWP of 30 and 28 represents in the indirect effects of methane decomposition to CO₂. (Myhre, et al., 2013)

^b Fourth IPCC Assessment report published in 2007 (IPCC AR4, 2007)

^c Sixth IPCC Assessment report published in 2022 (IPCC AR6, 2022)

2.1.2 Biomass Sources

The source of biomass is a crucial factor that influences the carbon emissions of a bioenergy system over its lifetime. Various variables such as the growing period, plant species, climate, and management practices can have a significant impact on the biogenic carbon accounting of biomass. Therefore, it is essential to consider these factors while assessing the carbon footprint of biofuels.

To facilitate the understanding of biogenic carbon accounting, this report categorizes biomass-derived feedstocks into five main categories: energy crops, crop wastes, forest residues, urban landscaping residues, and construction and demolition waste. Each of these categories is introduced in the following sections. These categories are referenced throughout the report as each is examined for biogenic accounting methodology, alternative fate, and verification options.



Five distinct categories of biomass are analyzed: energy crops, crop wastes, forest residues, urban landscaping residues, and construction and demolition waste. Each category exhibits unique characteristics and alternative fates that significantly impact carbon exchanges throughout the biomass lifecycle. Understanding these implications proves crucial for accurately representing the greenhouse gas (GHG) emissions reductions linked to biofuel production and utilization.

				
Energy Crops Crops that are grown specifically for their energy content. <ul style="list-style-type: none"> ○ Switchgrass ○ Miscanthus ○ Willow 	Crop Wastes Residues from agricultural crops. <ul style="list-style-type: none"> ○ Corn stover ○ Wheat straw ○ Rice straw 	Forest Residues Waste materials from forestry operations. <ul style="list-style-type: none"> ○ Tree trimmings ○ Slash ○ Stumps 	Urban Landscaping Residues Waste materials from urban landscapes. <ul style="list-style-type: none"> ○ Grass clippings ○ Yard waste 	C&D Waste Waste materials from construction and demolition activities.

Figure 2.3. Biomass Categories and Examples

2.1.3 Energy Crops

Energy crop biomass is derived from dedicated crops grown primarily for use as biofuels, such as corn, sugarcane, and soybean. These crops are typically annual, meaning they are planted and harvested within a single growing season. In the case of corn, for example, the crop is typically planted in the spring, harvested in the fall, and processed into ethanol or other biofuels. The carbon accounting for energy crop biomass feedstocks is typically based on the assumption that the carbon absorbed during plant growth is returned to the atmosphere relatively quickly upon combustion or decay, and that the crops are replanted annually or within a few years.

Farmed trees are another type of energy crop biomass, which are considered short-rotation crops. These include species such as willow and poplar, which are harvested in shorter timeframes and smaller in diameter than trees used for timber and other traditional uses. Poplar is generally grown in Mid-Atlantic and Southeastern regions of the US. Willow is a cold-tolerant species, and is grown in the Upper-Midwest and Northeastern regions of the US (Jackson, 2021). These crops can be harvested and processed for use as bioenergy on a cycle ranging from one to ten years, depending on the species and management practices used.



2.1.4 Crop Waste and Residue

Crop residues are an inevitable byproduct of agricultural production and represent a substantial source of biomass feedstocks for the production of biofuels and other bio-based products. Crop residues can be classified into three categories: primary residues, secondary residues, and tertiary residues. Primary residues are directly removed from the field after harvest, such as straw and stover. Secondary residues are generated during processing, such as bagasse and molasses from sugarcane processing. Tertiary residues are residues left on the field after harvest, such as root systems and plant debris.

While crop residues have traditionally been viewed as a waste product and left to decompose, they offer a significant opportunity to provide sustainable, low-carbon alternatives to fossil fuels.

2.1.5 Forest Waste and Residue

Forest wastes and residues come from two main sources: sustainable forest management practices and wildfire mitigation. Forest residues are a vital component of sustainable forest management practices. When trees are grown for commercial purposes such as timber, forest residues are generated through pre-commercial thinning operations and harvest practices. Pre-commercial thinning involves the removal of rows of trees in order to decrease competition for sunlight, water, and soil resources, and enhance growth rate and desired log quality. The frequency of thinning depends on the species, site productivity, desired final product, and local market conditions. During harvest operations, limbs, tree tops, and trees considered to have either poor form or health are also culled.

Both pre-commercial thinning and harvest residues are stored in slash piles, which are either left to decompose in-situ or are burned to facilitate reseeding. The decomposition process is a form of unmanaged composting. If left unmanaged, the decomposition process can result in significant greenhouse gas emissions, primarily methane.

Forest waste from wildfire mitigation is another source of biomass feedstock. Wildfires can pose a significant threat to communities and ecosystems, and forest management practices often include measures to mitigate the risk of wildfires. These measures can include thinning of overgrown forests and removal of dead or diseased trees. The resulting forest waste can be used as a feedstock for bioenergy production, as well as for other purposes such as soil amendment or animal bedding.

It is important to note that the use of forest residues must be managed properly to avoid unintended negative consequences, such as soil depletion and habitat destruction.

2.1.6 Urban Landscaping Residues

Urban landscaping residues refer to the organic material that is generated from maintenance activities of parks, golf courses, and residential areas such as pruning, mowing, trimming, and



fall cleanup. These residues can be used as a feedstock for next-generation biofuels, which can reduce dependence on fossil fuels and contribute to lower carbon emissions.

Right-of-way management is a significant source of urban landscaping residues. Roadsides, highways, and utility rights-of-way generate significant amounts of organic material from regular maintenance activities. Landscaping waste from parks and golf courses also contribute to the overall availability of urban landscaping residues. These materials are typically collected and transported to landfills, which not only leads to higher costs for municipalities but also results in greenhouse gas emissions. Utilizing these materials as a feedstock for next-generation biofuels not only provides an alternative to landfills but also contributes to the development of a circular economy.

2.1.7 Construction and Demolition Waste

Construction and demolition (C&D) waste is another potential source of biomass feedstock for next-generation biofuels. C&D waste includes materials such as wood, concrete, and metals that are generated from construction and demolition activities. One example of C&D waste that can be used for bioenergy production is railway ties. Railway ties are typically made from treated wood, which contains chemicals such as creosote that can make it difficult to dispose of. However, by converting railway ties into biofuels, the energy content of the wood can be harnessed and the environmental impact of disposal can be minimized. In addition, wood pallets, which are commonly used in shipping and storage, can also be a potential feedstock for biofuels. These pallets are often discarded after a single use and can contribute to the waste stream. By using wood pallets as a feedstock, their energy content can be harnessed while reducing waste.

2.2 The Alternative Fate of Biomass

The alternative fates, also known as counterfactuals, of biomass refer to the possible outcomes of a particular biomass type if it had not been utilized for bioenergy. Accurately accounting for the net carbon balance of a biomass feedstock requires considering these alternative fates. This means that a biobased product or bioenergy system must be compared to scenarios that would have occurred if the biomass had not been used.

Figure 2.4 presents examples of possible alternative fates for various types of biomass feedstock. For example, crops such as corn, sugarcane, and soybean could be utilized as agricultural products, either for direct consumption or as ingredients in food processing, if not used for biofuel production. Similarly, crop residues such as corn stover, sugarcane straw, and rice straw could be left for in-situ decay. Lumber and farmed trees like willow and poplar could be utilized to produce commercial products like paper, pulp, and pellet fuel if not used for biofuel production.

Ultimately, the full life cycle GHG emissions of a biomass feedstock are highly dependent on its alternative fate. A full life cycle assessment compares the emissions that occur in a bioenergy



system to the emissions that would have occurred if the bioenergy system did not exist, taking into account the various alternative fates of the biomass feedstock.

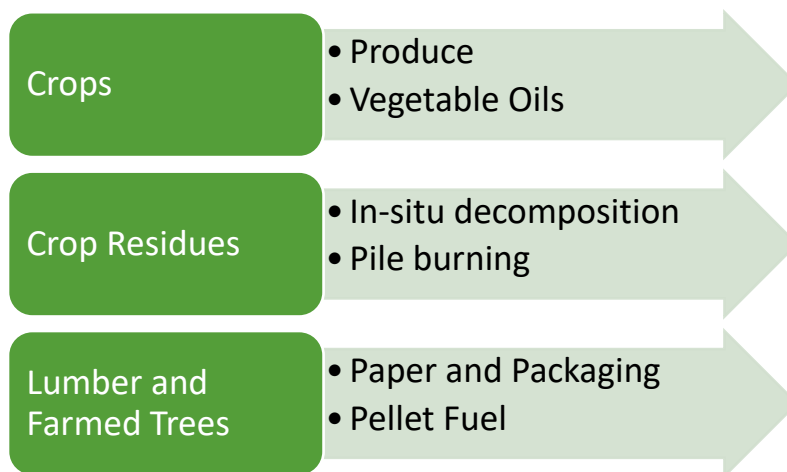


Figure 2.4. Possible alternative fates of biomass if not used for bioenergy.

Land Use Change (LUC) and Indirect Land Use Change (iLUC)

Land use change (LUC) and indirect land use change (iLUC) refer to the potential changes in land use patterns that may result from the production of biofuels. LUC occurs when land previously used for other purposes, such as agriculture or forestry, is converted into biofuel crop production. iLUC occurs when biofuel crop production displaces existing agricultural or forestry land, resulting in the conversion of other land, such as forests or grasslands, into new agricultural or forestry land to meet the displaced demand for food or other products. The potential for LUC and iLUC to occur and their associated greenhouse gas emissions must be considered when evaluating the net carbon balance of a particular biofuel feedstock and its alternative fates.

CARB has provided guidance on performing a comprehensive lifecycle analysis for biomass feedstocks in relation to land use change (LUC) and indirect greenhouse gas (GHG) emissions. This includes providing a LUC analysis by either performing a LUC analysis using GTAP-BIO coupled with the AEZ model to derive a feedstock-fuel specific LUC value, or demonstrating through robust data and analysis that the available LUC value of the LCFS regulation (shown in Table 2 below) is applicable to the feedstock sourced from a particular country or new US-based feedstock.

CARB guidance further states to provide a comprehensive LUC report summarizing model parameters used in the model including elasticities, baseline year, and the magnitude of biofuel demand, and all modeling assumptions should be clearly stated.



Table 2. Land Use Change (LUC) emission for use in CA LCFS Regulation

Biofuel	LUC (gCO₂/MJ)
Corn Ethanol	19.8
Sugarcane Ethanol	11.8
Soy Biomass-Based Diesel	29.1
Canola Biomass-Based Diesel	14.5
Grain Sorghum Ethanol	19.4
Palm Biomass-Based Diesel	71.4

It is worth noting that this guidance pertains to all biomass-derived feedstocks, regardless of category. Developers may argue that there is no LUC or iLUC emissions associated with biomass waste and residue feedstocks. This is because these feedstocks are typically generated as byproducts or waste from existing land uses, such as agriculture, forestry, or manufacturing processes, and therefore do not require additional land use or land conversion. However, CARB may still require a full evaluation of potential LUC and iLUC for these feedstocks to comply with LCFS regulation.

2.3 Properties of Biomass

Biomass feedstock properties have a significant impact on the emissions of a bioenergy system throughout its lifecycle. These properties affect combustion characteristics, efficiency, and emission factors used in the system's calculations. For instance, carbon content, heating value, and moisture content can affect biomass's effectiveness as a fuel in bioenergy systems. In addition to these, other properties such as ash content, bulk density, and particle size distribution can also affect the combustion and handling of biomass. Materials with high heating value and carbon content are usually more cost-effective and efficient to use as fuel, while high moisture content can decrease biomass heating value and make it harder to handle and transport. The following subsections examine and summarize the key biomass properties and their impact on the carbon balance.

2.3.1 Biomass Composition

The composition of biomass fuels is associated with a multitude of physical forms, but for nearly all plant species, the main structural cell wall components are cellulose, hemicellulose and lignin (Klass, 1998). Cellulose is the major structural polymer of a plant cell wall, while hemicellulose serves to strengthen the cell wall and interact with lignin, which provides flexibility and strength (see Figure 2.5 for the spatial arrangement of cellulose, hemicellulose and lignin).



The properties of biomass will be determined largely by their proportion of cellulose, hemicellulose and lignin. Lignin has a relatively high carbon content, however its structural properties are less favorable for use as carbon fiber, while cellulose has a lower carbon content, but more beneficial structure (Bengtsson, 2019). Cellulose content of biomass ranges from 9% to 80%, while hemicellulose content ranges from 10% to 50%, and lignin content ranges from 10% to 50% (Xu & Li, 2017). The percentages of each cell component for select biomass types are shown in Table 3.

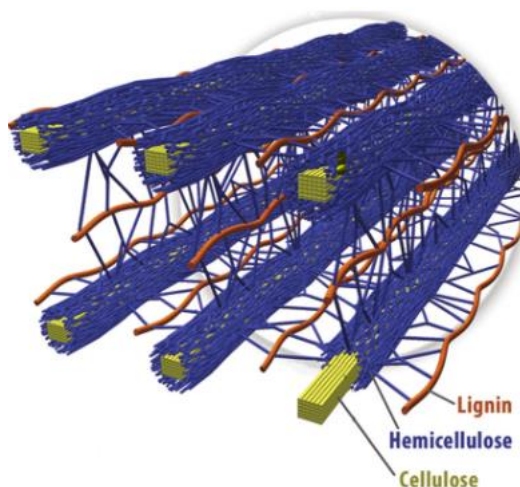


Figure 2.5. Spatial arrangement of cellulose, hemicellulose, and lignin in the cell wall of biomass. Source: (Brandt, Grasvik, Hallet, & Welton, 2013).

Table 3. Percentage of cellulose, hemicellulose and lignin content in select biomass types. Source: (Blaschek & Ezeji, 2022)

Biomass Type	Cellulose	Hemicellulose	Lignin
Hardwood	40-50	24-40	18-25
Softwood	45-50	25-35	25-35
Corn cobs	45	35	15
Grasses	25-40	35-50	10-30
Wheat Straw	33-40	20-25	15-20
Rice Straw	40	18	5.5

Calculating Emissions from Carbon Content

The proportion of cellulose, hemicellulose, and lignin in biomass determines the carbon content, which serves as a bases for calculating carbon emissions. However, other factors, such as moisture content and ash contamination, can also impact the actual emissions that occur.

For example, wood with a carbon content of 45 % would contain 450 g carbon per kg, or if fully oxidized it would emit 1,650 g of CO₂. However, if the wood contains 30% moisture, it would only contain 315 g carbon and emit 1,154 g CO₂. Since the effort the track biogenic carbon



depends both on the emissions from and use as well as the alternative fate, establishing the range in carbon content of biomass helps clarify their contribution to the net carbon balance.

Physical Properties

Physical properties of biomass can significantly impact its suitability for use in various bioenergy applications. For example, electrical conductivity is an important physical property, as biomass with high electrical conductivity may be more suitable for use in fuel cells or other energy conversion devices. Particle density is another property that can be important in bioenergy, as biomass with high particle density may be more energy-dense, meaning that it contains more energy per unit of weight or volume. This can be beneficial for certain bioenergy applications, such as the production of biofuels. The shape of biomass particles can also affect their flowability and handling characteristics, which can be important in certain bioenergy processes. For example, biomass with irregular or elongated shapes may be more difficult to handle and may require additional processing steps to prepare it for use in bioenergy systems. Finally, the thermal conductivity of biomass can affect its ability to transfer heat, which can be important in certain bioenergy applications such as the production of biochar or the use of biomass for thermal energy production. Biomass with high thermal conductivity may be more efficient at transferring heat than biomass with low thermal conductivity. Physical properties of biomass are summarized in Table 4 which was obtained from Wiebren De Jong's chapter in *Biomass as a Sustainable Energy Source for the Future* (De Jong & Ruud, 2014).

Table 4. Physical properties of solid biomass and their possible effects in processing

Physical property	Effect
Bulk density	Logistics (storage, transportation, handling)
Electrical conductivity	Microwave processing, particle cleaning via electrostatic precipitation (ash), or fine particulate matter repulsion by plants, e.g., <i>sea buckthorn</i> (tinyurl.com/luyld2g)
Hygroscopy	Logistics (storage, transportation, handling)
Particle density ^a	Conversion processes (e.g., segregation)
Particle porosity ^a	Formation of fines in processing, intraparticle heat and mass transfer impacted and so conversion
Particle shape (distribution)	Storage behavior (dimension/shape of a heap, bridging in bunkers, self-ignition), transportation (conveying) characteristics, mass and heat transfer behavior in conversion processes
Particle size (distribution)	Storage behavior (dimension/shape of a heap, bridging in bunkers, self-ignition), transportation (conveying) characteristics, mass and heat transfer behavior in conversion processes
Thermal conductivity	Physicochemical processing (heat transfer)



Chemical Properties

Chemical properties of biomass are listed in Table 5. These were also abstracted from de Jong report Biomass as a Sustainable Energy Source for the Future (De Jong & Ruud, 2014).

The elemental properties of biomass refer to the amounts of different elements present in the biomass, such as hydrogen (H), oxygen (O), nitrogen (N), and potassium (K). These elements can affect the energy content and reactivity of the biomass, as well as other properties such as its density and nutritional value. For example, biomass that is high in hydrogen may be more reactive and have a higher energy content, while biomass that is high in oxygen may be less reactive and have a lower energy content.

Fixed carbon refers to the carbon present in biomass that is not volatilized during pyrolysis or combustion. The fixed carbon content of biomass can be used to predict its energy content and behavior during bioenergy processes. Biomass with a high fixed carbon content may be more energy-dense and may be more suitable for use in certain bioenergy applications.

Ultimate analysis is used to determine the elemental composition of biomass. This information can be used to calculate the energy content of the biomass and predict its behavior during various bioenergy processes.

Similarly, proximate analysis involves the determination of the major chemical components of biomass, including the percentages of moisture, ash, volatile matter, and fixed carbon present. This information can be used to predict the behavior of biomass during processes such as combustion and fermentation, and can also be used to compare the quality of different biomass feedstocks. Table 5 shows the elements in solid biofuels and their effect in energy conversion.



Table 5. Elements in solid biofuels and their possible main effects in energy conversion processes

Element	Effect
C, carbon	Heating value, possible emission of CO, Generation of CO ₂ emissions
H, hydrogen	Heating value
O, oxygen	Heating value (negatively impacting)
N, nitrogen	Emission of NO, NO ₂ (together termed NO _x), and N ₂ O
Cl, chlorine	Emission of HCl and polychlorinated dibenzo-p-dioxin/furan (PCDD/F), causing corrosion and catalyst poisoning
S, sulfur	Emission of SO ₂ , SO ₃ (both named SO _x), causing corrosion and catalyst poisoning
F, fluorine	Emission of HF, causing corrosion
K, potassium	Corrosion, ash melting, ash utilization, aerosol formation
Na, sodium	Corrosion, ash melting, ash utilization, aerosol formation
Mg, magnesium	Ash melting, ash utilization, deposits formation
Ca, calcium	Ash melting, ash utilization, deposits formation
P, phosphorus	Ash utilization, deposits formation
Trace elements	Emissions, ash utilization, aerosol formation

2.3.2 Feedstock Properties

Feedstock properties are crucial when considering the life cycle emissions of a biomass feedstock to fuel system. Carbon content, moisture content, and heating value are some of the important properties to consider. Carbon content plays a significant role in determining the greenhouse gas emissions associated with its production and use. Moisture content impacts the efficiency of biofuel production and combustion. High moisture content can increase the energy required for drying and decrease the heating value of the feedstock. Heating value measures the energy that can be obtained from the feedstock when burned, and it affects the efficiency and cost-effectiveness of biofuel production. Below, we describe how each of these properties is related to the carbon balance of a biomass to biofuel system.

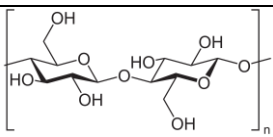
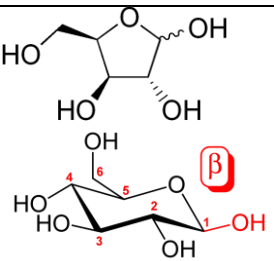
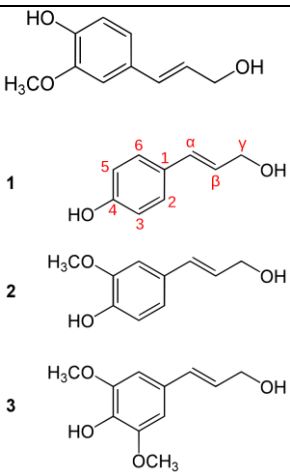
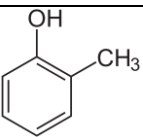
Carbon Content

Accurate modeling of the carbon content of biomass is crucial to understanding the role of plant carbon sequestration on the carbon balance of an energy system. The most widely used canonical value of the carbon content of biomass is 50% on a dry matter basis, which is calculated from an average molecular formula of CH_{1.44}O_{0.66}, which has a composition of about 50% carbon, 6% hydrogen, 44% oxygen, and trace amounts of metals (Ma, et al., 2017). However, the actual carbon content of biomass can vary drastically depending on the biomass category. Carbon content and other specific properties can be found in different Data sources, those are explained with more detail in Section 2.1.



The carbon content of biomass depends on its composition which is primarily cellulose, hemicellulose, and lignin as well as ash and moisture. Carbon content is consistent across species with the same chemical formula; however, carbon content varies in each material. Cellulose is a biologically well-defined material with a carbon content of 44.4%, however the other components of biomass consist of several different structures each with their own chemical formula and carbon content. Table 6 shows example structures for biomass components with an example carbon content calculated based on the typical formula. The range of carbon content based on literature values is also shown. Additionally, biomass contaminated with ash will have a lower carbon content than samples that aren't contaminated. As an example of the range of carbon content in biomass, Table 6 shows the carbon content and heating value for some woody biomass (hard wood, soft wood and waste) from different sources.

Table 6. Biomass Components Structure and Carbon Content

Component	Cellulose	Hemicellulose	Lignin	Tar and Pitch
Formula	$(C_{12}H_{20}O_{10})_n$	$(C_5H_{10}O_5)_m$	$(C_9H_{10.2}O_{3.4})_m$	$(CH_3)C_6H_4(OH)$ o-Creosol
Structure ^a				
% Carbon	44.58% ^a 44.4% ^b	40.0% ^a 25%-35% ^c	62.5% ^a 60%-65% ^b	77.7% ^a 64%-75% ^d

^a Carbon content show for example structure. Range based on literature values

^b Carbon Fibers from Lignin-Cellulose Precursors: Effect of Stabilization Conditions, (Bengtsson, 2019).

^c Of dry wood. *Biomass as a Sustainable Energy Source for the Future*. (De Jong & Ruud, 2014).

^d Analysis and Conceptual Model of its Structure. (Pasa, Carazza, & Otani, 1997)

Typical lignin from Le, 2017.

Coniferol Alcohol $HO(CH_3O)C_6H_3CH=CHCH_2OH$

PubChem shows... $C_{18}H_{13}N_3Na_2O_8S_2$



Calculating Carbon Content in Woody Biomass

Estimating the quantity of carbon in woody biomass may seem straightforward, as carbon makes up approximately half of the dry weight of wood. However, it is important to consider several factors that can significantly impact the accuracy of these estimates. For example, the moisture content and density of the wood can affect the weight of the wood, and therefore the amount of carbon present. In addition, the chemical composition of the wood, including the types and amounts of carbohydrates, lignin, and other compounds present, can impact the accuracy of carbon estimates. Careful consideration of these factors is essential for accurately estimating the carbon content of wood.

The moisture content of woody biomass can significantly affect its weight and must be taken into account when calculating its dry weight. Carbon makes up about half of the dry weight of woody biomass. To determine the dry weight of a given volume of wood, it is necessary to divide its weight by the sum of one and the moisture content, expressed as a decimal.

For example, kiln-dried lumber usually has a moisture content of around 15%. This means that the weight of the wood is 15% greater than if it were completely dry. To calculate the dry weight of kiln-dried wood, you would need to divide its weight by 1.15.

It's important to accurately calculate the dry weight of woody biomass because it determines the amount of carbon that can be derived from it. Accurately calculating the dry weight of woody biomass helps to determine the amount of carbon that can be derived from it and, in turn, the amount of carbon dioxide that will be released when it is burned. To ensure the validity of data on the carbon content of woody biomass found in databases (as outlined in Section 3.3), database developers must explicitly provide information on the moisture content of the biomass.

Table 7 presents data on the carbon content and heating value of several different biomass feedstocks, including forest residue, willow, poplar, pine, hemlock, miscanthus, switchgrass, and corn stover. The carbon content of these feedstocks ranges from 44.8% to 53.0%, while their higher heating values (HHV) and lower heating values (LHV) vary from 14.4 to 22.9 mmBtu/ton and 16.8 to 24.2 MJ/kg, respectively.

Torrefaction is a thermal treatment process used to convert biomass into a more energy-dense material. By removing some of the oxygen, torrefaction increases the carbon content of the biomass, resulting in a higher energy density and reduced transportation costs. It's worth noting, however, that torrefaction requires energy inputs and therefore has its own carbon footprint, which would need to be considered in a full LCA.



Table 7. Carbon Content and Heating Value

Feedstock	Source	Carbon Content (%)	HHV (mmBtu /ton)	LHV (mmBtu /ton)	HHV (MJ/kg)	LHV (MJ/kg)	Carbon Factor (g CO ₂ /kg)
Forest Residue	C-BREC	n/a	n/a	n/a	n/a	n/a	n/a
	GREET	50.3%	17.9	17.3	20.8	20.1	65,595
	PHYLLIS ^a	50.2% - 56.1%	22.2 - 22.9	20.9 - 21.6	23.4 - 24.2	22.0 - 22.8	81,252 - 84,036
Willow	C-BREC	49.6%	18.3		19.3		67,038
	GREET	48.7%	16.5	15.4	19.2	17.9	60,532
Willow torrefied	PHYLLIS	51.8% - 53.0% ^b	20.4 - 20.8	19.2 - 19.6	21.5 - 22.0	20.2 - 20.7	74,658 - 76,306
Poplar	C-BREC	n/a	n/a	n/a	n/a	n/a	n/a
	GREET	50.1%	17.1	15.9	19.8	18.5	62,503
Lignin from poplar	PHYLLIS	51.2% - 53.0%	20.3 - 21.0	19.2 - 19.6	21.5 - 22.2	20.2 - 20.9	74,475 - 77,076
Pine	C-BREC	49.3%	19.1		20		69,786
Clean Pine	GREET	50.1%	17.1	15.9	19.8	18.5	62,503
bark, pine	PHYLLIS	52.3% - 53.9%	19.4 - 19.9	18.2 - 18.7	20.4 - 21.0	19.2 - 19.7	70,921 - 73,046
Hemlock	C-BREC	49.7%	19.0		20.0		69,456
	GREET	n/a	n/a	n/a	n/a	n/a	n/a
Western hemlock	PHYLLIS	50.4% - 51.5%	19.0 - 19.4	17.8 - 18.2	20.1 - 20.5	18.8 - 19.2	69,603 - 71,178
Miscanthus	C-BREC	n/a	n/a	n/a	n/a	n/a	n/a
	GREET	47.6%	16.4	15.3	19.0	17.8	59,994
	PHYLLIS	47.9% - 50.3%	18.0 - 19.0	16.9 - 17.8	19.1 - 20.0	17.9 - 18.8	66,196 - 69,529
Switch Grass	C-BREC	n/a	n/a	n/a	n/a	n/a	n/a
	GREET	46.6%	15.6	14.4	18.1	16.8	57,085
	PHYLLIS	47.8% - 53.2%	17.1 - 19.0	15.9 - 17.7	18.0 - 20.1	16.8 - 18.7	62,569 - 69,603
Corn Stover	C-BREC	44.8%	17.8		19		65,170
	GREET	46.7%	15.8	14.7	18.3	17.1	57,785
	PHYLLIS	46.8% - 49.3%	17.2 - 18.1	16.0 - 16.8	18.1 - 19.1	16.9 - 17.8	62,862 - 66,196

^a Source: <https://phyllis.nl/>

^b Carbon content is higher in this case because is willow torrefied. The maximum value of carbon content in natural woody biomass is around 51%. Bark may also have a higher carbon content as the material is exposed to natural degradation.

Moisture

The moisture content of biomass is the quantity of water existing within the biomass, expressed as a percentage of the total material's mass. Moisture content of biomass in natural conditions (without any further processing) varies enormously depending on the type of biomass, ranging



from less than 15% in cereals straw to more than 90% as in algae biomass. (Sanchez, Curt, Robert, & Fernandez, 2019).

Water is generally held in biomass in two ways - either as a free liquid and vapor that is contained in the cell cavities, or as a molecule that is bound within the cell walls. Moisture content tends to vary widely with biomass species, age, geographic locations and genetic differences. It also varies between different anatomical fractions of the same plant and throughout the year (Biomass Chemistry, 2022).

Woody biomass moisture content can vary from 5% to approximately 60% depending on the conditions of the wood at harvest and the ambient atmospheric moisture as well as the duration of storage of the material. Many biomass conversion processes require feedstocks with specific moisture content which is achieved by drying the feedstock with process energy.

Presenting a carbon balance on a moisture free basis helps avoid errors in CO₂ emissions.

There are several ways to determine the moisture content in woody biomass, including the dry basis and wet basis methods. The wet basis method, also known as the green or wet basis method, is one of the most common. In this method, the moisture content in the wood is expressed as a percentage of the total weight of the wood, including both the dry wood material and the water (Govett, Mace, & Bowe, 2010).

The moisture content of biomass is critical in converting it to energy systems, as it affects the heating value. As the moisture content increases, the heating value of the biomass decreases, sometimes significantly. This means that the higher the moisture content, the greater the difference between the high heating value (HHV) and the low heating value (LHV), and the less total energy will be available, as shown in Figure 2.6. In order to obtain consistent estimates of carbon content, it is important to consistently measure biomass on the same moisture basis.



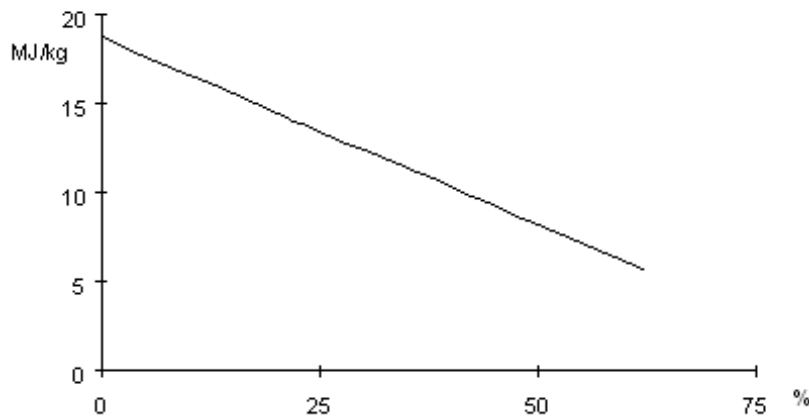


Figure 2.6. Effect of moisture (wet basis) on heating value³.

Heating Value

The heating value of biomass measures the amount of thermal energy stored in the material. Heating values can be measured as either the high heating value (HHV) or the low heating value (LHV). The HHV includes the sensible heat of vaporization of water during combustion, while the LHV excludes this heat. These values are typically expressed in units of energy per unit of mass, such as megajoules per kilogram (MJ/kg) or kilojoules per kilogram (kJ/kg). The HHV measures the total amount of heat produced by combustion, while the LHV represents the amount of heat that is actually available for capture and use during the combustion process (FAO, 2022b). The heating values of biomass are often expressed on a dry basis, as a significant amount of energy is required to remove moisture from woody biomass feedstocks. The HHV ranges from 19 to 22 MJ/kg, while the LHV ranges from 16 to 20 MJ/kg.

The heating value of biomass materials in GREET is based on the HHV, with an adjustment for the moisture content of the delivered biomass fuel. This calculation assumes that the biomass contains 6% hydrogen. It is important to note that the LHV in GREET is calculated on a bone-dry basis. Equation 2 takes into account the moisture content of each fuel and uses the LHV formula from van Loo (2002), which is consistent with studies on the drying requirements for biomass fuels (Gebreegziabher, Oyedun, & Hui, 2013).

$$\text{LHV} = \text{HHV} \times (1-\text{MC}) - 2.44(\text{MC}) - 2.44 \times (\%H) \times 8.936 \times (1-\text{MC}) \text{ in MJ/kg} \quad (2)$$

Table 8 presents a summary of HHV and LHV from GREET for some types of biomass that this study took in consideration including woody waste, hard wood and soft wood.

³ <https://www.fao.org/3/j0926e/J0926e06.html>



Table 8. Heating Values of Biomass Materials

Fuel	Higher Heating Value		Lower Heating Value ^b	
	Btu/ton	MJ/kg	MJ/kg	Btu/ton
Willow ^a	16,524,000	19.22	16.69	14,347,343
Poplar ^a	17,062,000	19.84	17.27	14,853,063
Clean Pine ^a	17,062,000	19.84	17.27	14,853,063
Forest Residue ^a	17,906,000	20.82	18.20	15,646,423
Urban Wood Waste	18,400,000	21.40	18.74	16,110,783
Lumber Mill Waste	17,484,000	20.33	17.74	15,249,743

^a Fuel property data from GREET provide the basis for biomass in this Study

^b 6% Moisture Content

Ash

Ash is defined as the inorganic content of biomass. It can be introduced during harvest and process, or exist naturally as biogenic material inside of plant tissues. The sum of all of the ash sources generally yields an ash content of roughly 0.1% for debarked wood chips, or as high as 26% for rice husks (Tao, Geladi, Lestander, & Xiong, 2012). Ash content increases as ash is introduced during harvesting, often from solid incorporated during collection. The carbon content of ash is usually low, typically less than 1%, and thus significant ash contamination can lower the overall carbon content of biomass. Additionally, ash is of interest to bioenergy producers because of the abrasive wear and tear that it causes on processing equipment.

2.1 Biomass Conversion Processes

The biomass conversion process will determine the feedstock to biofuel pathway. There are several technologies available for converting biomass into energy, each with its own advantages and disadvantages. The most common biomass conversion processes include thermal conversion, biochemical conversion, and thermochemical conversion. Here, we provide a brief overview of each of the biomass conversion processes, including the types of biomass that are most suitable for each process, as well as the advantages and disadvantages of each.

2.1.1 Thermochemical conversion

Thermochemical conversion is a process that involves the use of heat and chemical reactions to break down biomass into a range of products, including biofuels, biochemicals, and bioplastics. There are several sub-processes that fall under the umbrella of thermochemical conversion, including combustion, pyrolysis, gasification, and liquefaction (Zafar, 2021). A simplified overview of the thermochemical conversion process is shown in Figure 2.7. The following subsections then explain each process in detail.



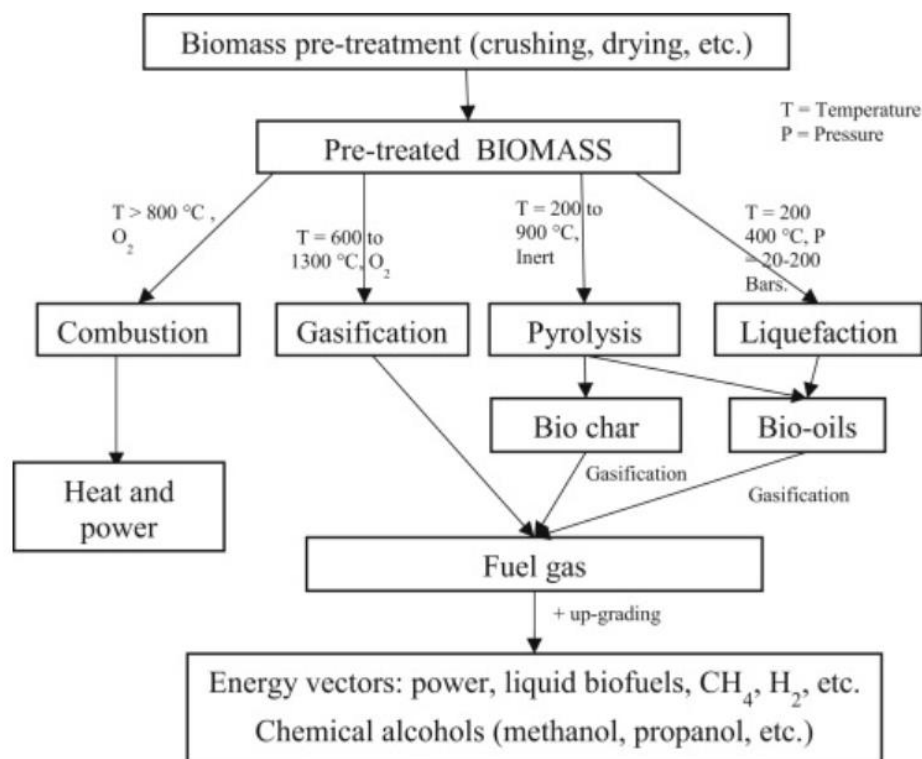


Figure 2.7. Overview of main thermochemical process. Source: (Ram & Kumar, 2021).

2.1.2 Combustion

Biomass combustion has been utilized for centuries to produce heat and electricity from a variety of organic materials, including wood, agricultural residues, and municipal waste. Today, biomass combustion continues to be an important technology for bioenergy production.

The efficiency of biomass combustion depends on a variety of factors, including the type and moisture content of the biomass, the type of combustion technology used, and the end use of the energy produced. In general, dry and dense biomass materials, such as wood pellets or briquettes, are more efficient for combustion than wet or low-density materials, such as grass or straw.

The moisture content of the biomass should be kept as low as possible to minimize the energy required for drying and to maximize the efficiency of the combustion process. To prepare the biomass for combustion, it is first heated and dried to remove moisture. Once all moisture has been removed, the biomass is heated to a temperature above 800°C in the absence of oxygen for pyrolysis to occur (see Figure 2.7). During this process, the biomass is broken down into simpler chemical compounds, such as hydrogen, carbon monoxide, carbon dioxide, methane, and other hydrocarbons. In the end, char and volatile gases are formed, which continue to react independently. The volatile gases require oxygen in order to achieve complete flame combustion, resulting in the production of mostly carbon dioxide and water. The solid char also burns, producing carbon monoxide and carbon dioxide.



There are several types of technologies available for biomass combustion, including grate boilers, fluidized bed boilers, and co-fired boilers. Grate boilers are the most common type of biomass boiler, and they operate by burning the biomass on a grate, similar to a coal-fired boiler. Fluidized bed boilers operate by suspending the biomass in a bed of hot air, allowing for more efficient combustion. Co-fired boilers are designed to burn both biomass and fossil fuels. Co-Firing can only occur in conjunction with coal fired power production. As this is being phased out, there are limited opportunities to co-fire biomass wastes to produce power.

2.1.3 Liquefaction

In the context of bioenergy, liquefaction is a process that converts biomass into a liquid form. The main goal of this process is to produce liquid products that can be used as transportation fuels, heating fuels, or raw materials for industrial processes. The conversion of biomass into liquid products is often associated with a higher value addition compared to alternative processes, such as carbonization and gasification.

There are two main approaches to liquefaction: direct liquefaction and indirect liquefaction (see Figure 2.8). Direct liquefaction is a process that converts biomass or other organic matter directly into liquid products, such as transportation fuels or chemicals, through a chemical reaction, while indirect liquefaction is a process that converts biomass or other organic matter into an intermediate product, such as syngas or bio-oil, which is then further processed into the desired liquid products. Each process is described in further detail below.

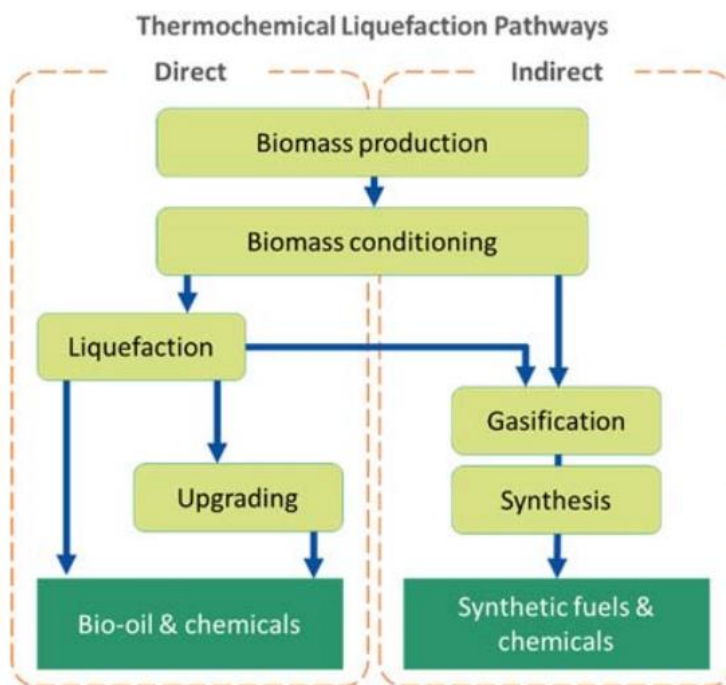


Figure 2.8. Difference between direct liquefaction and indirect liquefaction via gasification.
Source: (Funke & Dahmen, 2020).



Direct Liquefaction

The direct liquefaction of biomass refers to the conversion biomass into bio-oil, and the main technologies are hydrolysis fermentation and thermodynamic liquefaction.

There are two types of thermodynamic liquefaction pyrolysis liquefaction and hydrothermal liquefaction (Zhang, et al., 2019). Bio-oil, which is also regarded as pyrolysis oil or pyrolytic oil, could be obtained from both of these two methods. As shown in the literature, bio-oil is the extremely complex substance and composed of hundreds of organic compounds, e.g., alkanes, aromatic hydrocarbons, phenol derivatives, ketones, esters, ethers, sugars, amines, and alcohols. The pyrolyze bio-oils could be directly burned in boilers, or upgraded to produce valuable fuels and chemicals using the following methods: Extraction, emulsification, esterification/alcoholysis, supercritical fluids, hydrotreating, catalytic cracking, and steam reforming (Zhang, et al., 2019).

Indirect Liquefaction

The indirect liquefaction refers to the Fischer–Tropsch (F-T) process using the syngas of biomass as the raw material to produce the liquid fuel, including methyl alcohol, ethyl alcohol, and dimethyl ether (Zhang, et al., 2019).

Indirect liquefaction technology, which is divided into two stages. The first stage is a thermochemical gasification process. In this process, the syngas is produced after the raw material reacts with air or steam. In the syngas, the primary substances are CO, CO₂, H₂, and H₂O. The second stage is the well-established Fischer–Tropsch (F-T) process (Apanel & Johnson, 2004). During the F-T process, the mixture would be used to produce a range of chemicals, including methyl alcohol, dimethyl ether, and ethyl alcohol, while there is little research on the higher alcohols derived from the biomass syngas (Zhang, et al., 2019).

2.1.4 Gasification

Gasification of biomass offers the most efficient means of conversion of biomass feedstocks into useful products as the entire content of the feedstock is converted into syngas instead of only the cellulosic fraction which is the case with some cellulosic biofuels conversion processes.

2.1.5 Pyrolysis

Pyrolysis of biomass converts woody biomass into a liquid and gas products with the liquids being unstable needing further processing after production. Pyrolysis oils can be hydro-processed into hydrocarbon products but requires high pressure hydro-processing and consumption of large volumes of H₂ yielding products that are not conventional fuels but can be co-processed with crude in a conventional refinery at some level of co-feeding.



2.2 Data Sources

A lifecycle assessment (LCA) of biomass involves evaluating the environmental impacts of biomass energy systems over their entire lifecycle, from raw material extraction to disposal or reuse. Conducting an LCA requires accurate and comprehensive data on the chemical and physical properties of the biomass being examined. There are several sources that can provide this type of data, including:

1. Journal articles: Case studies published in scientific journals may provide detailed information on the properties of specific biomass types. These articles can be a valuable source of data for researchers conducting an LCA.
2. Life cycle biomass to energy models: Some models, such as the Greenhouse gases, Regulated Emissions, and Energy use in Transportation (GREET) model, include data on the properties of different biomass types. This data can be extracted and used in an LCA.
3. Biomass property databases: There are several databases dedicated to biomass properties, Phyllis and The Bioenergy Knowledge Discovery Framework (KDF). These databases can provide a wide range of data on the chemical and physical properties of different biomass types, including information on energy content, moisture content, and ash content.

In the following section, we examine several sources for data on the chemical and physical properties of biomass

2.2.1 GREET and LCA Models

GREET

The **Greenhouse gases, Regulated Emissions, and Energy use in Transportation (GREET)** is a comprehensive analytical tool designed to assess the life-cycle impacts of various vehicle technologies, fuels, products, and energy systems.

One of the key features of the GREET model is its ability to model emissions of traditional greenhouse gases (GHGs), including carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), as well as criteria pollutants from transportation fuels. The model uses global warming potential (GWP) values to aggregate these GHG species emissions into a single carbon dioxide equivalent (CO₂e) result. Volatile organic compounds (VOCs) and carbon monoxide (CO) are also accounted for in the model, in their fully oxidized forms as CO₂ (Life Cycle Associates LLC, 2020).

In addition to its GHG emissions modeling capabilities, the GREET model also includes life cycle inventory (LCI) data for a variety of biomass types, including energy crops, grasses, and woody biomass. This data can be used to assess the environmental impacts of different biomass energy systems and can be disaggregated to reveal underlying assumptions on biomass properties (see Table 7). This data can be particularly useful for policymakers and other stakeholders looking to evaluate the sustainability of different biomass energy systems.



C-BREC

The California Biomass Residue Emissions Characterization (C-BREC) model is a tool designed to assess the environmental and public health impacts of using residual biomass from California's forests for energy generation. Developed by the California Energy Commission, the model aims to reduce the state's reliance on fossil fuels and decrease the vulnerability of its electricity system to the impacts of climate change. The C-BREC model can also be used to evaluate the sustainability of other biomass energy systems, such as biofuel production (Carman, et al., 2021).

The C-BREC model is implemented using the R programming language and can be accessed using an online web tool. To use the model, users must specify certain key characteristics, including the location of the residue generation, the type of forestry or agricultural activity being conducted, the location of the residue use, and the counterfactual fate of unremoved biomass (e.g., piled, scattered, burned). Other key supply chain characteristics, such as post-harvest treatment and end-use technology, must also be specified.

The C-BREC model relies on a range of data sources to input biomass properties and assess the environmental and public health impacts of biomass energy generation in California. These data sources include:

1. The CONSUME model for wildfire risk: This model is used to assess the potential risks associated with wildfire events and the likelihood of such events occurring. By considering these risks, the C-BREC model can provide a more accurate assessment of the overall sustainability of biomass energy generation in California.
2. Biomass inventory data: The C-BREC model uses data on the quantity and quality of biomass residues available for energy generation. This includes data on the types and amounts of biomass residues generated from different forestry and agricultural activities, as well as data on the physical and chemical properties of these residues.
3. Emissions data: The C-BREC model uses data on greenhouse gas emissions associated with different stages of the biomass energy generation process. This includes emissions from the production, transportation, and end-use of biomass residues.

By considering a range of factors and data sources, the model allows for the assessment of the environmental and public health impacts of biomass energy generation, as well as the potential risks associated with such activities.

2.2.2 CONSUME

CONSUME is a database developed by the USDA Forest Service that is used to assist resource managers in planning for wildland fire events, such as prescribed burns and wildfires. It uses fuel loadings, fuel moisture, and other environmental factors to predict fuel consumption, pollutant emissions, and heat release (Ottmar & Prichard, 2022). The emissions species



considered in the CONSUME model include CO, CO₂, CH₄, and non-methane hydrocarbons (NMHC) (Carman, et al., 2021).

Although CONSUME was not specifically designed to calculate the carbon content in biomass, it is possible to estimate carbon content using CONSUME data, as shown in Table 9. The table shows that the carbon content for selected woody materials, such as slash, lodgepole, and hardwood, is consistent with expected values. However, the carbon content for Western pine is significantly lower, at 24.66%, compared to the expected range of 45%-49%. The extent of the use of emission factors in CONSUME should be examined as the Western pine data appear to be represented on a 50% moisture basis. Table 10 provides a clear comparison between the values obtained from all sources. Figure 2.9 presents a graphical representation of the GHG emissions reported by CONSUME for the selected biomass materials used to calculate the carbon content discussed in Table 9.

Table 9. Emission Factors and Calculation of Carbon Content from CONSUME (Prichard S. O., 2019)

Specie	<i>Emissions (g/kg)</i>				%C	GHG (g/kg)	Fully Oxidized to CO ₂
	CO	CO ₂	CH ₄	NHMC			
Slash Smolder	540	1402	190.0	4.9	49.09%	2137.1	1799.9
Slash Flaming	167	1693	57.5	2.5	49.58%	1919.3	1817.8
Lodgepole Smoldering	333	1486	182.5	5.6	47.58%	2006.1	1744.6
Lodgepole Flaming	104	1701	37.5	2.1	48.55%	1843.9	1780.2
Hardwoods Flaming	107	1695	55.0	3.0	48.57%	1859.9	1781.0
Western Pine Flaming ^a	95	832	36.1	1.6	24.66%	964.7	904.1

^a GHG emission factors for western pine appear to be for material with 49.3% carbon and 50% moisture.



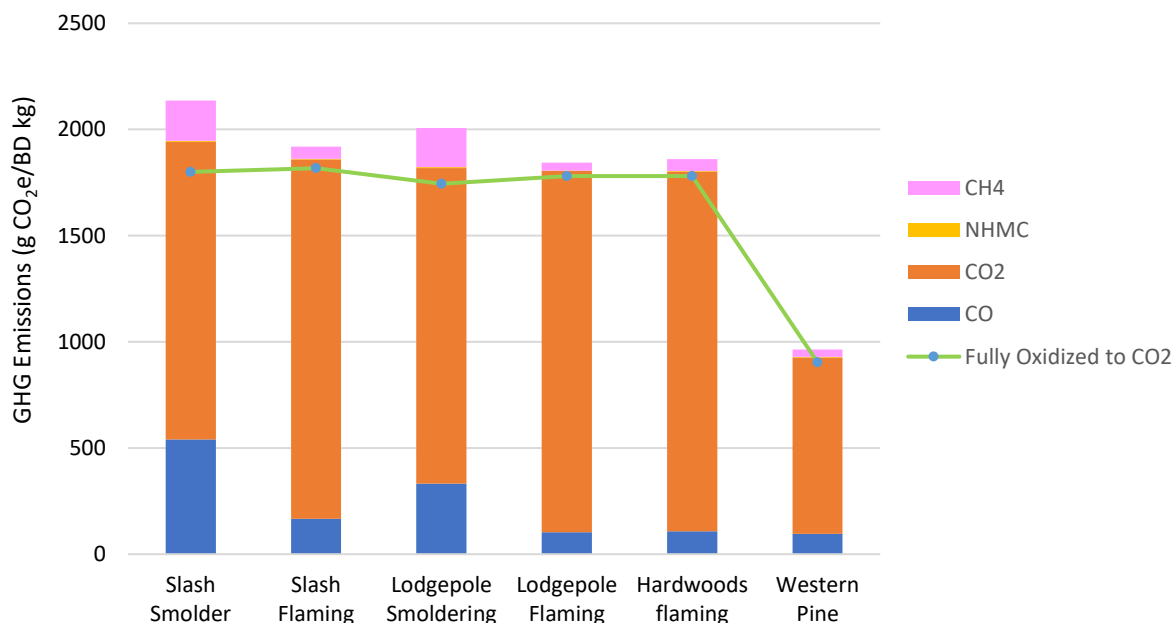


Figure 2.9. GHG emissions by CONSUME.

C-BREC has been used in conjunction with the CONSUME model to estimate emissions from pile burns, prescribed burns, and wildfire (Carman, et al., 2021). However, the fact that the difference in carbon content for Western pine between CONSUME and C-BREC is greater than 20% raises points to potential challenges in identifying carbon content and GHG emissions which warrants examining the causes of such differences and underlying assumptions. Comparing the results of the CONSUME model with those from other sources, such as satellite observations or ground-based measurements may provide insight to accurate and reliable estimates of carbon content and GHG emissions.

Table 10. Carbon content in Pine

Material	Source	Carbon content (%)
Pine	C-BREC	49.3%
Clean Pine	GREET	50.1%
Bark, Pine	PHYLLIS	52.3% - 53.9%
Western Pine Flaming	CONSUME	24.66%

2.2.3 PHYLLIS

The Phyllis database is a comprehensive resource that provides detailed information on the chemical and physical properties of woody biomass feedstocks (European Commission, 2013). Developed by the University of Ghent in Belgium, Phyllis is a valuable resource for researchers conducting a lifecycle assessment (LCA) of biomass energy systems. By accessing the data provided by Phyllis, researchers can gather a wide range of information on the properties of different biomass materials, including:



1. Classification codes: Each data record in Phyllis includes a unique ID number and classification codes that can be used to identify the type of biomass material being examined.
2. Ultimate analysis: The ultimate analysis data in Phyllis includes information on the carbon, hydrogen, oxygen, nitrogen, sulfur, chlorine, fluorine, and bromine content of the biomass material. This data is provided in weight percent for dry material, dry and ash-free material, and as-received material.
3. Proximate analysis: The proximate analysis data in Phyllis includes information on the ash content, water content, volatile matter content, and fixed carbon content of the biomass material. This data is provided in weight percent for dry and as-received material.
4. Calorific value: Phyllis provides data on the calorific value of different biomass materials, expressed in mega-joules per kilogram.
5. Metal content: The data in Phyllis includes information on the metal content of different biomass materials, including data on alkali metal content.
6. Composition of the ash: Phyllis provides data on the composition

The Phyllis database allows users to select a classification scheme for the biomass materials being examined and view the samples in the database through an interactive tree structure. The samples are grouped according to the chosen classification scheme and can be searched using sample names, classification groups, and sample IDs. The tree structure highlights the search results and allows users to show or hide different groups of data by clicking the header. When possible, the database converts dry values to dry and ash-free and as-received values for certain properties, displaying all three values side-by-side. Figure 2.10 provides an example of the database for forest waste from South Africa, demonstrating the interactive tree structure and the range of data available (TNO, 2020).



ID-number	#3121
Material	Forest waste
Classification	CEN/TS 14961 classification ▶ Solid biofuels ▶ Woody biomass ▶ Wood processing industry
	ECN Phyllis classification ▶ untreated wood
	NTA 8003 classification ▶ [100] hout ▶ [110] vers hout ▶ [114] dunningshout
Country	South Africa
Production date	2007-08-21
Submitter organisation	ECN (Netherlands)

Values

Property	Unit	Value			Std dev	Det. lim	Lab	Date	Method	Remarks
		ar	dry	daf						
▼ Main biomass properties										
▼ Proximate analysis										
Moisture content	wt%	56.80	← Edit						CEN/TS 14774-1,2,3	
Ash content at 550 °C	wt%	1.25	2.90						CEN/TS 14775	
▼ Ultimate analysis (macroelements)										
Carbon	wt%	22.94	53.10	54.69					CEN/TS 15104	
Hydrogen	wt%	2.68	6.20	6.39					CEN/TS 15104	
Nitrogen	wt%	0.48	1.11	1.14					CEN/TS 15104	
Sulphur	wt%	0.03	0.07	0.07					CEN/TS15289	
Total (with halides)	wt%	84.18	63.38	62.29					Calculated	
▼ Heating value										
Net calorific value (LHV)	MJ/kg	7.29	20.09	20.69					CEN/TS 14918	
Gross calorific value (HHV)	MJ/kg	9.26	21.44	22.08						

Figure 2.10. Forest waste database (TNO, 2007).

2.3 Representation and Reporting of Emission Factors (EFs)

Emissions factors (EF) are a tool used to estimate the amount of greenhouse gases or other pollutants emitted during a specific activity or process. They are typically expressed as the amount of emissions per unit of activity, such as kilograms of emissions per unit of energy produced or per unit of fuel consumed. These factors can be used to calculate the total emissions resulting from a specific activity or process by multiplying the emissions factor by the amount of activity or fuel consumed.

Emissions factors are usually presented in terms of mass per unit of activity, such as kilograms of emissions per megajoule of energy produced. However, they may also be presented in other units, such as grams of emissions per mile traveled for transportation fuels.

Emissions factors can be derived from a variety of sources, including measurements taken during controlled laboratory experiments, field studies, or estimates based on engineering models. The accuracy and reliability of emissions factors may vary depending on the data sources used to calculate them. It is therefore important for researchers to carefully consider the quality and relevance of the data sources used to calculate emissions factors in order to ensure the accuracy of their estimates.



3. THE NET GREENHOUSE GAS BALANCE OF BIOMASS

The most straightforward assumption regarding the net carbon balance for biomass in a bioenergy system is that of neutrality, which suggests that the carbon sequestered during photosynthesis is equal to the carbon emitted during combustion, is a commonly used approach in conducting life cycle assessments (LCAs) for bioenergy systems. However, this assumption is being widely debated among the scientific community (Wiloso, Heijungs, Huppes, & Fang, 2016). Bio-based materials can cause removals and emissions that impact atmospheric CO₂ concentrations, even on short timescales. On longer timescales, it is essential to determine whether a bio-material system leads to a net gain in the biosphere carbon stock before considering the system carbon neutral.

While models may include the assumption that CO₂ will eventually be re-sequestered as forest regrowth, or that residues would have been emitted later by decay or wildfire, the timing of near-term climate impacts versus long-term recovery is an ongoing debate (Buchholz, Hurteau, Gunn, & Saah, 2016). The debate surrounding the biogenic carbon neutrality assumption centers around the fact that accepting this assumption can overlook the true carbon impact of a bioenergy system. Therefore, understanding the carbon balance as it relates to a particular biomass type, location, and alternative fate is crucial in facilitating the use of biomass in the CA LCFS regulation. The following subsections examine categories of GHG accounting, analytical approaches to net carbon balance, and how other policies and regulations account for biogenic carbon under their framework.

3.1 Categories of GHG Accounting

Several approaches exist to quantify the life cycle of carbon in biomass. The approach implemented will depend on the purpose of the study, the time period under examination, and underlying assumptions regarding the characteristics of the biomass under consideration and its alternative fates. The treatment of indirect land use change (iLUC) emissions in relevant programs, models, and studies is also examined.

Many LCA programs, models, and studies treat biogenic carbon in biomass from various sources as carbon-neutral⁴. Carbon neutrality refers to the life cycle of biogenic material. Photosynthesizing organisms, such as plants, fix carbon from the atmosphere as they grow, and when such biomass decays or combusts, an equivalent amount of carbon is released to the

⁴ Carbon neutrality is implemented in many different ways in GHG calculations. In corn ethanol pathways, for example, biogenic carbon is treated as neutral, with no carbon accounted for in either the tailpipe emissions nor the life cycle, however, in the GREET model (on the Results Tab), the positive tailpipe emissions are represented with a biogenic uptake credit factored into the well-to-tank phase. In the case of forest residue to ethanol, and biomass to power pathways, the GREET model accounts for the positive emissions from fuel combustion and the negative biogenic carbon uptake. This approach is sometimes referred to as Totality of Emissions accounting. Landfill gas is similarly accounted for. Regardless of the accounting method, the biogenic uptake or avoided CO₂ from combustion balances the CO₂ in the end-use.



atmosphere. Thus, over an entire life cycle, such biomass can be considered carbon-neutral. Two accounting approaches that are typically employed to represent carbon neutrality for biomass-based products are described below.

Carbon Neutral Approach

The Carbon Neutral approach is applied in numerous policy initiatives and modeling systems. In this approach, the emissions caused by bio-based materials in the combustion phase are equal to those removed during photosynthesis, and are therefore not included in the carbon intensity calculations for a product life cycle.

This Approach assumes that: 1) there is no time-lag associated with emissions relative to the preceding biogenic carbon uptake, and 2) the biomass embodied in the bio-based materials will grow back within the time period under consideration. When the time elapsed between biomass growth and biofuel combustion is relatively short, or when “waste” residues from managed forests or lumbermill operations, that would otherwise either decay in-situ, or burn as a result of prescribed or wild fires, are being utilized, this carbon-neutral assumption is defensible. In the case of non-waste forestry-derived feedstocks, however, the growth period of the woody biomass is significantly longer than annual agricultural or bioenergy crops. The assumption of carbon neutrality is therefore considered to be weaker due to the relatively longer timeframe in which decay and combustion may occur.

Biogenic Uptake and Credit Approach

The Biogenic Uptake and Credit (BUC) approach is a variation of the Carbon Neutral approach in which the biogenic uptake and credit are explicitly accounted for. In the BUC approach, all of the CO₂ emitted from vehicle fuel use and process emissions is accounted for in the GHG emissions and biogenic carbon uptake is treated as a credit. The BUC approach can be considered a variation of the Carbon Neutral approach because the biogenic uptake credit is equivalent to the biogenic emissions over a product’s lifetime. The BUC approach is used in models and product LCA standards, including the U.S. EPA Inventory (EPA, 2022b), and the European Product Life Cycle Reporting Standard (Bhatia, et al., 2011).

3.1.2 Temporal Accounting

Time-accounting approaches are analytical methods that aim to capture the temporal dynamics of biogenic carbon flows throughout a bioenergy system's life cycle. These approaches seek to account for the carbon sequestration that occurs during the growth phase of the biomass, as well as the carbon emissions that arise from the bioenergy system's operation, whether from combustion or decomposition. Additionally, these methods consider the carbon storage that occurs in long-lived bio-based products.

Several time-accounting approaches have been developed, each with its own strengths and limitations. For example, some approaches utilize models that estimate the timing and rate of carbon sequestration and emissions from different parts of the bioenergy system, while others utilize empirical data to estimate the carbon flows. Some approaches incorporate carbon



dynamics over a range of time horizons, from short-term to long-term, while others focus on specific time periods.

Because biomass to biofuel systems sequester and emit carbon on timescales relevant to global climatic change, understanding the temporal dynamics of biogenic carbon flows can inform policy decisions.

3.2 Treatment of Biogenic Carbon in Regulated Programs

The treatment of biogenic carbon in regulated programs is an important factor to consider when making policy decisions for GHG reduction programs. In Table 11, we can see a summary of the treatment of biogenic carbon in various regulated programs. Among them, eight programs consider biogenic carbon as carbon neutral. The EPA U.S. Inventory is the only program that requires that carbon and biogenic carbon be reported separately (EPA, 2022b). Several of these programs are discussed in further detail in the following sections with an analysis of their treatment of biogenic carbon in woody and other biomass materials, either as feedstocks or fuels.

Table 11 illustrates a variety of regulatory programs spanning federal, state and international entities, as well as a variety of feedstocks including biomass forest and crop residues, and the GHG accounting treatment for each program. With the exception of the LCFS CCS protocol, each of these programs identifies biomass as being carbon neutral, either using a Carbon Neutral or BUC approach. These programs and nuances in the associated GHG calculations are described briefly below.

The treatment of biogenic carbon is either on a neutral basis such that CO₂ from combustion and biogenic uptake are not counted in emission factors or a biogenic uptake credit which corresponds to the carbon in biomass is part of the calculation. Note that the



Table 11. Treatment of Biogenic Carbon in Regulated Programs

Program	Citation	Approach	iLUC	Biomass Feedstock
EPA RFS	(EPA, 2010)	Carbon Neutral	0	Forest Thinnings, Slash
EPA RFS	(EPA, 2011)	Carbon Neutral	0	Corn stover
EPA U.S. Inventory	(EPA, 2022b)	Reports Biogenic Separately ^a	0	Biomass
CA LCFS Biomass Residue ^b	(CARB, 2009a)	Carbon Neutral – positive emission with uptake credit	TBD	Forest Residue
CA LCFS Crop Residue ^b	CARB 2015a, 2015b (CARB, 2014; CARB, 2009b)	Carbon Neutral	0	Corn Stover, Wheat Straw, Sugarcane Straw
CA LCFS CCS Protocol	(CARB, 2018b)	Fully oxidized carbon in fuel or defer to CA-GREET	0	Wood and Wood Residuals
CA LCFS Grid Avg Power	(CARB, 2018c)	Carbon Neutral – positive emission with uptake credit	0	NA
CA LCFS Biomass Energy Crop ^b	(CARB, 2009a)	TBD	TBD	Farmed Trees
CA LCFS Crop-derived feedstock	(CARB, 2023)	Carbon neutral with requirement to analyzed indirect emissions.	TBD	Biomass
CA RPS	(CA PUC, 2009)	Carbon Neutral	0	Biomass
Canada CFS ^d	(ECCC, 2020)	Carbon Neutral	0	Biomass
EU REDII	(EU, 2021)	Carbon Neutral	0	Biomass
NZ ETS	(NZ ETS, 2021)	Carbon Neutral	0	Forest Biomass
RTFO	(RTFO, 2021)	Carbon Neutral	0	Biomass
RenovaBio	(RenovaBio, 2017)	Carbon Neutral	0	Biomass
CORSIA	(Prussi, et al., 2021)	Carbon Neutral	0	Forest Residue
CORSIA	(Prussi, et al., 2021)	Carbon Neutral	-5.2 g/MJ	Farmed Poplar

^aRequires annual emissions for applicable categories to be reported separately for biogenic and non-biogenic.

^bCA LCFS pathways were preliminary and never used for credit generation.

^cEmission factors in the CCS protocol reflect fully oxidized carbon as CO₂ without reference to any biogenic uptake credit other than providing CA-GREET as an alternative source of emission factors.

^dCanada CFS is in pre-publication.

3.2.1 EPA RFS

The Renewable Fuel Standard (RFS) was enacted by the United States Congress in 2005 under the Energy Policy Act to reduce GHG emissions. Renewable fuel categories under the RFS



include biomass-based diesel, cellulosic biofuel, advanced biofuel, and total renewable fuel. The policy was extended in 2007 to increase long term goals for total renewable fuel use, explicitly define renewable fuels, and include waiver authorities.

Several fuel pathways are identified under the RFS. A fuel pathway is a combination of the fuel's feedstock, the fuel's specific product process, and the fuel's end type. Approved pathways meet certain emissions reduction criteria established by the EPA. Example of feedstocks that exist in approved pathways include crop residue, forest slash, pre-commercial thinnings and tree residue, switchgrass, miscanthus, energy cane, *Arundo donax*, *Pennisetum purpureum*, separated yard waste; biogenic components of separated municipal solid waste (MSW), cellulosic components of separated food waste, and cellulosic components of annual cover crops. Any process that converts cellulosic biomass to fuel can be considered for approval under the RFS.

To determine if a fuel meets the criteria for an approved pathway, the fuel's lifetime emissions are compared to that of a baseline fossil fuel. The analysis of a fuel's lifetime emissions is based on the GREET model which applies the same biogenic carbon accounting method discussed in Section 4.1. The EPA has adopted the carbon balance approaches from the GREET model for its treatment of biomass (EPA, 2010).

3.2.2 Greenhouse Gas Reporting

Greenhouse gas emissions are reported in national inventories, including the United States' (EPA, 2020), as well as many programs designed to reduce overall GHG emissions from different sectors of society, including programs targeting the transportation sector, such as the California Cap-and-Trade Program, the California Low Carbon Fuel Standard (CA LCFS), the Oregon Clean Fuel Standard (OR CFS), the Washington Clean Fuel Standard (WA CFS), and the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). Numerous models and "carbon footprint calculators" have also been developed to quantify the carbon intensity of products, entities, and processes, including lifestyles. This section describes the different carbon accounting approaches employed in such inventories, programs, and tools, with a focus on the treatment of biogenic carbon.

EPA

The EPA characterizes GHG emissions using two complementary programs – the Greenhouse Gas Reporting Program (GHGRP) and the Inventory of U.S. Greenhouse Gas Emissions and Sinks (Inventory). The Inventory is updated annually based on GHGRP reporting. The GHGRP requires fuel and industrial gas suppliers, and other large⁵ sources of GHG emissions in the United States to report their facility-level GHG emissions annually in accordance with the Code of Federal Regulations Title 40 Part 98 (C.F.R. Title 40, 2009). GHG emissions are estimated using methodologies consistent with IPCC guidelines for key categories that have been prioritized

⁵ Approximately 7,600 facilities that emit over 25,000 metric tonnes of CO₂e per year report their annual emissions. Agricultural and land-use sectors are not required to report their emissions.



based on the relative proportion of a national inventory that they represent (IPCC, 2006a). The Inventory provides a high-level national accounting of GHG emissions based on the finer-resolution facility-level data reported in the GHGRP. Emissions are accounted for both with and without uncertainty, and with and without contributions from land use, land-use change and forestry (LULUCF). Including uncertainty and LULUCF, the 2020 Inventory included 47 source categories that accounted for 95.9% of the total emissions (EPA, 2022b). The top 5 contributing categories included road transport-related fuel combustion, coal-fired electricity generation, net carbon stock change from forest land remaining forest land, gas-fired electricity generation, gas-fired industrial combustion. Net carbon fluxes from changes in biogenic carbon reservoirs are accounted for in the estimates for LULUCF.

The GHGRP addresses biogenic CO₂ separately from other emissions sources, as this excerpt describes:

For facilities, except as otherwise provided in paragraph (c)(12) of this section, report annual emissions of CO₂, CH₄, N₂O, each fluorinated GHG (as defined in § 98.6), and each fluorinated heat transfer fluid (as defined in § 98.98) as follows.

- (i) Annual emissions (excluding biogenic CO₂) aggregated for all GHG from all applicable source categories, expressed in metric tons of CO₂e calculated using Equation A-1 of this subpart. For electronics manufacturing (as defined in § 98.90), starting in reporting year 2012 the CO₂e calculation must include each fluorinated heat transfer fluid (as defined in § 98.98) whether or not it is also a fluorinated GHG.*
- (ii) Annual emissions of biogenic CO₂ aggregated for all applicable source categories, expressed in metric tons.*
- (iii) Annual emissions from each applicable source category, expressed in metric tons of each applicable GHG listed in paragraphs (c)(4)(iii)(A) through (F) of this section.
(A) Biogenic CO₂.
(B) CO₂ (excluding biogenic CO₂).*

Here, biogenic CO₂ emissions are clearly reported separately from non-biogenic emissions sources (WRI, 2005). This Regulation does not, however, address the reporting of biogenic CO₂ uptake nor removals.

CA Inventory and Cap-and-Trade Program

The California Cap-and-Trade Program, established by CARB in 2012, pursuant to Assembly Bill 32, is a market-based emissions trading system that establishes a declining cap on emissions over time and distributes tradeable credits under the cap. This program applies to emissions economy-wide and covers approximately 80 percent of the State's GHG emissions. Entities⁶ in

⁶ Covered entities are those that emit 25,000 or more metric tonnes of CO₂e/year. Approximately 450 entities report to CARB annually via the Mandatory Reporting Regulation (MRR).



CA that generate emissions through their activities, for example electricity generation, manufacturing, or fuel refining, must comply with the program by purchasing credits or allowances in an amount equal to the level of their emissions. As the cap declines annually, so do the number of overall credits available, and therefore emissions.

The Compliance Offsets Program is a component of the CA Cap-and-Trade Program that issues Offset Credits to qualifying projects that reduce or sequester GHGs in compliance with CARB Compliance Offset Protocols. Offset credits represent verified GHG emissions reductions or removal enhancements from sources that are not obligated in the Cap-and-Trade Program and may be purchased by obligated parties to satisfy a small⁷ percentage of their overall compliance obligation.

3.2.3 California Low Carbon Fuel Standard (LCFS)

The LCFS has several examples of the treatment of biogenic carbon from biomass. Biomass-based electric power is part of the electricity mix for power generation. In addition, several fuel pathways have been published for both woody biomass and crop residue-based pathways. CARB has at least four different programs that address woody biomass as a feedstock, each of which is framed, and reports emissions slightly differently. In order to demonstrate CARB's treatment of biogenic carbon under the LCFS, pathway output from CCS, biomass power, woody biomass, and crop residue is discussed below.

Carbon Capture and Sequestration (CCS) Protocol

The CCS Protocol under the LCSF does not explicitly state a biogenic carbon credit for biofuels (CARB, 2018c). The CCS refers to the CA-GREET model as the primary source of emissions factors, and refers to Appendix E from the CCS (see Table 12) as a secondary source of emissions factors. Note that in Table 12 only positive emissions factors for biomass-derived fuels are listed, and no credits assigned to the biomass. The protocol refers to the emission factors are presumably the approach defined in CA-GREET:

“GHG emissions from fuel combustion and electricity use must be determined using emission factors available in CA-GREET. If an emission factor for a particular fuel is not available in CA-GREET, applicants must refer to combustion emission factors in Tables E1-E3 in Appendix E (Table 12).”

GHG emissions from fuel combustion and electricity use must be determined using emission factors available in CA-GREET. If an emission factor for a particular fuel is not available in CA-

⁷ This percentage changes over time and is currently capped at 4% of emissions compliance obligation for 2021-2025, increasing to 6% from 2026-2030.



GREET, applicants must refer to combustion emission factors in Tables E1-E3 in Appendix E (Table 12).

$GHG_{combustion}$ = GHG emissions from fuel combustion in stationary equipment including emissions from parasitic load (MT CO₂e/year).

$EmbodiedGHG_{electricity+steam}$ = Embodied (upstream) GHG emissions from purchased electricity and steam use (MT/CO₂e year).

$EmbodiedGHG_{fuel}$ = Embodied (upstream) GHG emissions of fuel used in stationary equipment including embodied emissions associated with parasitic load (MT/CO₂e year).

Table 12. CCS Protocol stationary emission factors for petroleum fuel combustion

Table E3. Stationary Emission Factors for Petroleum Fuel Combustion¹²

Biomass-Derived Fuels (Solid)	kg CO₂/ton	g CH₄/ton	g N₂O/ton
Agricultural Byproducts	975	264	35
Peat	895	256	34
Solid Byproducts	1096	332	44
Wood and Wood Residuals	1640	126	63
Biomass -Derived Fuels (gaseous)	kg CO₂/scf	g CH₄/scf	g N₂O/scf
Landfill Gas	0.025254	0.001552	0.000306
Other Biomass Gases	0.034106	0.002096	0.000413
Biomass Fuels (liquid)	kg CO₂/gal	g CH₄/gal	g N₂O/gal
Biodiesel (100%)	9.45	0.14	0.01
Ethanol (100%)	5.75	0.09	0.01
Rendered Animal Fat	8.88	0.14	0.01
Vegetable Oil	9.79	0.13	0.01
Biomass Fuels (Kraft Pulping Liquor by Wood Furnish)	kg CO₂/MMbtu	g CH₄/MMbtu	g N₂O/MMbtu
North American Softwood	94.4	1.9	0.42
North American Hardwood	93.7	1.9	0.42
Bagasse	95.5	1.9	0.42
Bamboo	93.7	1.9	0.42
Straw	95.1	1.9	0.42

¹² U.S. EPA. Direct Emissions from Stationary Combustion Sources (EPA, 2016).

Biomass Power

The carbon intensity calculation of electricity from biomass in CA_GREET 3.0, follows a totality of emissions approach. The totality of emissions approach includes the total CO₂ being emitted from the process and also incorporates the biogenic CO₂ uptake from the atmosphere. The process of generating electricity from biomass can be divided into two major segments. First, there is the biomass farming and transportation. Second, there is the combustion of biomass in power plants to generate electricity.



Biomass farming and transportation emissions are straightforward as biogenic CO₂ is not emitted. Combustion of biomass in power plants emits biogenic CO₂ and other gases which have the biogenic carbon in them which was up taken by the biomass from the atmosphere. As mentioned above, CA-GREET 3.0 calculates and indicates the emission of total CO₂ and then subtracts the biogenic CO₂ taken by the biomass.

The biogenic CO₂ is determined by calculating the total carbon in the gaseous emissions from the power plant, occurred due to combustion of biomass. The gaseous elements presented in CA_GREET 3.0 which have carbon in them are VOC, CO, CH₄ and CO₂. The carbon content in the aforementioned gases is biogenic, and the sum gives us the total biogenic carbon in the biomass. Using this, the biogenic CO₂ uptake from the atmosphere can be calculated. CA_GREET3.0 then subtracts this CO₂ from the total CO₂ and calculates the GHG emissions. In below, the value of CO₂ in the 'Fuel' column is negative, as it has been subtracted with the biogenic CO₂. The direct GHG emissions from biomass power plants include the BUC approach. The calculation method is apparent in CA-GREET3.

In the last row of Table 13, it is clear that the biogenic C is calculated from CO₂, VOC, CO and CH₄. This shows that CA-GREET 3.0, provides a credit for the biogenic CO₂ uptake by the biomass, and that the biogenic carbon includes carbon, not only in CO₂ but also in VOC, CO, and CH₄ from the power plant.

The BUC approach is implemented in numerous energy policies as discussed in Section 3.2. In general, biotic carbon is treated based on its uptake from the atmosphere with negative emissions. The direct biotic carbon emissions from biomass combustion are treated as carbon neutral or in more detail according to the following:

$$\text{GHG}_b = \text{VOC} \times \text{MW}_{\text{CO}_2} / \text{MW}_{\text{VOC}} + \text{CO} \times \text{MW}_{\text{CO}_2} / \text{MW}_{\text{CO}} + \text{CH}_4 \times \text{GWP}_{\text{CH}_4} + \text{N}_2\text{O} \times \text{GWP}_{\text{N}_2\text{O}} + \text{CO}_2 - \text{CO}_2c \quad (1)$$

Where VOC, CO, CH₄, and N₂O and CO₂ refer to the direct emissions from combustion. The global warming potential of VOC and CO are treated as fully oxidized CO₂ due to the short lifetime of these pollutants in the atmosphere. This method is implemented in the GREET model, though some accounting schemes may not include this detail. CH₄ and N₂O emissions are multiplied by their global warming potential (GWP) and CO₂ has a GWP of 1. Finally, the uptake of CO₂ is represented in the CO₂c term, which includes all of the carbon in the biomass. This BUC approach, in effect counts the GWP weighted CH₄ and N₂O emissions. The carbon in CH₄ is often considered part of the GWP of CH₄. Therefore, CO₂c is often counted as the carbon in CO₂, VOC, and CO.



Table 13. CA-GREET3 output. The biogenic CO₂ credit is represented in the last entry

	User-Inputted Emission Factors (Default Data Here Are Emission Factors for EPA Database (g/kWh))									
	By Fuel-Type Plants									
	Biomass Boiler: Willow	Biomass Boiler: Poplar	Biomass Boiler: Switchgr ass	Biomass Boiler: Miscanthus	Biomass Boiler: Forest Residue	Biomass IGCC Turbine: Willow	Biomass IGCC Turbine: Poplar	Biomass IGCC Turbine: Switchgrass	Biomass IGCC Turbine: Miscanthu s	Biomass IGCC Turbine: Forest Residue
VOC	0.135	0.135	0.135	0.135	0.135	0.070	0.070	0.070	0.070	0.070
CO	4.755	4.755	4.755	4.755	4.755	0.071	0.071	0.071	0.071	0.071
NOx	0.927	0.927	0.927	0.927	0.927	0.078	0.078	0.078	0.078	0.078
PM10	2.814	2.814	2.814	2.814	2.814	0.024	0.024	0.024	0.024	0.024
PM2.5	1.976	1.976	1.976	1.976	1.976	0.012	0.012	0.012	0.012	0.012
SOx	0.918	0.355	2.152	1.474	0.654	0.578	0.223	1.355	0.928	0.412
BC	0.273	0.273	0.273	0.273	0.273	0.002	0.002	0.002	0.002	0.002
OC	0.644	0.644	0.644	0.644	0.644	0.004	0.004	0.004	0.004	0.004
CH ₄	0.493	0.493	0.493	0.493	0.493	0.033	0.033	0.033	0.033	0.033
N ₂ O	0.066	0.066	0.066	0.066	0.066	0.094	0.094	0.094	0.094	0.094
CO ₂	1,630	1,621	1,662	1,599	1,499	1,031	1,025	1,052	1,011	948
CO ₂ (w/ C in VOC, CH ₄ & CO)	-1,639	-1,630	-1,672	-1,608	-1,508	-1,032	-1,026	-1,052	-1,012	-949

Woody Biomass LCFS Pathways

CARB prepared draft pathway documents for the conversion of forest residue and farmed trees to cellulosic ethanol (CARB, 2009a; CARB, 2009b). The analysis followed the CA-GREET approach which included a biogenic uptake credit for carbon in the biomass that offset the release from process emissions and fuel combustion. An example of the calculation approach from the biogenic uptake credit is shown in Table 14.

Table 14. Output from GREET pathways for cellulosic ethanol from farmed trees by fermentation

GHG Species	g/mmBtu	g CO ₂ e/MJ
VOC	6.0	
CO	85.2	
CH ₄	11.5	
N ₂ O	6.85	
CO ₂	112,972	
Total GHGs (gCO ₂ e/mmBtu)	115,527	109.5
CO ₂ credit from direct use of tree burning as process fuel	(-112,751) ^a	(-106.9)
Total GHGs	2,702	2.56

^a Total CO₂ exceeds biogenic CO₂ since a small amount of diesel and natural gas fuels are used in the pathway.

While biomass was treated as carbon neutral in these documents, CARB indicated that the analysis was preliminary:

This is a preliminary estimate of the carbon intensity for the fuel derived from the feedstock presented in this document. At this time, this document has been provided for informational purposes only. Staff is in the process of obtaining additional information to refine and/or modify the values presented in this document. The refinement is both for direct and indirect effects. When staff has completed the analysis, a final value will be presented in the future for the fuel presented in this document.



Crop Residues

Pathways exist using GREET for lifecycle GHG emissions from crop residues to cellulosic ethanol. Following the CA-GREET approach, these pathways include a biogenic uptake credit for carbon in the biomass that offsets the release from process emissions and fuel combustion. The treatment of biogenic carbon for crop residue used as process fuel and feedstock is the same as that in Table 14.

3.2.4 Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)

CORSIA is a global market-based mechanism established in 2016 by members of the International Civil Aviation Organization (ICAO) to calculate and address the life cycle GHG emissions of aviation fuels associated with international civil travel (Prussi, et al., 2021). CORSIA aims to mitigate aviation fuel CO₂ emissions through two mechanisms: offsetting (an action by a company or individual to compensate for their emissions by financing a reduction in emissions elsewhere), and use of lower-emission sustainable aviation fuel (SAF). Their goal is to scale up SAF and other nascent technologies such as electric and hydrogen-powered aviation, and decrease the need for offsetting.

CORSIA assumes biogenic CO₂ emissions are carbon neutral, as explained in the report detailing the methodology (Prussi, et al., 2021):

For biomass-derived fuels, biogenic CO₂ emissions from fuel combustion are assumed to be offset by the biomass carbon uptake happened during the biomass growth, and therefore count as zero in the LCA of SAF. Jet fuel CO₂ combustion emissions only include CO₂ from fossil sources.

3.2.5 EPA Code of Regulations

Biogenic CO₂ emissions from combustion of biomass with other fuels.

Based on the Code of Regulations the equation 1 allows to estimate biogenic CO₂ emissions for operating hour from units that combust a combination of biomass and fossil fuels (*i.e.*, either co-fired or blended fuels) (EPA, 2022a).

$$V_{CO2H} = \frac{(\%CO_2)}{100} \times Q_h \times t_h \quad (Eq. 1)$$

Where:

V_{CO2h} = Hourly volume of CO₂ emitted (scf).

$(\%CO_2)_h$ = Hourly average CO₂ concentration, measured by the CO₂ concentration monitor, or, if applicable, calculated from the hourly average O₂ concentration ($\%CO_2$).

Q_h = Hourly average stack gas volumetric flow rate, measured by the stack gas volumetric flow rate monitor (scfh).

t_h = Source operating time (decimal fraction of the hour during which the source combusts fuel, *i.e.*, 1.0 for a full operating hour, 0.5 for 30 minutes of operation, etc.).

100 = Conversion factor from percent to a decimal fraction.



In addition, in Table 15 is listed the biogenic CO₂ emissions from the combined combustion of biomass and fossil fuels is required for those biomass fuels; In a cases that a biomass fuel is not listed in Table 15 is combusted in a unit that has a maximum rated heat input greater than 250 mmBtu/hr, if the biomass fuel accounts for 10% or more of the annual heat input to the unit, and if the unit does not use CEMS to quantify its annual CO₂ mass emissions (EPA, 2022c).

Table 15. Default CO₂ Emission Factors and Hight Heat Values for Various Types of Biomass Fuel

Fuel type	Default high heat value	Default CO ₂ emission factor
Other fuels - solid	mmBtu/short ton	kg CO₂/mmBtu
Municipal Solid Waste	9.953	90.7
Biomass fuels - solid	mmBtu/short ton	kg CO₂/mmBtu
Wood and Wood Residuals (dry basis) ^a	17.48	93.8
Agricultural Byproducts	8.25	118.17
Peat	8	111.84
Solid Byproducts	10.39	105.51

^a Use the following formula to calculate a wet basis HHV for use in Equation C-1: $HHV_w = ((100 - M)/100) \times HHV_d$ where HHV_w = wet basis HHV, M = moisture content (percent) and HHV_d = dry basis HHV from Table C-1.

3.3 Other Analysis Schemes

The notion of carbon neutrality is a simplified version of the carbon accounting of biomass. A key aspect that is not explicitly addressed under the carbon neutral assumption is the influence of time on emissions release to the atmosphere. Annual crops such as corn and wheat exhibit relatively short cycles of growth and decay, however, woody biomass grows, decomposes and burns over varying, and sometimes longer time periods, therefore, its alternative fate is potentially more complicated than that of annual crops. Those questioning the carbon-neutral assumption point out that near-term emissions associated with use of waste residues (e.g., biomass to power or biofuel) can lead to increased climate-forcing over policy-relevant timeframes. This argument assumes that the alternative fates (decay and/or burning) of the same residues in-situ would have occurred over longer period of time.

Several modeling systems, discussed in the following sections, take into account the potential alternative fate of biomass residues, and incorporate a time-horizon for the growth and regrowth of biomass.



3.3.1 C-BREC

The California Biomass Residue Emissions Characterization Model (C-BREC) was designed as a transparent and customizable tool for calculating the life cycle impacts of residual biomass⁸ for California's energy policies (Carman, et al., 2021). The framework was commissioned by the California Energy Commission to address the objective of reducing environmental and public health impacts of electricity generation and decreasing the vulnerability of California's electricity system to climate impacts, however, the model may be used to inform other biomass energy systems, including biofuel production.

The C-BREC framework authors acknowledge existing controversy regarding biogenic emissions; however, they conclude that the issue of reporting biogenic issues is straightforward when dealing with biomass residues:

As the biomass under consideration is residue, and the activity generating the residue is assumed not to be driven by the residue market, this question is simpler than in other biomass LCAs. There is no change in on-site C pools beyond the presence/absence of the biomass residue itself, so by tracking the full emission profile of the use case, net of the emissions from fire and decay in the reference case, we are able to account for all net emissions, biogenic and otherwise.

The C-BREC framework addresses the assumption of carbon-neutral accounting by accounting for all emissions, including biogenic, associated with the use of biomass residues and their counterfactual (reference) fates, e.g., decay or burning – either prescribed or unplanned wildfire. C-BREC counters a common assumption that all biomass is either completely combusted through burning events or decays at a single rate, and by differentiates such parameterization across geographies and according to different in-situ spatial configuration (“disposition”) of biomass residues. More specifically, emissions associated with each counterfactual fate are based on existing models and literature values, specific to species composition, size class and disposition, and climatic factors. As an example of the counterfactual fates considered under the C-BREC framework, see Table 16, and Table 17, below.

⁸ Woody biomass residues are defined as those derived parts of the tree remaining after a primary silvicultural treatment that do not have a market pathway (i.e. forest slash). Agricultural biomass residues are defined as any material remaining in-field following the harvest of an annual crop, or trimmings, dead material, and plant waste from perennial crops.



Table 16. Counterfactuals for forest residues included in C-BREC framework

Definition of Reference and Use Cases for Forest Residues	
F-R1. Biomass Left On-Site	All residues are left on-site to decay and are subjected to annualized wildfire probability.
F-R2. Pile Burn	All piles are burned in year 1 – the same year as the primary treatment. Any scattered residues are left unburned. Residues that remain are treated as scattered and subjected to decay and annualized wildfire probability.
F-R3. Broadcast Burn	All scattered residues are burned in year 1 – the same year as the primary treatment. Any piles that exist are unburned. Residues that remain are subjected to decay and annualized wildfire probability.
F-R4. Pile and Broadcast Burn	All piles and all scattered residues are burned in year 1 – the same year as the primary treatment. Residues that remain are treated as scattered and subjected to decay and annualized wildfire probability.
F-U1. Collect All Piles	All piled residues are collected. Residues that remain are subjected to decay and annualized wildfire probability.
F-U2. Collect All Piles and/or Technically Recoverable Scattered Residues	All piled residues are collected, and all technically recoverable scattered residues are collected. Residues that remain are subjected to decay and annualized wildfire probability.

Table 17. Counterfactuals for agricultural residues included in C-BREC framework

Definition of Reference and Use Cases for Agricultural Residues	
A-R1. Biomass Left Scattered On-Site	Residues are left scattered in-field to decay. Decomposition dynamics depend on the crop (in the case of rice, depending also on whether the field is flooded post-harvest).
A-R2. Residues Incorporated Into Soil (Straw Only)	Residues are tilled into the soil in the field in which they were grown during year 1 – the same year as the primary harvest activity.. This option is limited to straw residues (corn, cotton, rice, and wheat). Decomposition dynamics depend on the crop (in the case of rice, depending also on whether the field is flooded post-harvest).
A-R3. Residues Burned On-Site	All residues are control-burned during year 1 – the same year as the primary harvest activity.
A-U1. Collect Residues	Biomass residues are collected. Residues that remain are subjected to above-ground decay.



Accounting for Time Dependencies

Global Warming Potential (GWP) measures the impact of a greenhouse gas on global warming over a specific time frame, typically 100 years (GWP-100). It compares the heat-trapping ability of different gases to carbon dioxide. Global Temperature Potential (GTP) measures the impact of a greenhouse gas on global mean surface temperature over a set time frame. Most regulatory frameworks, including CARB use GWP-100 for policy decisions and emissions assessments. The implications of GWP assumptions for methane are shown in Figure 3.1 below.

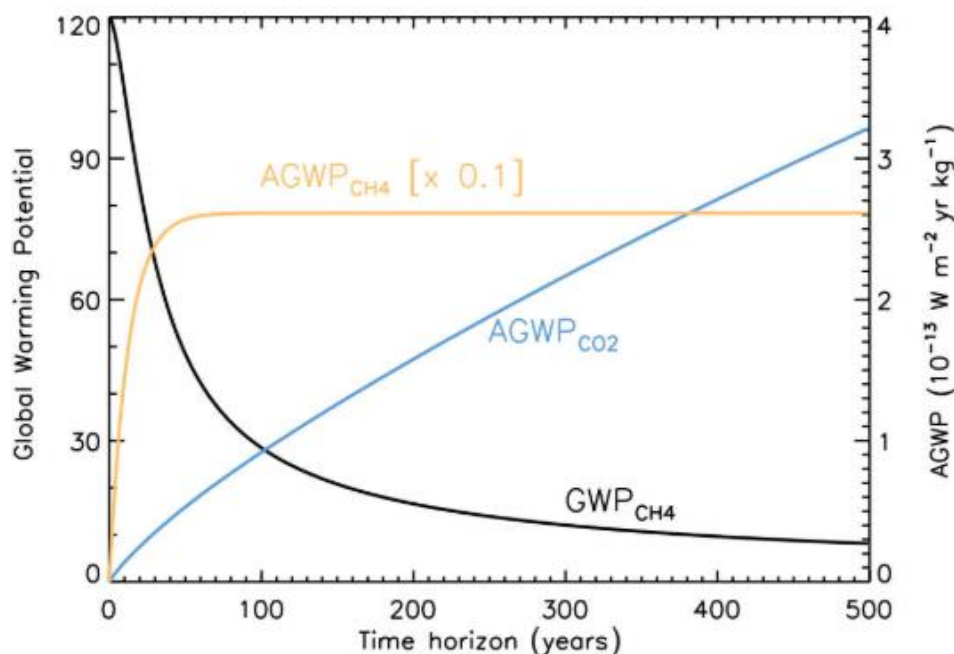


Figure 3.1. Time horizon impact on methane GWP⁹.

In order to account for climate-forcing effects on policy-relevant timescales, C-BREC calculates emissions both on a GWP basis, and on a GTP basis. GTP is a measure of the heat absorbed over a given timeframe, and thus in this context, reflects the increase in temperature due to a given emissions trajectory for the equivalent GWP timeframe. C-BREC is based on burning emission factors from the Bluesky modeling framework (Larkin, et al., 2009), and decomposition emission factors based on negative exponential models of decay (Blasdel, 2020). The C-BREC model characterizes the variable emissions from different biomass supply chains as well as the counterfactual emissions from prescribed burn, wildfire, and decay avoided by residue mobilization.

Figure 3.2 illustrates the breakdown of carbon intensity outcomes (in net grams of CO_2 equivalent per kilowatt-hour) in the recent California treatments case study with carbon intensity displayed on the horizontal axis and relative prevalence of a given range of results

⁹ Source: Center for Methane Research. Implications of GWP Time Horizons. <https://www.gti.energy/wp-content/uploads/2019/02/CMR-Implications-Using-Different-GWP-Time-Horizons-White-Paper-2019.pdf>



represented on the vertical axis. The chart also presents the CA grid average and US Grid average, the Grid values are on a life-cycle basis and are derived from Chen and Wemhoff (Fingerman, et al., 2023; Chen & Wemhoff, 2021).

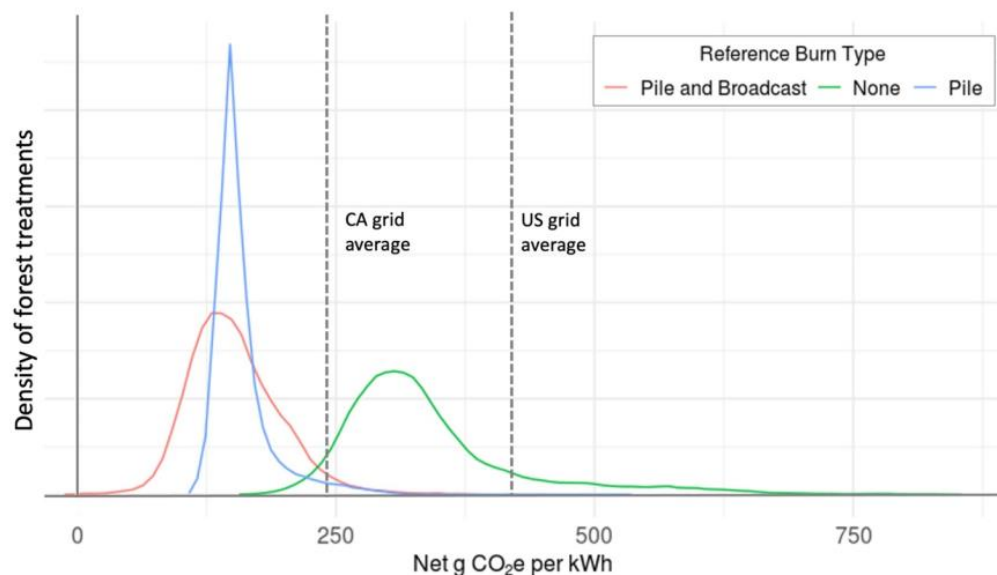


Figure 3.2. Distribution of carbon intensity results (net g CO₂e kWh⁻¹) across the California recent treatments case study, disaggregated to illustrate the difference across reference case prescribed burn scenarios (Fingerman, et al., 2023).

CARB used the C-BREC model to characterize the amount and location of available forestry residues and affiliated criteria emissions for the five treatment scenarios they considered in the 2022 Draft Scoping Plan update (CARB, 2022c). However, C-BREC may not be a useful for accounting for lifecycle emission in the context of the California LCFS.

The California LCFS is based on the GREET model framework. GREET is available as a spreadsheet tool that can be disaggregated to reveal precisely where emission totals are coming from. C-BREC is available as a web tool. C-BREC is programmed in the programming language R. While this code had previously been publicly available on GitHub, the code is no longer available online. Thus, C-BREC is a black box that takes inputs at generates several project characteristics, such as total electricity generated, tones of total residue generated, net GHG emissions, and Net Criteria pollutants. Figure 3.3 shows one region selected for a test in North California and Figure 3.4 shows an output example using C-BREC web tool.



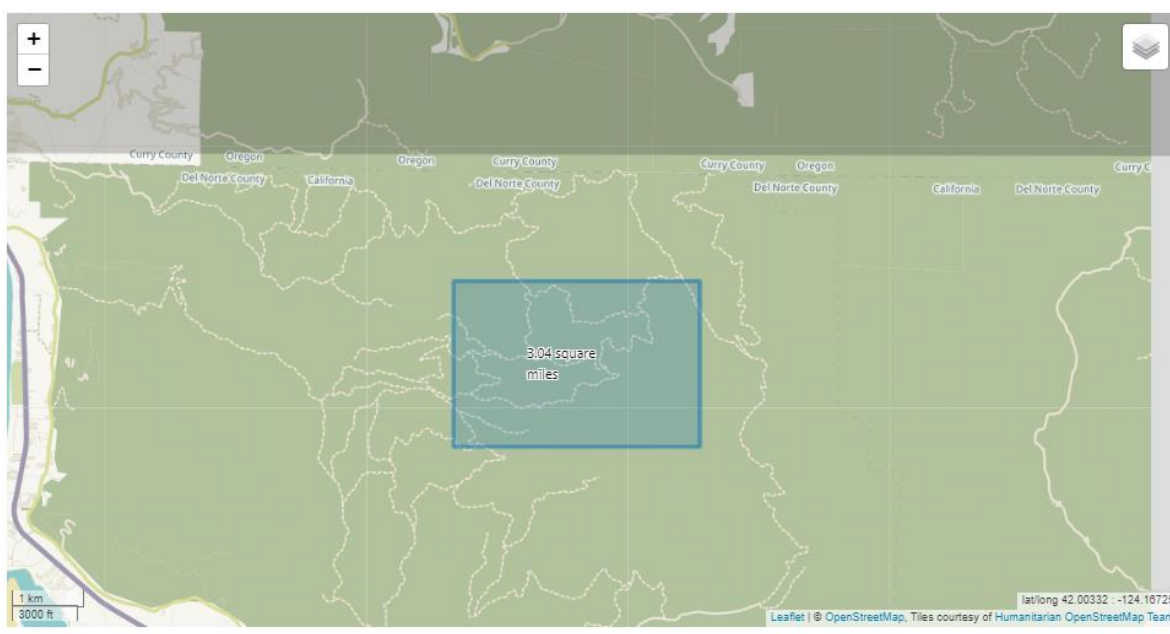


Figure 3.3. Screenshot of location selected.

Project Characteristics

Total electricity generated

2.44e+4 MWh

Tons of total residue generated

2.31e+4 metric tons

Net Greenhouse Gas Emissions

g CO ₂ e/kWh (100-yr GWP Normalized)	g CO ₂ e/kWh (100-yr GTP Normalized)	kg CO ₂ e (100-yr GWP Normalized)	kg CO ₂ e (100-yr GTP Normalized)
339.017	93.063	8.272e+6	2.271e+6

Net Criteria Pollutants

PM ₁₀ (g)	NO _x (g)	SO ₂ (g)	CO (g)	VOCs (g)	Black Carbon (g)
-2.745e+7	2.484e+7	4.290e+6	-1.577e+8	-6.748e+7	-4.116e+6

Figure 3.4. Example C-BREC Output.

Using previously downloaded R code, allow for the development of disaggregated results; however, a complete disaggregation remains elusive. We can see that the methodology employed by C-BREC does not align with that of GREET and an external representation of sample calculations would be helpful. For example, C-BREC includes emissions that are outside the scope of the GREET system boundary. Figure 3.5 presents an example for diesel and gasoline's emission factors from EPA.



```

0 # emissions factors for diesel and gasoline come from the EPA:
1 # https://www.epa.gov/sites/production/files/2015-07/documents/emission-factors\_2014.pdf
2 # Diesel assumed to be distillate fuel oil No. 2
3 CO2_diesel_grams = 10210 # LCA COMMENT - this doesn't include life cycle emissions, GREET would say 13,087
4 CH4_diesel_grams = 0.41
5 N2O_diesel_grams = 0.08
6
7 # Gasoline assumed to be motor gasoline
8 CO2_gas_grams = 8780
9 CH4_gas_grams = 0.38

```

Figure 3.5. Emission factors for Diesel and Gasoline from EPA.

The C-BREC model estimates emissions from both flaming and smoldering combustion during biomass residue burning. Flaming combustion occurs when there is sufficient oxygen available to sustain a flame and is typically associated with the initial stages of combustion while smoldering combustion occurs when there is limited oxygen and is characterized by slower, less intense burning. On the other hand, the residual emissions factor refers to the emissions that occur after the primary combustion phase, which includes both flaming and smoldering combustion. These residual emissions are typically associated with the smoldering phase of combustion, which can continue after the flames have died down. Table 18 shows those three types of emissions mentioned before.

Table 18. General emissions factors in C-BREC

Pollutant	Flaming Emission Factors (kg/kg)	Smoldering Emission Factors (kg/kg)	Residual Emission Factors (kg/kg)
CH ₄	0.0038	0.0099	0.0099
CO	0.0718	0.2101	0.2101
CO ₂	1.6497	1.3931	1.3931
NO _x	0.0024	0.0009	0.0009
PM ₁₀	0.0086	0.0196	0.0196
PM _{2.5}	0.0073	0.0166	0.0166
SO ₂	0.001	0.001	0.001
VOC	0.0173	0.049	0.049

The C-BREC model also includes specific emission factors for open burning piles, which are commonly used for the disposal of agricultural and forestry residues. These piles can include a variety of materials, including crop residues, forest slash, and other woody debris. Table 19 present the values for those emission factors.



Table 19. Piles Emission Factors

Pollutant	Flaming Emission Factors (kg/kg)	Smoldering Emission Factors (kg/kg)	Residual Emission Factors (kg/kg)
CH ₄	3.28 / 2000 = 0.0016	11.03 / 2000 = 0.0055	11.03 / 2000 = 0.0055
CO	52.66 / 2000 = 0.0263	130.37 / 2000 = 0.0652	130.37 / 2000 = 0.0652
CO ₂	3429.24 / 2000 = 1.7150	3089.88 / 2000 = 1.5450	3089.88 / 2000 = 1.5450
NO _x	0.00242	0.000908	0.000908
SO ₂	0.00098	0.00098	0.00098
VOC	0.017342	0.0490268	0.0490268

Note that the emissions factors estimated by C-BREC are specific to the conditions and types of biomass residue burning activities that were studied in California.

C-BREC model includes some assumptions parameters for collection and processing as shown in Figure 3.6. Additionally, C-BREC includes other key input parameter as the mass loss fraction, decay mass fraction, and decay emission fraction. These analysis systems may change with updates to the model.

```

# # Processing and Collection -----
# residue_slope_cutoff <- 80 # Slope (%) above which collection of residues is not allowed
# density_threshold <- 13 # sdt/acre. Threshold at which a project is defined as "high volume" and associated equipment is applied
# ave_harvest_acres <- 25 # acres. Associated with an average "catch basin" for in-field processing equipment. This is used to determine a multiplier for equipment hauling emissions.
# harvest_tonnes_per_person_day <- 16.04 # tonnes / person-day. From Barrett, S., Bolding, M., & Munsell, J. (2017), reported 224.62 tonne per crew per week, 2.8 people per crew, and assume 5 days per week
# crew_commute_dist <- 80.5 # km. Assumption of 50 miles
# equip_commute_dist <- 80.5 # km. Assumption of 50 miles
# equip_kn_per_hour <- 58 # km/hr. Equivalent to ~36 MPH
# transfer_point_distance <- 8.04672 # kilometers, equal to 5 miles. Additional hauling distance used if project includes a transfer point
# unloaded_truck_eff_improve <- 0.15 # Assume 15% fewer emissions (15% greater efficiency) on the return trip back to the field
# Associated with set() function in year 1 calculations in run-cbrec.R
# firecols <- c('CWD_Scattered_CombustionFrac',

```

Figure 3.6. Assumptions parameters in C-BREC model.

The mass loss fraction is used to estimate the amount of biomass that is burned during a biomass residue burning activity. The mass loss factor represents the fraction of the initial biomass that is lost during the burning process due to factors such as combustion efficiency and volatilization as shown in the Figure 3.7 below.

```

# -----
# Calc power plant mass and energy inputs
# -----
# Calculate mass loss fraction after storage decay (fraction of pp_residue.delivered_tonnes)
# Emissions from storage decay are allocated to the first year. Variable avg_storage_time_months defined in constants.R as global variable
storage_mass_lost_fraction <- round(2.1469127002*log(days_per_month * avg_storage_time_months) - 1.5039981419, 1) / 100 # From dry matter loss (DML) research
# Add columns to cbrec_df

```

Figure 3.7. Mass loss fraction.

Figure 3.8 presents two more parameters used in the C-BREC model: the decay mass fraction and a CH₄ decay emissions fraction. The first one is used to estimate the amount of biomass that has decayed prior to the burning activity. This parameter is important because decaying biomass contains less carbon than fresh biomass, and therefore produces fewer emissions



when burned. Additionally, the CH₄ decay emissions fraction represents the fraction of the total methane emissions that are produced due to the decay of biomass prior to the burning activity.

```
duff_decay_mass_fraction <- 0.02 # (Mass as Duff) / (Mass Lost from Decay)
duff_k_val <- 0.002 # Decay constant for duff for exponential decay function
CH4_decay_emissions_fraction <- 1E-5 # (Mass Carbon as CH4) / (Mass Carbon Lost from Decay). Applied to scattered and piled woody material (forest and ag).
foliage_to_duff_trigger <- 0.5 # (Mass Foliage Remaining) / (Original Mass Foliage) value below which all mass foliage remaining is moved to duff

# Decay of Power Plant Storage Piles -----
avg_storage_time_months <- 6 # Average months residues are stored at power plant before combustion (must be <= 12 as emissions are allocated to first year)
CH4_decay_emissions_fraction_storage <- CH4_decay_emissions_fraction # (Mass Carbon as CH4) / (Mass Carbon Lost from Decay)
```

Figure 3.8. Decay mass and emission fraction.

C-BREC cases

We conducted several cases using the C-BREC web tool, assessing various scenarios across a limited number of locations within California. The tool allowed us to analyze the carbon intensity outcomes of biomass treatments in diverse geographic settings, providing insights into the potential impacts of biomass utilization. By running simulations on the CBREC web tool, we could evaluate the net grams of CO₂ equivalent emitted per kilowatt-hour (gCO₂e/kWh) across these locations. Table 20 below present 6 different cases from different locations.

Table 20. Cases ran on CBREC in North, Central and South California

Location	North CA (Shasta County)	North CA (Blue Mountain)	Central CA (Big Bar Mountain)	Central CA (Fox Mountain)	South CA (Baid Peak)	South CA (Hunter Peak)
Thin part	Thin from Above	Thin from Above	Thin from Above	Thin from Above	Thin from Above	Thin from Above
% of residue in piles	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
%Basal Area removed	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%
Residue Biomass collected	Piles Only	Piles Only	Piles Only	Piles Only	Piles Only	Piles Only
Type of biopower facility	Current	Current	Current	Current	Current	Current
Hauling distance	50 miles	50 miles	50 miles	50 miles	50 miles	50 miles
Type of Residue	High Residue Density: Dry, Grind	High Residue Density: Dry, Grind	High Residue Density: Dry, Grind	High Residue Density: Dry, Grind	High Residue Density: Dry, Grind	High Residue Density: Dry, Grind
Residue location	Left in Place	Left in Place	Left in Place	Left in Place	Left in Place	Left in Place
Units	Results					
kg CO	170,200,000	120,500,000	6,140,000	36,090,000	4,649	40,410
kg PM	-28,500,000	-16,670,000	-1,612,000	-13,870,000	52	451
Tonnes biomass	10,900.0	9,915.3	472.5	4,272.2	3.7	32.1
Power (MWh)	10,800.0	9,951.5	474.5	4,101.6	3.7	31.8
MJ Power	38,880,000	35,825,256	1,708,344	14,765,796	13,176	114,552
Efficiency	21.0%	21.3%	21.3%	20.3%	21.0%	21.0%
GJ Biomass	185,300	168,560	8,033	72,628	63	546
g/kWh	310.68	369.51	590.85	414.66	1181.54	1182.37
kg CO ₂ e	3.355E+06	3.677E+06	2.804E+05	1.701E+06	4.324E+03	3.762E+04
g CO₂e/kg Biomass	307.83	370.86	593.38	398.10	1171.93	1171.69
CI (g CO₂e/MJ)	16.88	20.33	32.53	21.82	64.25	64.23

The variation in carbon intensity across California location can be attributed to user error: the model allows users to choose forest locations, however not all locations are suitable for biomass power utilization. The Southern California locations chosen would not be suitable biomass power locations, and thus the resulting carbon intensity of the biomass is higher than forested location in Northern California.



3.3.2 Stand Level vs Landscape Level Forest Accounting

Comparisons of GHG depends not only on the bioenergy combustion technology and fossil fuel technology employed, but also on the biophysical and forest management characteristics of the forests from which biomass is harvested, and the starting point of the analysis. For example, forest carbon accounting results that are based on a static stand-level versus a dynamic forest landscape management approach, will greatly differ. As illustrated below, a single stand-level analysis will reflect a carbon debt-then-dividend that occurs over a longer timeframe than a dynamic carbon balance for a managed forest landscape over an equivalent timeframe.

Stand Level

Using a stand-level approach, Walker et al. showed that during the initial period of forest growth, approximately 32 years, GHG emissions from forests exceeded those of energy-equivalent fossil fuel combustion, accumulating carbon debt in these forest systems (Walker, Cardellichio, Saah, & Hagan, 2013). Thereafter, forest GHG decreased incrementally in relation to fossil fuel combustion, yielding carbon dividends in the respective forest systems (Figure 3.9). They also found that replacing fossil fuels in thermal or combined heat and power (CHP) applications typically has lower initial carbon debts than do utility-scale biomass electric plants because the thermal and CHP technologies achieve greater relative efficiency in converting biomass to useable energy. Subsequently, the time needed to pay off the carbon debt and begin accruing the benefits of biomass energy are shorter for thermal and CHP technologies when the same forest management approaches are used in harvesting wood.

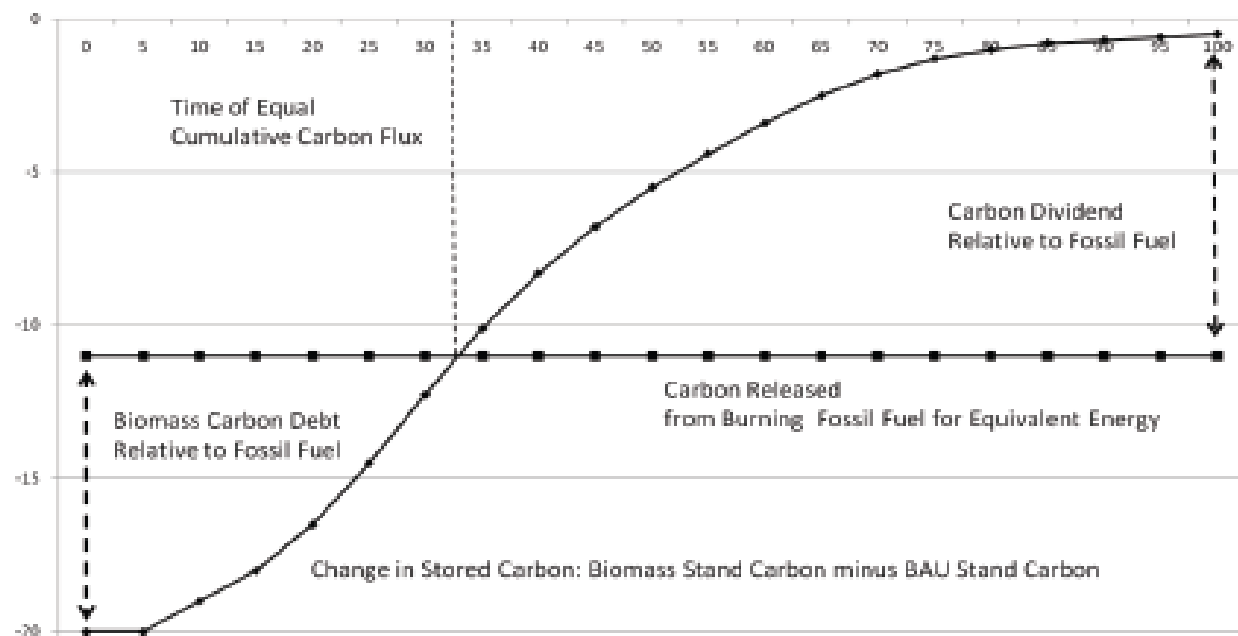


Figure 3.9. Incremental carbon storage (in tonnes) for a forest stand scenario compared to fossil fuel combustion. Source: (Walker, Cardellichio, Saah, & Hagan, 2013). Note: BAU represents a typically harvested stand.



Landscape Level

Applying a landscape-level approach to forest carbon accounting, Strauss demonstrated that, assuming sustainable forestry practices, carbon released by combustion from selective harvesting is offset by carbon accumulation from the rest of the system's continued growth, thus, portraying forest carbon accounting as a dividend-then-debt scenario (Figure 3.10) (Strauss, 2011).

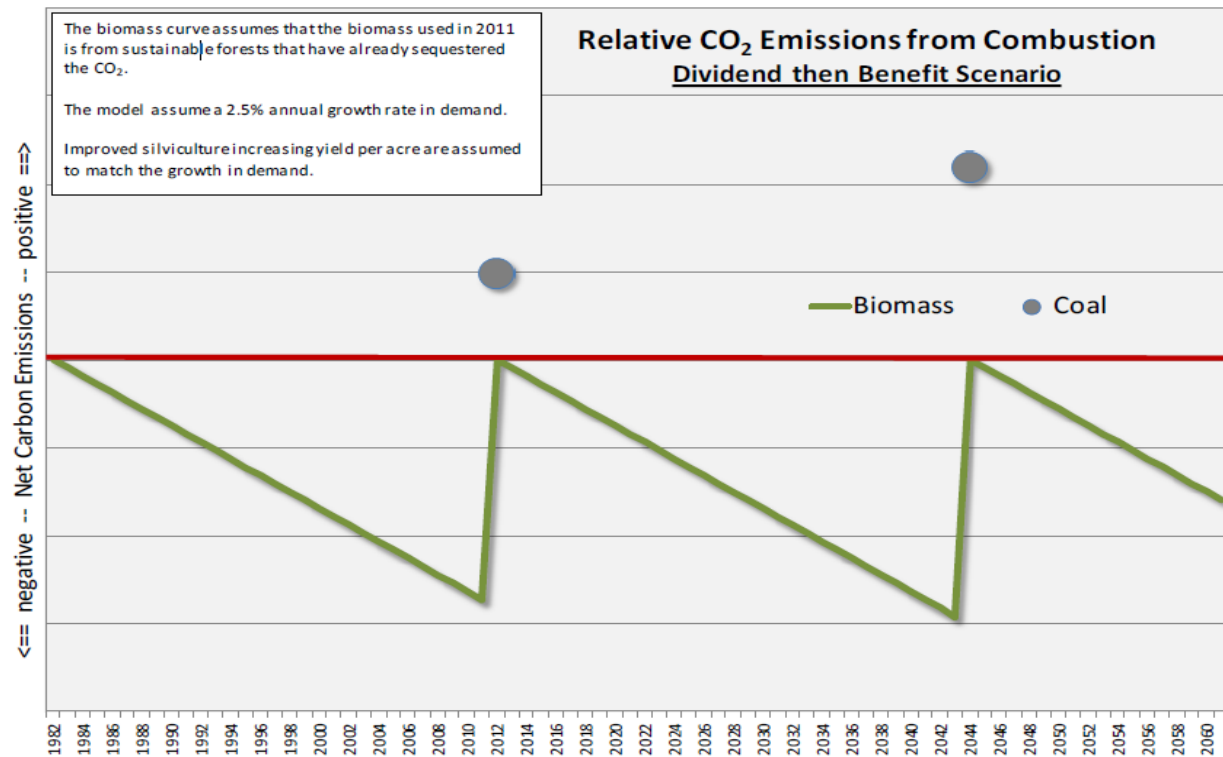


Figure 3.10. Incremental carbon storage and associated emissions in sustainably harvested forests. Source: (Strauss, 2011).



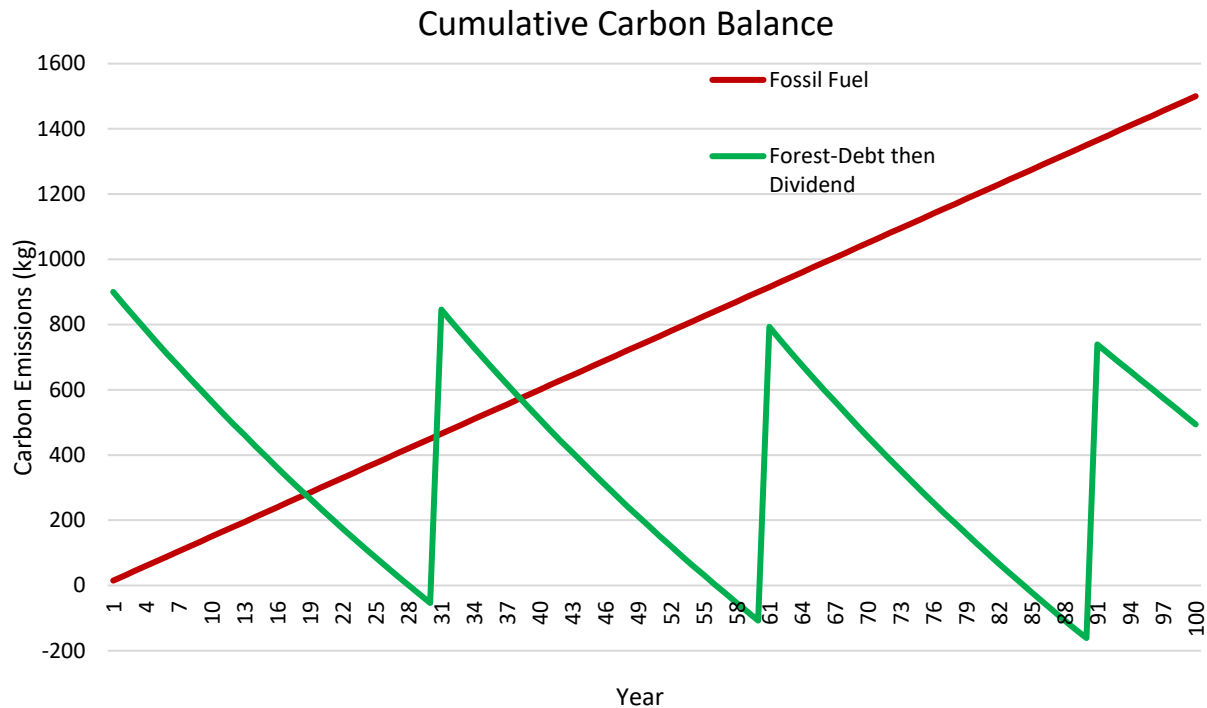


Figure 3.11. Incremental carbon storage and associated emissions.

Argonne National Laboratory and CORRIM (2018) analyzed carbon dynamics for a stand-level framework compared to a landscape-level dynamic framework (Han, et al., 2018). In their stand-level analysis two cycles were considered. In the first cycle, standing trees were harvested to produce biofuels, and then the harvest was replanted. In the second cycle, a forest harvest was planted, followed by newly grown trees being harvested for biofuel production. In both scenarios, biogenic emissions and uptake were accounted for at the point at which they occurred. In their landscape-level analysis, carbon emissions and uptake did not change over time because biomass was sustainably harvested from forests, keeping net primary productivity constant. The results of this study are summarized in Figure 3.12.

The authors concluded that a landscape-level analysis is appropriate for conducting LCAs of products from forests managed using sustainable forestry management goals, i.e., a steady supply of forest biomass to customers and steady revenue to the respective landowner. They also found that slower-growing forestry-derived bioenergy feedstocks have larger variations in GHG emissions compared to short-rotation woody crops (SRWCs) that have relatively shorter growth cycles and faster growth rates, and that the increased elapsed time between biomass growth and biofuel combustion may weaken the assumption of carbon neutrality.



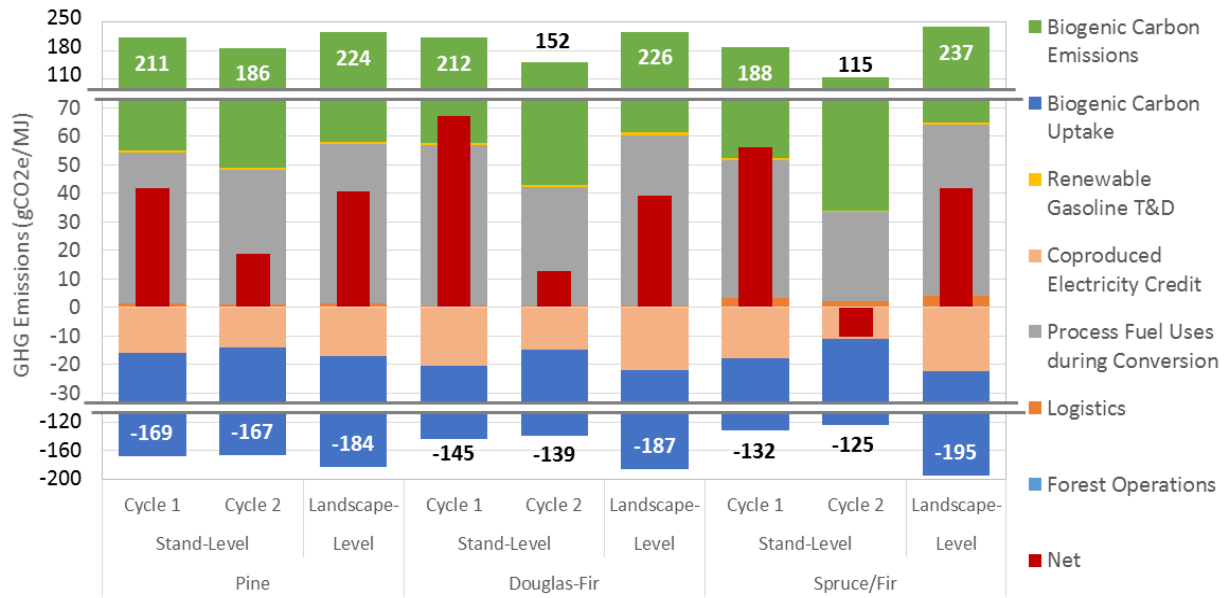


Figure 3.12. CORRIM and Argonne National Laboratory analysis of renewable gasoline from emissions Pine, Douglas-Fir, and Spruce/Fir feedstocks (Han, et al., 2018).

3.3.3 WWF Biogenic Carbon Footprint Calculator

The World Wildlife Foundation (WWF), in partnership with Quantis, Intl., developed a biogenic footprint calculator for a variety of forest-based products. The calculator takes into account the conventional carbon footprint of a bio-based product (excluding biogenic emissions), and separately accounts for biogenic emissions using dynamic methods, representing a variation of the Biogenic Uptake and Credit Approach. This dynamic accounting reflects the potential gap in carbon stocks when biomass is harvested, regrowth time, and the length of time that carbon is stored in a bio-based product (Gmunder, Zollinger, & Dettling, 2020). Figure 3.13 below demonstrates the modeled forest carbon stock after harvesting 1,000 m³ of Spruce from a cool temperate climate to make sawlog and veneer log.



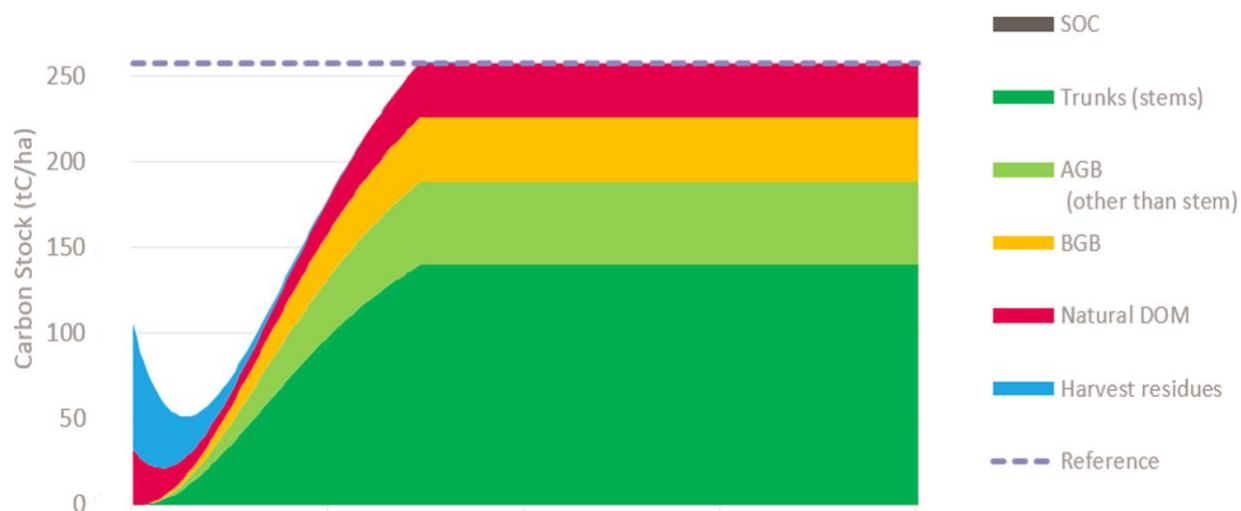


Figure 3.13. Forest carbon stock after harvesting 1,000 m³ of cool temperate spruce starting at t_0 . Carbon pool include stem wood (green), ground biomass (light green), below-ground biomass (yellow), natural dead organic matter (red), harvest residues (blue), and soil carbon (gray). The dotted purple line refers to the reference carbon stock.

3.4 Stock and Flow Accounting Framework

Stock and flow accounting seeks an alternative framework to LCA for comparing the CO₂ effects of biofuel use to that of fossil fuel use. DeCicco (2016) characterized this approach as Annual Basis Carbon (ABC) accounting and argued that the assumption of biogenic carbon neutrality embedded in LCA is inaccurate because it doesn't fully account for all emissions sources. When applied to fuels, the ABC approach accounts for all CO₂ emissions from end-use regardless of the fuel's origin. For biofuels, direct emissions to the atmosphere are reported without crediting biogenic carbon uptake. DeCicco proposed an attributional accounting protocol to report net CO₂ uptake, and credit producers when biogenic uptake exceeds biogenic emissions (DeCicco, et al., 2016).

In his 2016 study, DeCicco compared the emissions from all biofuels in the United States between 2005 and 2013 with the cumulative additional carbon uptake on cropland over the same time period. He reported that the biogenic carbon emitted from the biofuels is always greater than the additional carbon uptake on croplands over this time period, referring to this difference as the neutrality gap. Over the time period, he concluded that only a 37% of emissions are offset due to biogenic uptake, rather than the 100% offset assumed by most LCA frameworks (based on an assumption of carbon neutrality). DeCicco further concluded that a reduction in the biogenic emissions offset in LCA models would lead to drastically different carbon intensities, and in some scenarios could result in a biofuel having a greater carbon intensity than petroleum (DeCicco, et al., 2016). Figure 3.14 shows an analysis of the cumulative carbon emitted by U.S. Biofuels up to 2013.



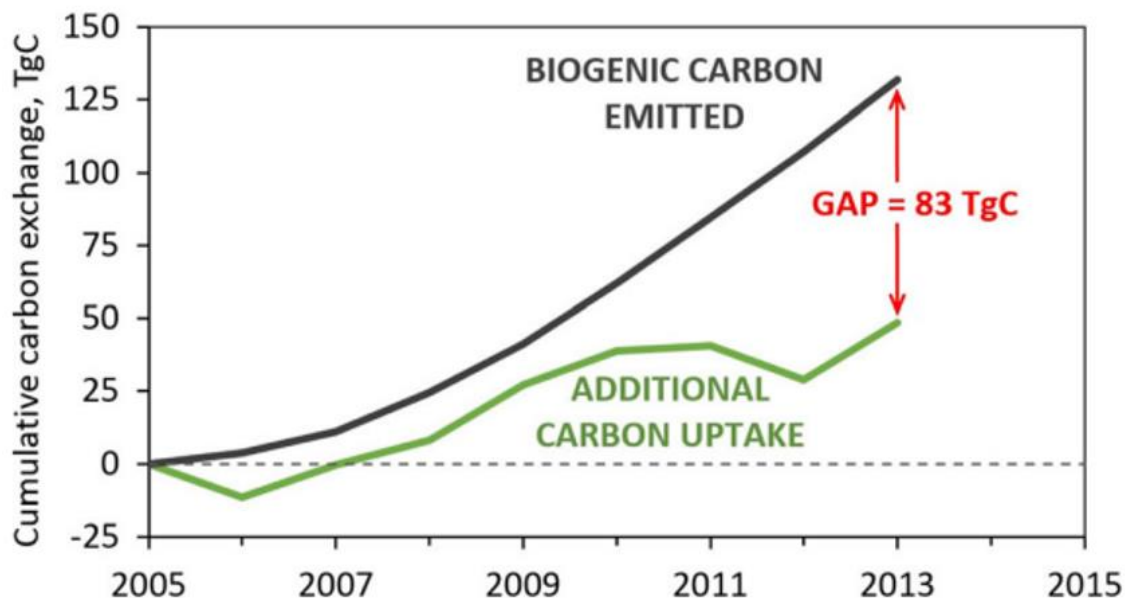


Figure 3.14. DeCicco’s analysis of cumulative carbon emitted by U.S. biofuel use compared to additional carbon uptake on cropland.

Critics of DeCicco’s study, including De Kleine and Mueller (De Kleine, Wallington, Anderson, & Chul, 2017; Mueller, 2016) contend that the ABC methodology has failed to establish meaningful correlations between existing biofuels policies and net carbon uptake, and that it does not include several important carbon pools in its assessment.

3.5 Summary of Carbon Balance Approaches

Each approach to accounting for biogenic carbon has strengths and weaknesses that could depend on the feedstock under consideration, process-related emissions, and the bio-product’s end use. The following summarizes the biogenic carbon accounting methods discussed herein.

The simplest approach to accounting for biogenic carbon in a bio-product is to assume the biogenic carbon neutrality, and ignore emissions caused by biogenic uptake or combustion/decomposition. This approach is the simplest to model while still giving providing accurate results over a product’s entire lifespan. Critics of the carbon neutral approach argue that the simplifying assumptions misrepresent the impact or timing of carbon emissions.

A variation of the carbon neutral approach, the biogenic uptake and credit approach (also called the totality of emissions approach), explicitly states the biogenic carbon flows. While this adds complexity to a model, it also allows for more detailed carbon accounting; carbon can be allocated to specific parts of a product’s life cycle, or to co-products in proportion to the amount of biogenic carbon stored or released.



Several time-based approaches exist. The Debt-then-Dividend approach (Walker, Cardellichio, Saah, & Hagan, 2013) posits that a bio-product is not considered carbon neutral until enough time has passed for new biomass to accumulate the same magnitude of carbon stocks as was contained in the bioproduct. This approach may be best suited for slow growing biomass, such as trees. The approach faces critics; critics argue that Walker et al's approach incorrectly isolates carbon sources and sinks instead of modeling biomass sources and sinks as complete systems.

3.5.1 Modeling Woody Biomass at Individual and Landscape Level

CORRIM and Argonne National Laboratory's studies take a different approach to Debt-then-Dividend by modeling woody biomass at both the individual tree level and the landscape level. This approach provides valuable insights into how assumptions about biomass regrowth and temporal biogenic carbon impact the lifetime carbon emissions of a bioproduct. However, this level of detailed analysis may not be necessary for all bio-products. The study concludes that the temporal accounting of biogenic carbon emissions is most critical when feedstocks have longer growth cycles and slower-growing rates. The results from this study are especially important for policymakers, as they highlight the need for nuanced approaches to biogenic carbon accounting to accurately assess the environmental impact of bioenergy systems.

3.5.2 Annual Basis Accounting vs. LCA

DeCicco's method of Annual Basis Accounting (ABA) is the final approach to biogenic carbon accounting discussed in this review, and is separate from a life cycle assessment. Using this system-wide approach in his 2016 study, DeCicco compared cumulative biofuel emissions, including biogenic emissions, to additional cumulative crop production over a specified time period. The benefit of this approach is that it provides a high-level understanding of how the biofuel system is performing in regards to net carbon balance. However, it may not be practical to implement for individual biofuel pathways.

3.6 Summary and Recommendations for GHG Accounting

In summary, the predominant precedent for biofuel policy is to model biogenic carbon based on a carbon neutral approach. The diversity of approaches to biogenic carbon accounting and lack of scientific consensus represents a challenge for incorporating such feedstocks into LCFS programs. The LCFS programs that do include biomass feedstocks assume carbon neutrality, either implicitly by ignoring biogenic carbon, or explicitly by accounting for offsetting biogenic carbon uptake and emissions. The carbon neutral approach, however, may not be appropriate for all biomass feedstocks, particularly those with longer growth cycles.

To date, CARB has not formally identified an approach to quantifying emissions associated with certain types of biomass residues, including those from wood and nutshells (Figure 3.15). The lack of such transparent guidance impinges the ability to plan and execute biofuel projects that can deliver alternative biomass residue fates for hard-to-decarbonize sectors such as sustainable aviation fuel. As a result, these types of biomass residues may continue to emit



GHG emissions associated with business-as-usual conventional fates, e.g., burning and decomposition, as uncertainty of their treatment in the LCFS increases perceived investor risk.

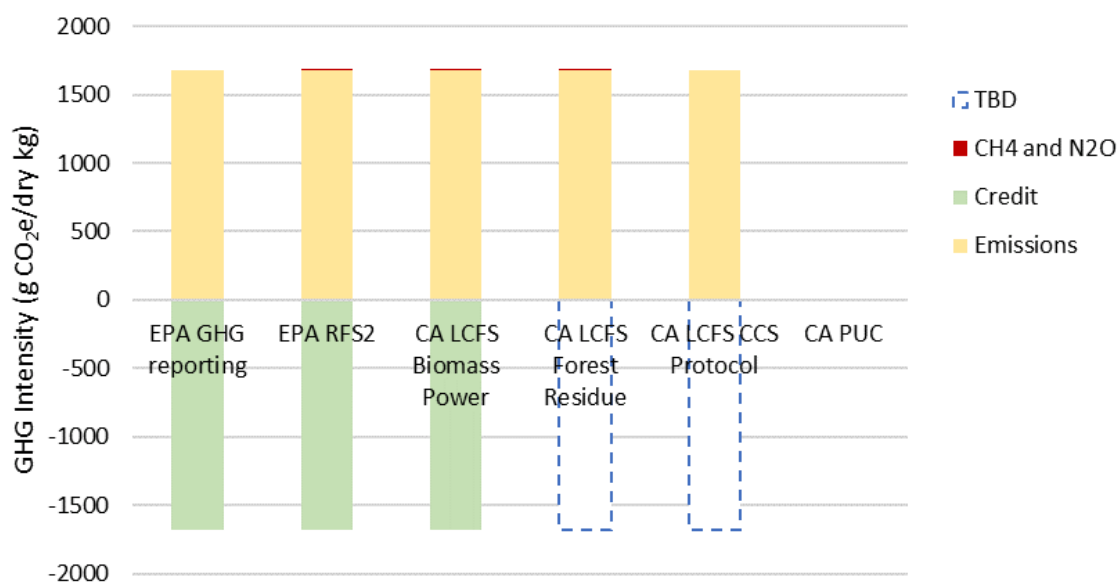


Figure 3.15. Status of federal and California biofuel policy.

In the meantime, the IPCC (IPCC, 2022) is warning, with high confidence, that global warming is likely to reach 1.5C between 2030 and 2052 if it continues to increase at the current rate, and California, and other regions of the world, are besieged by wildfires and impacted by burning and decomposition of biomass residues. In the Draft 2022 Scoping Plan, CARB acknowledges this urgency to take action to reduce reliance on fossil fuels and increase carbon sequestration. The specific issue of GHG accounting for woody biomass residues, however, has remained unaddressed since CARB published the *Detailed California-Modified GREET Pathway for Cellulosic Ethanol from Forest Waste* in 2009.

As presented in this summary of existing biofuel policies and modeling approaches, the carbon neutral approach to accounting for biogenic carbon is a simplified one. Clarification of biomass residue categories, and associated certifiable verification methods can provide information to support definition of biogenic carbon accounting methods for woody biomass and other residues not yet defined. Taking such action will provide policy certainty to support biofuel project developers, including those planning to produce sustainable aviation fuel. Therefore, we propose the following actions to advance progress on the policy treatment of biomass in the CA LCFS:

1. Establish clear categories for biomass types listed in Table 25;
2. Evaluate impacts of various alternative fates;
3. Assess feedstock verification options;
4. Develop mechanisms to assign GHG intensity for alternative fate of biomass.



Additionally, we propose a peer review of the abovementioned biomass accounting models to review the inputs, assumptions, and model implementation. Given that CARB has named the C-BREC model to characterize the amount and location of available forestry residues and affiliated criteria emissions in the 2022 Draft Scoping Plan update (CARB, 2022b), any peer review should begin with C-BREC. To further describe the treatment of biomass, CARB could consider sponsoring in depth workshops explaining model input and assumptions.



4. THE ALTERNATIVE FATE OF BIOMASS

Understanding the alternative fate of biomass is essential to completing a full life cycle assessment, and a framework for determining alternative fates is essential for CARB to provide guidance. In this section, the alternative fates of biomass explored. These alternative fates include decomposition through methods such as composting, aerobic and anaerobic decomposition, combustion through controlled burning or wildfire, and transformation into marketable products such as food, packaging, and chemical products (Figure 4.1).



Figure 4.1. Possible alternative fates of biomass.

Each category of biomass may have different optimal fates based on its specific properties and the intended end-use. For example, food waste may be best suited for composting or anaerobic digestion, while wood waste may be better utilized through combustion or transformation into wood products. After each alternative fate of biomass is introduced, the specific alternative fates of biomass are described based on the category, location, and farming or harvesting practices surrounding the biomass feedstock.

4.1 Decomposition and Natural Processes

The process of decomposition is a fundamental part of the cycling of organic matter in the ecosystem. When dead tissues from trees and other plants are left undisturbed for an extended period of time, they begin to undergo a natural process of decomposition. The primary decomposers of these dead tissues are fungi, which break down the woody materials into simpler organic forms.



Three major factors control decomposition: climate, quality of the litter, and the soil microbial and faunal communities, as shown in Figure 4.2. Other factors can be important such as soil pH and aeration but tend themselves to be influenced by the three main factors.

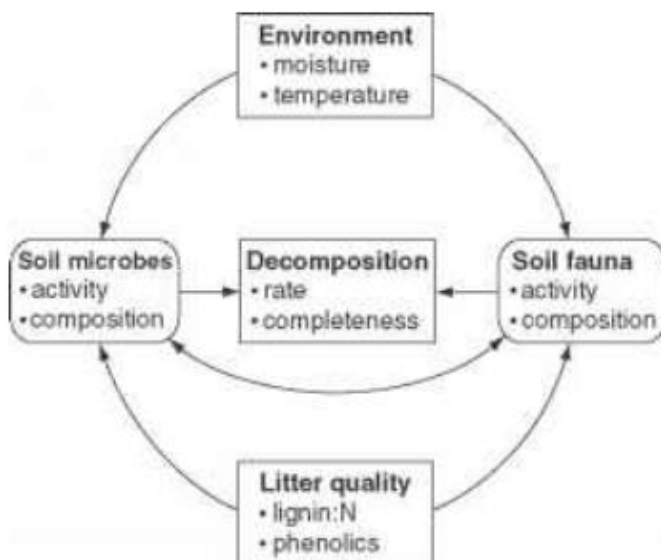


Figure 4.2. Factors that affect the decomposition time. Source: (Prescott, Maynard, & Laiho, 2000).

Decomposition of Agricultural Residues

The decomposition of agricultural biomass is influenced by various factors, including its chemical composition. A study conducted by the USDA in 2007 found that the rate of decomposition is impacted by the quality of the residue, microfaunal and soil conditions, and climate factors. Climate was found to be the best predictor of decomposition kinetics on a global scale, but within a specific climatic region, the chemistry of the biomass was determined to be the strongest predictor of decomposition kinetics. The process of decomposition plays an important role in converting biomass residues into soil organic matter, with the rate of decomposition determining the net increase in soil organic carbon (SOC) levels, which requires that inputs of carbon into the soil surpass carbon efflux (Johnson, Barbour, & Lachnicht, 2007).

Decomposition of Woody Biomass

Woody biomass undergoes a process that typically involves at least four stages of decomposition, illustrated in Figure 4.3. The first stage is a lag phase, where there is no weight loss or change in specific gravity. The length of this phase depends on the size of the substrate, with larger woody substrates generally having longer lag times. During phase 2, logs begin to weather and fragment, leading to leaching losses and microbial activity. In phase 3, there is rapid microbial mineralization and continued fragmentation. Finally, phase 4 is a stable phase



that is dominated by lignin decomposition. At this point, most coniferous logs consist of a mass of crumbly brown cubical rot (Edmonds, 1991).

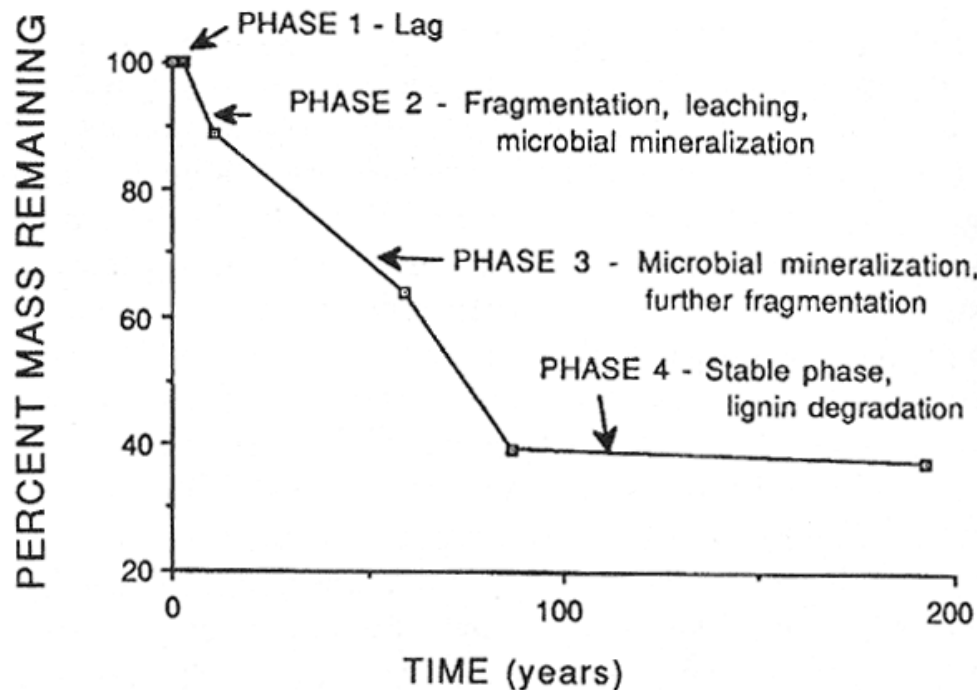


Figure 4.3. Woody biomass decomposition phases. Source: (Edmonds, 1991).

Composting

Composting is a form of decomposition that is intentionally facilitated to produce a rich soil for gardening or agriculture. During composting, microorganisms break down organic matter. Composting requires a mix of carbon-rich materials (such as dried leaves, sawdust, or shredded paper) and nitrogen-rich materials (such as food waste, grass clippings, or manure) to provide a balanced diet for the microorganisms.

Some biomass feedstocks are better suited for composting than others. For example, food waste is a candidate for composting because it is typically high in nitrogen and moisture, which provide ideal conditions for microbial activity. On the other hand, agricultural wastes such as straw or corn stalks are typically low in nitrogen and high in lignin, which are more difficult to break down and require specialized microorganisms. These types of wastes may require pre-processing or conditioning before they can be effectively composted.

Landfilling

Biomass may be disposed of in a landfill, where it may decompose. The rate of decomposition and the emissions that occur as the biomass decomposes depend on the location and



management strategies at the landfill. Biomass contained in landscaping residue and construction demolition debris may be landfilled if it is not composted.

4.1.2 Factors affecting decomposition

Decomposition is affected by physical and chemical factors as shown in Figure 4.4 temperature can be considered as a prime factor in the decomposition rate, other factors are the humidity, forest type and wood source. Soil properties are another factor that affect decomposition and include: texture, the most significant factor as it stimulates nutrient and water dynamics, porosity, permeability latitude and surface area. Major chemical properties include pH, cation exchange capacity, organic matter content and nutrients, and soil microbial activity.

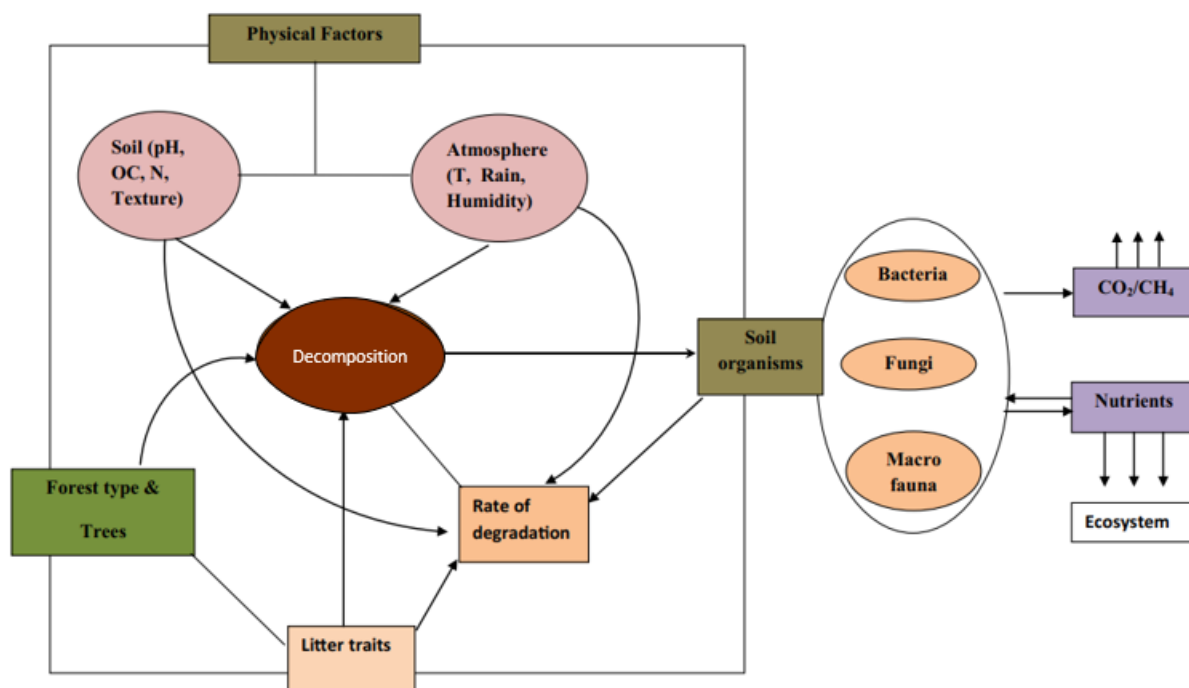


Figure 4.4. Diagrammatic representation of factors affecting biomass decomposition. Source: (Krishna & Mohan, 2017).

Other studies demonstrate that decomposition is affected by the quality of the litter and the concentration of phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), carbon (C), and Nitrogen (N). Litter with high concentration of phenolics (tannin and LIGN) and low concentration of N generally decomposed slowly (Lambers, Chapin, & Pons, 1998). Litter decomposition rates increased with N, P, K, Ca and Mg but decreased with C:N, LIGN and LIGN:N (Zhang, Hui, Luo, & Zhou, 2008).

Composting and Landfilling Emission Factors

Table 21 provides emission factors for wood waste under various management scenarios, including landfilling, composting, and unmanaged composting. The table compiles data from



several sources, including CARB, (Pier & Kelly, 1997; Amlinger, Florian, Peyr, & Cuhls, 2008; Pipatti, et al., 2006b). Notably, this table includes emission factors for unmanaged composting of woody biomass, which had not been previously calculated.

To estimate avoided methane emissions, we used the Tier 1 Biomethane-derived from Anaerobic Digestion of Organic Waste Calculator provided for the California Low-Carbon Fuel Standard (LCFS). The calculator estimates an overall emission factor of 277 grams CO₂e per wet kg for urban landscaping waste, based on values presented in Table 21. The emission factor range was derived from calculations from the CARB Tier 1 calculator, which considered emissions from landfilling and composting of urban landscaping waste and wood waste. However, it should be noted that the emission factors for residue piles from forest product mills are not actively managed and aerated.

Table 21. Composting and Landfilling Emission Factors for Wood Waste

Data Source	Material	Fate	Emission Factors g/AR kg			
			CH ₄	N ₂ O	CO ₂ e	Moisture (%)
(CARB, 2018c)	Wood Waste ^a	Landfilling, 75% CH ₄ capture	9.16	0.09	255.9	45%
	Wood Waste ^a	Managed Composting	0.82	0.09	47.3	45%
	Wood Waste ^a	64.1% Compositing, 35.9% landfilling	3.81	0.09	122.2	45%
	Wood Waste ^a	64.1% composting 35.9% Landfill 50% CH ₄ Capture	13.2	0.09	357.1	45%
(Pier & Kelly, 1997)	Forest Products Mill Waste	Waste Piles	78	0	1,950	62.9±1.1
(Amlinger, Florian, Peyr, & Cuhls, 2008)	Green Waste ^{ab}	Managed Composting ^{cd}	0.604	0.178	68	50%
(Pipatti, et al., 2006b)	Solid Waste ^{bc}	Range of Composting	10 (0.08 to 20)	0.6	429	60%
This Study	Woody Biomass	Unmanaged Composting	10	0.09	277	45%

^a CH₄ and N₂O emissions calculated from CARB Tier1 BDRD calculator. CO₂e emissions exclude the net emissions from stored carbon in the landfill (which does not apply to composting). The values are based on wood waste only with 45% moisture (excluding yard waste).

^bGarden and park sources

^cFood, garden, and park

^dIncludes aeration via regular mechanical turning



We utilized the midpoint of the IPCC emission factors for composting to estimate emissions and recommend their use in this design pathway. While managed composting may result in lower emissions, it may not be a feasible treatment option for all waste management scenarios. Conversely, studies have reported higher emissions from unmanaged sawdust piles (Pier & Kelly, 1997), with 7 times higher GHG emissions than assumed in this analysis.

4.2 Biomass Combustion

Biomass combustion is a process where organic materials, such as agricultural residues, woody biomass, and other forms of organic matter, are burned, resulting in the rapid release of heat energy, GHG emissions, and particulate matter (PM). This process can be intentional, such as pile burning of agricultural residues or forest thinning, or unintentional, such as wildfires caused by natural or human-induced factors.

In this section, we identify the emission factors linked to various types of biomass combustion and identify the biomass feedstock categories that are commonly associated with this alternative fate.

4.2.1 Wildfire

Forest biomass that is not utilized for bioenergy production is at risk of being burned during a wildfire, which is becoming a growing concern in many areas due to the increase in their size and frequency. The length of the wildfire season in the Western United States has increased by over 2 months, and the average annual area burned has doubled since the 1980s (Congressional Research Service (CRS), 2019). To mitigate this risk, reducing fuel loads in forests through thinning and other management practices, as well as utilizing forest waste for energy production, has been proposed.

Although wildfire is not considered in the LCFS, it is considered an alternative fate in this analysis as it displaces wood combustion. To assess the GHG emission reductions associated with biofuel production in comparison to combustion of woody biomass during wildfires, emission factors were established based on a literature review (see Table 22).

4.2.2 Controlled Burning

Controlled burning is the intentional combustion of biomass with the intent of managing agricultural or forestry systems. Here we describe two categories of controlled burning: agricultural pile burning and controlled burning for forest management and wildfire abatement.

Agricultural Pile Burning

Agricultural pile burning is a common practice used for vegetation management in various settings, including agricultural fields, orchards, rangelands, and forests. It is a useful method for removing crop residues left after harvesting grains such as hay and rice, as well as orchard and vineyard prunings and trees. Farmers also use pile burning to remove weeds, control pests, and prevent disease, particularly in crops such as rice and pears.



Despite its effectiveness, pile burning results in the rapid release of emissions and particulate matter, which can cause poor air quality in nearby communities. As a result, some California localities have implemented programs to limit agricultural burning. One such program is the "Alternatives to Burning" (ATB) program established by the San Joaquin Air Resources Board. The ATB program aims to eliminate agricultural open field burning by 2025 by reincorporating orchard removal residue back into the field through grinding, spreading, tilling, and ripping the wood residue back into the soil. Additionally, the program seeks to send the material to verified markets for beneficial reuse, including secondary uses such as landscape mulch, dust control, land spreading, Trex Decking, and soil amendments.

Forest Management and Wildfire Abatement

Prescribed burning is an intentional, valuable tool for fuel management forest and ecosystem restoration. It is a controlled application of fire to a forest to accomplish the objectives of a landowner or land manager (Grebner, Bettinger, & Siry, 2014). It could be used to assist in the development of a forest with a preferred species overstory, a midstory free of undesirable plant vegetation, and an understory composed of desirable herbaceous and woody plants (Grebner, Bettinger, & Siry, 2014).

The timing of a burn determines the plants which will be benefited and controlled, the impact on wildlife species, and safety. Most burns are conducted mid to late spring, or in the fall (Sargent & Carter, 1999). Before conducting a prescribed burn, firebreaks are created. A firebreak is an area that will contain a fire within its boundaries, for example a plowed or disced strip, reaching down to mineral soil, is the most common method of establishing a firebreak. Firebreaks can also be planted to grasses and clovers so they can provide key food and cover to wildlife; firebreaks should be at least 20 feet wide (Sargent & Carter, 1999).

Prescribed fires should be designed to meet the specified silvicultural objectives without negatively affecting off-site social values. The smoke produced by fires may not only be a nuisance for nearby communities but may also increase the risk of accidents on roads and harm poultry farms. Within the area being burned, prescribed fires can result in a short-term increase in mineral nitrogen in the soil surface and an increase in phosphorous, the level of which is a function of the duration and intensity of the fire (Galang, Morris, Markewitz, Jackson, & Carter, 2010). However, over time, prescribed burning can prevent or reduce accumulations of nutrient capital that would otherwise occur naturally (Grebner, Bettinger, & Siry, 2014).



Insect Infestation

Reducing loads of forest biomass may also prevent insect infestations in certain forests. Insect infestations (Collins, Rhoades, Battaglia, & Hubbard, 2012) and drought (Stephens, et al., 2018) have resulted in widespread tree mortality and caused concern regarding the associated increased fuel load and wildfire risk. Woody material in forests that are damaged due to factors including disease, insect infestations and extended drought can lead to considerable fuel loads that either decompose and produce carbon dioxide and/or methane and nitrous oxide, or are ignited through controlled burns or wildfires and emit a wider range of GHG and PM.

Biomass Combustion Emission Factors

Table 22 lists emission factors used in regulatory contexts (EPA, 1995; Jenkins, 1996; Argonne National Laboratory, 2022; CARB, 2018a), and otherwise reported (Akagi, et al., 2011; Springsteen, et al., 2011). Values representing the approximate median of the reported ranges of respective emission factor values are recommended for use in this design pathway: methane emissions reported for open pile burning (3 g CH₄/dry kg - Springsteen et al., 2011); and nitrous oxide emissions reported for temperate forest wildfire (0.16 g N₂O/dry kg - (Akagi, et al., 2011)).

Using the above methane and N₂O emission, an emission factor of 15,073 g CO₂e/MMBtu, HHV can be calculated (using 17.91 MMBtu/dry ton biomass). In an analysis for this study, a 50% burning rate was assumed as a conservative factor, reducing the emission factor used to 7,546.5 g/MMBtu. The methane, nitrous oxide and carbon dioxide emission factors listed in Table 22 include the fraction of smoldering emissions, in contrast to those produced from high temperature combustion in boilers. Emissions were estimated by converting the methane and nitrous oxide emission factors to a g/MMBtu basis, multiplying them by 100-year AR4 Global Warming Potential values (IPCC AR4, 2007), and summing those values.



Table 22. Biomass Burning Emission Factors

Data Source	System	Emission Factors g/dry kg			CO ₂ e C Neutral
		CH ₄	N ₂ O	CO ₂	
(Prichard, et al., 2020) ^a	Forest	4.294 (3.387 SD)	1.304 (0.839 SD)	1595.6 (166.2 SD)	495.942
(Argonne National Laboratory, 2019)	Sugarcane Bagasse	2.7	0.07	1660	88.36
(California Air Resources Board (CARB), 2018a) ^a	Straw Burning	2.7	0.07	1830	88.36
(CARB, 2016) ^b	Rice Straw	1.17	0.02	1830	35.21
(Urbanski, 2013) ^{a,c}	SE Conifer PF	2.32 (1.09)	0.16 (0.21)	1703 (171)	105.68
	SW Conifer PF	3.15 (0.91)	0.16 (0.21)	1653 (34)	126.43
	NW Conifer PF	4.86 (1.37)	0.16 (0.21)	1598 (39)	169.18
	Western Shrubland PF	3.69 (1.36)	0.25 (0.18)	1674 (38)	166.75
	NW Conifer Wildfire	7.32 (0.59)	0.16 (0.21)	1600 (19)	230.68
(Springsteen, et al., 2011) ^a	Woody Biomass, Open Piles	3	NA	1833	122.68
(Akagi, et al., 2011) ^a	Temperate Forest	3.92 (2.39)	0.16 (0.21)	1637 (71)	160.58
	Crop Residue	5.82 (3.56)	NA	1585 (100)	193.18
(EPA, AP-42, 1996) (EPA, 1995)	Conifer Logging				
	Slash, Piled	1.0 - 8.5 ^d	NA	NA	115
	Pile Burn	1.0 - 4.7 ^e	NA	NA	60
This Study ^f		3	0.16	Neutral	122.68

Values reported in brackets represent authors' estimates of observed parameter variation, unless otherwise specified as SD, standard deviation.

^a Reported range reflects the following combustion categories: flaming, fire, and smoldering

^b Based on (Jenkins, 1996); unit is % of fuel dry mass.

^c N₂O values listed are from (Akagi, et al., 2011).

^d Range reflects various conifer species

^e Reported range reflects the following combustion categories: flaming, fire, and smoldering

^f 3 g CH₄/dry kg and 0.16 g N₂O/dry kg represent the approximate median of the reported range. For the purposes of this study, the methane estimates from (Springsteen, et al., 2011), and (Akagi, et al., 2011) provided an estimate of the GHG intensity (15,073 g CO₂e/MMBtu, HHV) with the AR4 GWP factors.

4.3 Marketable Products

Biomass can be used in various marketable consumer products. The emissions associated with these products depend on the specific biomass, its end-use, and its disposal.



Agricultural biomass, such as corn, sugarcane, and soybeans, have a wide range of market uses, including food production such as produce, vegetable oils, and corn syrup. The emissions associated with these products vary, with some products having low emissions due to efficient production processes and others having high emissions due to energy-intensive processing or transportation.

Food waste and landscaping biomass can be composted, and the resulting compost can be sold as a marketable consumer product. Under CA State Bill SB 1383, jurisdictions are required to procure organic waste products, which can include compost for use on public property. Notably, procuring biobased compressed natural gas (CNG) for use in public vehicles is also acceptable under this regulation.

Woody biomass has traditionally been used for paper and cardboard products, with managed forests historically sending thinnings to paper mills for production. However, in recent years, markets for paper mills have not been successful, and foresters have not had a market for thinnings. This lack of market can result in higher emissions from disposing of the unused biomass, or in some cases, open burning of the material, which can have negative environmental and health impacts.

4.4 Alternative Fate by Biomass Category

Table 23 presents an overview of possible alternative fates for various types of biomass feedstock. For example, crops such as corn, sugarcane, and soybean could be utilized as agricultural products, either for direct consumption or as ingredients in food processing, if not used for biofuel production. Similarly, crop residues such as corn stover, sugarcane straw, and rice straw could be left for in-situ decay, used as animal feed, or employed for energy production if not used for biofuel production. Orchard prunings could be burned for energy production or left for in-situ decay, while lumber and farmed trees like willow and poplar could be utilized to produce commercial products like paper, pulp, and pellet fuel if not used for biofuel production.



Table 23. Biogenic carbon for commercial products feedstock categories, application, and fate

Feedstock	Possible Alternative Fate
Crops	Agricultural products
Crop residues	
Corn stover	In-situ decay; domesticated animal feed; energy production
Sugarcane straw	In-situ decay; burning; energy production
Nut shells	Animal feed, biochar; energy production
Rice Straw	In-situ decay; wildlife forage; burning
Orchard Prunings	Burning; energy production
Lumber	Commercial products
Farmed Trees	Paper, pulp, pellet fuel, energy
Energy crops	Biomass energy

Table 24 presents examples of alternative fates for different types of biomass feedstocks, along with their respective net carbon balances. For instance, forest pre-commercial thinnings and forest harvest residues can either be burned or stored, with burning leading to higher emissions and storage to lower emissions. In the case of sawmill residues, producing biofuels results in lower emissions than burning the material, while storing it has an even lower emission impact.

Table 24. Net carbon balance for waste and residue feedstock categories, application, and fate

Feedstock	Example Application and Fate	Higher Emission Alternative
Forest pre-commercial thinnings ^a	Decomposition, burning, Collateral burning	Storage
Forest harvest residues (slash)		
Sawmill residues ^b	Decomposition, burning	Storage
Municipal Sewer Waste	Landfilling, evolving composting and treatment systems.	Landfilling, evolving composting and treatment systems.
Urban landscaping		
Construction & Demolition		Particle board furnish
Tallow, UCO	Various disposal options Assumed decomposition of inedible products, various disposal options.	Boiler fuel, oleo chemical production
Landfill gas	Flaring assumed in LCFS	Power Generation

^a Includes limbs, tree tops, and cull trees (those considered to be unsuitable for the production of lumber or other dry wood products due to either decay, form, limbiess, or splits).

^b Include bark, shavings, chips, unfinished wood cuts, and hog fuel.



4.4.1 Forest Wastes and Residues

Standing trees exist in both managed and natural forests and on tree farms. The alternative fate is dependent on the forest type and forestry practices.

Managed Forests

Managed are an important source of timber products, providing a renewable resource for construction, paper, and other wood-based industries. These forests are carefully planned and maintained to ensure sustainable and responsible use of the resource.

Managed forests operate on rotation periods. This is the length of time between harvesting trees in a given area. The specific length of the rotation period depends on factors such as tree species, local climate, and market demand for timber products. For example, a rotation period for a fast-growing species like pine might be 25 years, while a slower-growing species like oak might have a rotation period of 50 years or more. During this time, the forest is allowed to regenerate, with new trees growing to replace those that have been harvested.

During the harvesting process, there is often leftover material such as branches and tops of trees, which is called slash. Slash can be left on the ground to decompose naturally, which can help to improve soil health and promote new tree growth. Alternatively, it can be chipped or ground into small pieces and used as biomass for energy production. This can help to reduce reliance on fossil fuels and promote the use of renewable energy sources.

Thinnings are another important aspect of managed forests. As trees grow, they compete with each other for resources such as sunlight, water, and nutrients. Thinning involves selectively removing some trees from a forest to reduce competition and promote the growth of the remaining trees. Thinnings can be used for a variety of purposes, including pulpwood for paper production or sawlogs for lumber. In addition to promoting healthy forest growth, thinnings can also provide a source of revenue for forest owners.

Natural Forests

Natural forests can be managed to mitigate risks such as wildfire and insect infestations through the harvest of biomass. The practice involves removing excess vegetation, such as small trees and brush, from the forest floor. This reduces the amount of fuel available for wildfires and also helps to prevent insect infestations by reducing the amount of available habitat for insects.

The biomass harvested from natural forests can be used for a variety of purposes, including the production of wood chips, pellets, and biofuels.

Farmed trees

Softer woods such as poplar, willow and pine, and smaller diameter material are typically sourced from tree plantations for pulp and paper products and for power production, although biomass power demand is declining relative to the growth of other renewable sources. By



design, tree plantations are meant to be actively managed and harvested, and lack the diverse structure and function of natural forests. Left unmanaged, these plantations can become overcrowded, creating high fuel loads and risk for disease and fire. Left unburned in-situ, dead woody biomass decomposes, producing carbon dioxide in an aerobic environment and methane and nitrous oxide in an anaerobic environment. The alternative fate to paper products is associated with the impact of indirectly effecting the conversion of land to tree farms.

Sawmill Residue

Lumber mills produce saw dust and residues remaining from milling trees for lumber products. Sawmill residues include bark, stems, shavings, chips, unfinished wood cuts, and sawdust that are produced from a commercial mill, and hog fuel that are byproducts of milling saw logs. These woody waste products generally do not meet EISA RFS requirements as feedstocks for renewable fuel production as their source cannot be traced back to the initial harvesting site and therefore cannot be proven to be from forest land meeting EISA 2007 requirements. Typically sawmill waste is not sent to landfills due to the increasing cost associated with tipping fees, as well as states like California¹⁰, with mandates limiting the percent of organic material allowed in landfills. The material decomposes through several mechanisms, including by application as wood chips for landscaping, as landfill cover, while stored in feedstock piles at power plants, and when integrated into compost.

4.5 Southeastern U.S. Forest Biomass

Understanding Managed Forestry in South

The importance of forestry in the Southeastern U.S. cannot be overstated, and the success of forestry in The Southeastern U.S. today was not inevitable. In the early days of logging, forests were exploited, leaving the state with millions of acres of barren lands. Today, Southeastern U.S. forests are diverse and plentiful. Exploitation is no longer a viable option for a sustainable timber business, and instead the timber industry has become a major factor in replenishing and increasing forest yield throughout Louisiana.

Threats to South Eastern U.S. Forests

Maintaining and growing forests in the Southwest does not come without challenges. In 2020, the state of Louisiana published a Forest action plan to assess the current state of forestry and identify key threats. In the report, three primary threats are identified (Greene & Brasher, 2020):

- Lack of active management on private lands,
- Challenges to forest health, and
- Challenges facing wildland fire management.

¹⁰ CA Senate Bill 1383, effective January 1, 2022



Active management of private lands, is inextricably linked with the other challenges faced. For example, lack of appropriate forest management has led to a buildup of fuels that can increase the risk of wildfires. Additionally, poor forest management can result in the spread of many forest insects and diseases (Greene & Brasher, 2020).



Figure 4.5. An older pine tree splitting and breaking due to fungal infection. Photo courtesy of David J. Moorhead, University of Georgia, Bugwood.org.

The Role of Thinning in Maintaining Healthy Forests

Selectively cutting trees, or “thinning,” is integral to maintaining the health of managed forests. Wildlife biologist have long recognized that thinning pine timber stands can increase forest health. When a forest is thinned, space between the trees allows sunlight to reach the ground, stimulating plant growth and allowing for rich biodiversity on the forest floor. Additionally, thinning can remove diseased or damaged trees that are competing with healthy trees, allowing the healthy trees to thrive. In an ideally managed forest, stands would be thinned to allow for 60 percent of the ground to be in direct sunlight at noon (Georgia Department of Natural Resources). Failure to thin trees results in the following:

- **Tree death.** Because the trees are competing for sunlight, water, and nutrients, failure to thin them will ultimately result in self-thinning. Trees stressed due to lack of resources are more susceptible to disease and insect infestation. Many or all the trees within a timber stand may die. None of the trees will grow to a height or diameter sufficient for economic removal for lumber production.



- **Increased risk of insect infestation.** Insufficient resources for the trees make them more susceptible to insect infestation, especially Southern Pine Beetles (SPB). Thinning stands is an established best practice to reduce risk of beetle infestations (Hahne, 2021).
- **Increased risk of disease.** Thinning not only removes rows of trees, but selectively removes diseased trees, reducing the risk of spreading disease to other trees (Dickens & Moorhead, 2015).
- **Increased risk of wildfire.** Thinning provides increased separation of trees and reduces the risk of trees catching fire.
- **Decreased wildlife.** Under forest growth positive for wildlife. “Wildlife biologists have recognized the value of thinning pine timber stands for wildlife management for a long time. The benefits to wildlife are derived from opening a closed tree canopy to allow sunlight to reach the ground. The sunlight stimulates plant growth and produces an abundance of various food and cover plants valuable to wildlife (Georgia Department of Natural Resources).

Alternative Fate of Managed Forest Waste in the Southeastern U.S.

The fate of managed forest waste sourced in the Southeastern U.S. depends on if the waste comes from slash or thinnings.

Pulpwood Markets & the Health of Managed Forests

Foresters and wildlife biologists agree that thinning managed forests results in healthier trees, more biodiversity, and a more productive forest.

When paper mills were active in the Southeastern U.S. region, foresters sold trees cut during thinnings as pulpwood for paper production. However, in the past several decades paper production has halted in the region, and there is no longer a market for pulpwood.

Without a market for the pulpwood, many foresters choose not to thin. The consequences of this are directly tied to the threats to forests outlined in Louisiana’s forest action plan.



Slash is the residue, including treetops, branches, and bark, left on the ground after logging or accumulating as a result of a storm, fire, delimbing, or other similar disturbance. These materials are produced during both thinning operations, and in the final harvest prior to replanting. The amount of slash as a percentage of the total harvest for plantation pine forest is estimated to be 20%. When there is not a market for slash, it is distributed across the forest floors, or used in the logging trails to improve traction in wet weather. Typically, the forest residues are fully decayed within 1-2 years.



Figure 4.6. Thinning piles near Columbia, LA

Thinnings, as described in the previous section, are reductions in the number of trees within a timber stand that done to enhance the growth of the remaining trees within the stand (Figure 4.6). Due to lack of demand for pulpwood within the project region, substantial amounts of thinnings are stacked at the edge of the timber stand and allowed to decay. Foresters estimate that about 10% to 20% of the thinnings in the region are left to rot.

In either scenario, the biomass piled or left on the forest floor will release biogenic carbon dioxide, methane and nitrous oxide into the atmosphere. For biomass that left on the forest floor, the rate of decomposition affects how quickly emissions occur. This rate of decomposition will be dependent on a number of factors, including temperature, precipitation, altitude, latitude, and different biological and mechanical degradation processes. With increasing temperature, precipitation, and biological vectors, decomposition will increase (Dai, 2021). Given these factors, slash on forest floors would decompose faster than slash in a typical California forest. In typical forest, slash left on the forest floor will decompose within one to two years. In this scenario, a managed forest will be a net source of GHG emissions (Clark, Gholz, & Castro, 2004). Therefore, converting slash from managed forests into fuel can offset fossil fuel use, and be a net positive for short-term climate goals (McKechnie, Colombo, Chen, Mabee, & McLean, 2011).



Both models and observations show that proper forest management can increase carbon sequestration and improve tree health. However, without markets for forest wastes and residues, private landowners cannot afford to adequately manage their forests. The results are (a) dense forests that stunt tree growth and promote disease spread, or (b) the accumulation of forest wastes that will rot, emitting CO₂, CH₄, and N₂O.



Slash

- Scattered throughout forest floor to rot



Thinnings

- Mismanaged or stacked and left to rot

For the purposes of complying with statewide low carbon fuel regulations, the net GHG balance of using forests wastes and residues as a transportation fuel compared to conventional fuel must be quantified. Given that (1) land management activities, such as thinning, result in increased carbon sequestration, and (2) wastes and residues produced during thinning would be left to emit all of their biogenic GHG back into the atmosphere, it could be argued that some forests wastes and residues are carbon negative.

While quantifying the precise amount of additional carbon sequestered due to active forest management remains a challenge, assuming carbon neutrality is a conservative approach. Many life cycle assessment programs, models, and studies treat biogenic carbon in biomass from various sources as carbon-neutral.

Through photosynthesis, trees fix carbon from the atmosphere as they grow. When trees are harvested or die, the woody biomass decays or combusts, and an equivalent amount of carbon is released to the atmosphere. Thus, over an entire life cycle, such biomass can be considered carbon-neutral.



This is fitting with current approaches to corn accounting in LCFS programs. While corn is grown and harvest on shorter time scales than forest residues, the resulting carbon balance is better for managed forestry than for corn farming. As shown in Figure 4.7, harvesting biomass initially decreases the amount of carbon stored in the forest biomass, but when the forest regrows, it will sequester more carbon than without thinning. The slash left behind from thinning operation would otherwise decompose on the forest floor, and thus emissions would occur regardless of if they are used for transportation fuel or not. Both are consistent with carbon neutral carbon accounting.

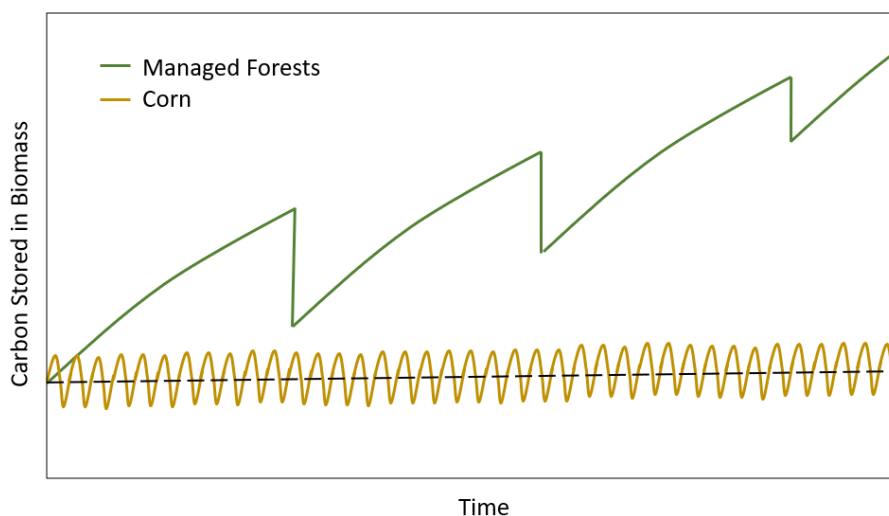


Figure 4.7. Fluxes in carbon stored in biomass for managed forests and corn grown for energy use.

4.6 Orchard Prunings

Fate of Agricultural Waste in the San Joaquin Valley

The San Joaquin Valley in California has developed a program called Alternatives to Burning (ATB) to reduce agricultural emissions. The program aims to eliminate open-field burning by 2025 and has two goals. The first is to incorporate orchard removal residue back into the field by grinding, spreading, tilling, and ripping the wood residue back into the soil. The second is to send the material to verified markets for secondary use, such as landscape mulch, dust control, Trex Decking, and soil amendments. The program financially subsidizes the growers or landowners to comply with the program, but uses of agricultural residue involving combustion or gasification of biomass resulting in emissions are non-compliant and are not incentivized.

Agricultural wastes in the valley often end up in residue piles. There are no designations or GPS mapping of existing residue piles, and they are not tracked. However, the Almond Board and agricultural agencies track removals annually to document the number of acres planted, removed, and in production. The current biomass residue has no economic value in the field or at processing/recycling yards based on existing market conditions, and its value depends on its production to the consuming markets' specifications and designated transport.



The outlook for selling residues in the present California biomass residue market is mixed. The existing biomass power producer biomass market is still the highest volume market, but the ability to sell at a monetized value has diminished due to the closures of biomass power-producing facilities and downward price pressure. The biomass market desperately needs a regulatory strategy and long-term consuming markets to support the abundant supply of residue.

Fate of Woody Biomass in California Forests

Excess biomass in California's forests can lead to an increased risk of forest fires due to the accumulation of dead and dry plant material. The buildup of this fuel source can create a highly combustible environment that is more susceptible to ignition from natural causes like lightning strikes, as well as human activities like campfires and fireworks. In addition, the excess biomass can provide a continuous source of fuel for fires, making them more difficult to control and extinguish. Figure 4.8 shows a forest incinerating near Midpines.



Figure 4.8. A forest burns near Midpines, northeast of Mariposa. Photograph: David McNew/AFP/Getty Images.

One way to mitigate the risk of forest fires caused by excess biomass is through active forest management practices, such as fuel reduction treatments. These treatments involve removing excess biomass through prescribed burning, mechanical thinning, and other techniques. By reducing the amount of dead and dry plant material in the forest, the risk of ignition and the severity of potential fires can be significantly reduced. In addition, fuel reduction treatments can also help promote forest health by increasing the availability of nutrients and reducing competition among trees.

Currently, there are limited markets for biomass removed from forests, which hinders the ability to effectively mitigate wildfire risk.



5. EMISSIONS FROM BIOMASS COLLECTION AND USE

The life cycle inventory (LCI) data in the GREET model provides valuable insights into the energy and emissions involved in the biomass life cycle, including crop growth, transportation, land use changes, fertilizer production, and combustion. The LCI data is organized as arrays of energy use and emissions values, which can represent either a single process fuel or feedstock or aggregated fuel cycle results.

By combining process-specific input parameters and downstream loss factors with the LCI data, organizations can use the information to model new fuel pathways and estimate emissions associated with different biomass feedstocks. This allows for effective comparisons of emissions from different fuels or feedstocks.

The LCI data in GREET is kept up-to-date with the latest scientific knowledge and advancements in biomass production and use, making it a reliable source of information on the emissions associated with biomass transportation and harvest.

However, it is important to also consider the alternative fate of biomass, which refers to the scenario in which it is not used for energy generation. This factor plays a critical role in determining the overall emissions associated with biomass use and, despite its significance, is poorly understood.

To get a complete picture of emissions from biomass utilization, it is crucial to take both the LCI data and the alternative fate of biomass into account. A comprehensive cradle-to-gate life cycle assessment can provide a more comprehensive evaluation of emissions from biomass by considering both of these factors. This paper seeks to provide a better understanding of the alternative fates of the several categories of biomass described in Section 2.

The emissions of CO₂ are found in every step of biomass process (From farm to gate); however, each type of biomass include different levels of emissions. In the following table you can find a summary between energy crops and residues emissions and the section where you can read more details about it in the report.



Processing Stage	Residues	Energy Crops	Report Section
<u>Farm to Gate</u>			
Felling	x	x	Section 5 and 5.3
Chipping	x	x	Section 5.3
Fertilizer		x	Section 5.2
Fertilizer N ₂ O		x	Section 5.2
Transport	x	x	Section 5.2
<u>Avoided Emissions</u>			
Burning	x		Section 4.6
Decomposition	x		Section 4.5
Collateral burning/effects	x	x	Section 4.6
Indirect Land Use		x	Section 2.2

5.1 Biomass Collection

Biomass collection and transportation play a crucial role in determining the carbon emissions associated with biomass energy production. The manner in which biomass is collected and transported can significantly impact the energy inputs and emissions generated during the process. The collection of biomass can take several forms, including harvesting crops and residues, collecting forest residues and thinnings, or gathering waste streams. The type of biomass and the method of collection play a role in the carbon footprint of the final energy product.

Transportation of biomass from the collection site to the processing plant is also a significant contributor to the carbon footprint of the energy production process. Long-distance transportation, particularly by truck or train, can result in significant emissions due to the energy consumption of the vehicles. Additionally, the energy used to dry the biomass for transportation can also result in emissions.

The collection method it would depend of the final use of the product or residue. However, the common factor in all the methods is the use piles to collect any waste initially before any other action. Table 25 presents a summary for collection methods in various types of biomass from different sources as farming residues, forest products and residues and urban landscaping.



Table 25. Biomass Types and Collection Methods

Biomass Types	Biomass Collection Methods
Farming Residues	
Crop Residues	The conventional baling system produces rectangular bales that measure approximately 14 in. x 18 in. x 50 in. and weigh 35 to 100lb (Dauve & Flalm, 1979).
Corn Stover	One-pass stover harvest is performed now for silage, so collecting the grain and stover when the grain dries to 24% or lower and the stover is still high in moisture is feasible (Atchison & Hettenhaus, 2004).
Sugarcane Straw	The straw left on the ground is collected and shredded by a self-propelled forage harvester, loaded onto trucks and transported to the mill separately from the cane (Carvalho, Veiga, & Bizzo, 2017).
Nut Shells	Usually, the nut shells are pelletized or torrefied, that is, they are collected in piles and transported to the final use (Noszczyk, Dyjakon, & Koziel, 2021).
Rice Straw	Could be collected by the use of conventional baling equipment to make two or three-wire rectangular bales. Buck rakes to make large piles of residue. Field cubing equipment. Field chopping equipment (Kadam, Forrest, & Jacobson, 2000).
Forest Products and Residues	
Energy Crops	The biomass is felled by a feller/buncher before the conventional harvest to get it into piles to be transported to the final facility.
Lumbermill waste	Collected in bins or containers stations organize by different sizes and shapes (Woodweb, 2022).
Forest Thinnings	Piles disposal for thinnings mostly small diameter thinning (Page-Dumroese, Busse, Archuleta, McAvoy, & Roussel, 2017).
Forest Slash	Slash piles are currently used as the preferred method for residue disposal. The piles can be burned at various times of the year, offer a larger margin of safety (Page-Dumroese, Busse, Archuleta, McAvoy, & Roussel, 2017).
Urban Landscaping Residues	Some cities utilize a “Master Composter” where the municipalities provide low-cost compost bins. The schools have a red bin to these residues (Schoolmaster, S., & Hudak, 2000).
Construction & Demolition waste	Usually, these residues are collected in trucks to be transported to their final destination.



Life cycle inventory (LCI) data can provide valuable information on the energy inputs and emissions associated with the collection and transportation of biomass. The LCI data in the GREET model (Greenhouse Gases, Regulated Emissions, and Energy use in Transportation) provides information on the energy and emissions associated with various stages of the biomass life cycle. The LCI data can be used to model new fuel pathways and compare the emissions of different biomass types. The LCI data in GREET is based on the latest scientific knowledge and is updated regularly to reflect the latest advancements in biomass production and use.

5.2 Material Flow

Material flow refers to the movement of materials, such as biomass, through different stages of the production and consumption process. In the context of biomass collection and use, material flow encompasses the physical and logistical aspects of obtaining, transporting, and converting biomass into useful energy and products. Understanding material flow is critical in evaluating the carbon emissions associated with biomass utilization, as the emissions generated at each stage of the flow will affect the overall emissions of the entire life cycle.

In terms of biomass collection, material flow begins with the harvesting of the feedstock, whether it be forest residue, agricultural waste, or purpose-grown energy crops. The type of harvesting equipment used will impact the energy required and emissions generated, as well as the quality of the biomass produced. For example, the use of commercial scale logging equipment may increase productivity and safety, but also increase the potential for residual damage to the environment. On the other hand, traditional chainsaw methods may cause less damage, but may not be as efficient.

Once the biomass is harvested, it is typically chipped on-site to reduce the size and make it easier to transport. The biomass is then transported to the processing facility or energy plant. The mode of transportation can have a significant impact on the emissions generated, as the distance and type of vehicle used will affect fuel consumption and emissions.

At the processing facility, the biomass is converted into energy or further processed into other products, such as biofuels or pulp and paper. The energy requirements and emissions generated at this stage will depend on the type of conversion technology used, as well as the quality and composition of the feedstock. For example, using advanced technologies such as gasification or pyrolysis can reduce emissions compared to traditional combustion technologies.

GHG emissions for woody biomass and agricultural residues

As mentioned before, the emissions from biomass will depend on its management method, the technology used, transportation, and its final use.

Figure 5.1 compares GHG emissions for four different woody biomass sources and an agricultural source, in Ethanol production.



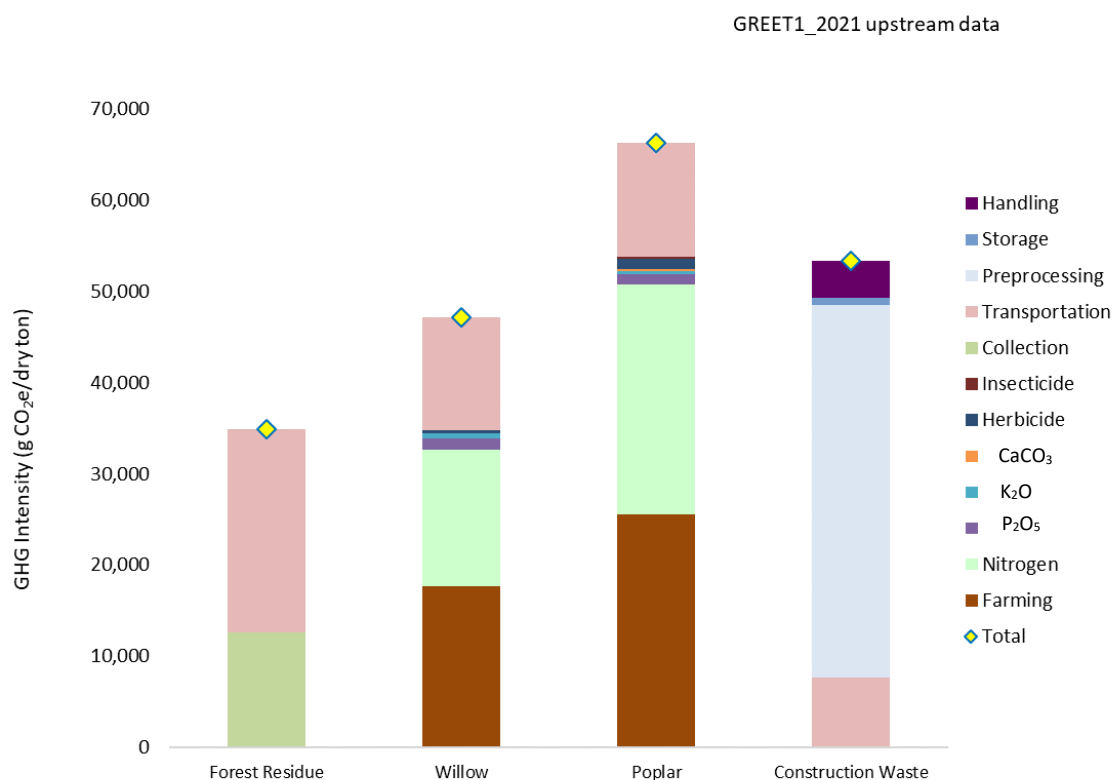


Figure 5.1. GHG Intensity for biomass depending on energy inputs and transportation logistics. GHG emissions correspond to 40% to 51% carbon in biomass.

As is noticed in Figure 5.1 the GHG emissions evaluated include collection, transportation, farming, fertilizer, herbicide, insecticide, handling, pre-processing, and storage when it is applicable using the GREET 2021 upstream data.

As it is shown in Figure 5.1 the emissions for woody biomass are between 35,000 gCO₂/dry ton (Forest Residues) and 66,000 gCO₂/ton (Poplar), in the case of construction waste are around 53,000 gCO₂/ton. Zhang et al. showed that the emissions for woody biomass in their study are between 23,000 gCO₂/ton and 56,000 gCO₂/ton (Zhang , Johnson, & Wang, 2015; Sonne, 2006); another study presented the emissions from woody biomass is 40,000 gCO₂/ton, however this study was focus on Michigan, that could means the distances in that study can be shorter than in California generating less emissions in transportation (Handler, Shonnard, Lautala, Abbas, & Srivastava, 2014).

Transportation is one of the factors that released an important quantity of emissions, at least for construction waste, willow, and poplar which represent between 14% to 26% of the emissions. These results are congruent with the percentage of transportation emissions presented in Xu et al. study where transportation represent between 12.1% to 34.4% of the emissions for forest (Xu, Latta, Lee, Lewandrowski, & Wang, 2021). However, for forest residue



the percentage of emissions for transport is around 64%, in this case the emissions from transport are higher because for woody biomass the transportation is usually done in trucks which could increase a little the emissions; Sonne's study for woody biomass, transportation represented 69% of the emissions, which is not very far from the result from greet (Sonne, 2006). It is important to highlight that transportation emissions depend of the method on transportation and the distance between the farm or land to the facility and all the studies mentioned before have different locations.

The collection for forest residues represents around 36% of the emissions. Zhang's study in Michigan found that the emissions for harvesting of forest biomass supply were 17.4 kgCO₂/ton; and for forest residues, in Figure 5.1 the collection is around 12.50 kgCO₂/ton, representing a better scenario (Zhang , Johnson, & Wang, 2015). As it was expected, collection is less GHG-emission intensive for forest residue than for the farm-based feedstocks because we assume forest residue is a waste product. The allocation method and type of timber harvesting operation assumed could both have significant implications for the overall life cycle impacts derived from forest residues (Hsu, et al., 2010).

Particularly for willow and poplar, nitrogen and farming are notorious sources of the emissions. This result is congruent because they are feedstocks which actually include the farming into the boundaries of study. Carbon is found in all living organisms and is the major building block for life on Earth. Carbon exists in many forms, predominately as plant biomass, soil organic matter, and as the gas carbon dioxide (CO₂) in the atmosphere and dissolved in seawater. Carbon can remain stored for a long time, or be quickly released into the atmosphere (Schlesinger, 1999). In the cases of willow and poplar, all the carbon that is in the plant is released in the atmosphere during the harvesting, representing between 37% - 39% of the GHG emissions which is between the range of emissions presented for others studies, for example, Handler et al. showed that the farming emissions factor represented between 32% and 44% of the emissions, however in those cases they included the harvest and timber as part of the farming, which may slightly increase emissions (Handler, Shonnard, Lautala, Abbas, & Srivastava, 2014; Sonne, 2006).

Moreover, nitrogen represent between 31% and 38% of the emissions for willow and poplar, which represent a logical result because nitrogen is one of the most common fertilizers used for plants since it can move around the plant supporting plant growth (Phoslab, 2013). The rest of fertilization and herbicides contribute around 0.2% - 2% in the emissions.

Last but not least, around 1% of the emissions for constructions waste is the storage. Generally, the residues from construction get stock for a period of time in piles before to be transported to their last use, and this produce an important generation of emissions.

5.3 Woody Biomass feedstock

Wood pellets are a renewable energy source derived from compressed sawdust or other forms of wood waste. They are commonly used for heating and energy generation purposes, and their



popularity is growing as a result of the increased focus on renewable energy sources. The production of wood pellets requires a significant amount of energy inputs, including the energy used in harvesting and processing the raw materials, transportation of the materials, and energy required to produce the final product.

Logging and Feedstock Collection

The wood harvesting process typically involves felling trees using chainsaws or mechanical felling machines and moving the logs to a central location (skidding). The equipment used for these activities typically runs on diesel fuel. The choice between using chainsaws versus commercial scale logging equipment depends on the evaluation of factors such as productivity, safety, and potential for residual damage, particularly in heavily forested regions.

The portion of the tree that is converted to biomass feedstock is chipped on-site and then transported for further processing for biomass energy or pulp/paper operations. The handling and chipping of the remaining portions of the log that are not converted to lumber also requires energy input, with a preliminary estimate being the same as that for forest residue. The alternative fate of lumber mill residues, such as storage in debris piles, may also require energy and should be considered in the evaluation of biomass utilization emissions.

For this study, several sources were consulted to estimate energy inputs for collection of woody feedstocks. Table 26 lists values from the GREET model and those derived for this Study. Considerations for the latter category include the following: since feedstock to lumbermills is already transported for that purpose, the emissions associated with feedstock transportation are zero.

Table 26. Diesel Consumption for Collection of Woody Feedstocks

Biomass Type	Btu/BD^a ton	gal/AR^c ton	MC^b	gal/BD ton
<u>Source: GREET</u>				
Willow	185,000	1.44	30%	2.06
Poplar	268,597	2.09 ^d	30%	2.99
Clean Pine	144,177	1.12	30%	1.60
Forest Residue	132,180	1.03	30%	1.47
Logging Residues	188,829	1.37	50%	
Forest thinnings	292,706		50%	
Construction & Demolition Waste	408,068	3.18	15%	3.74
<u>Source: Derived in Study</u>				
Lumber Mill Waste	0	0	40%	0

^aBone dry, i.e., zero-percent moisture.

^bMoisture content in GREET is inferred from truck cargo capacity, which is stated on a BD-basis; MC sourced from Unnasch and Buchan, 2021.

^cAs-received

^d Compare to 1.37 gal/AR ton in (Zhang , Johnson, & Wang, 2015).

The energy inputs for wood pellet production are a crucial aspect of the life cycle analysis of this energy source. The energy requirements specified by Kingsley for processing forest residue are approximately double the values estimated by GREET for forest residue (Kingsley, 2008). However, Kingsley's estimates for forest product mill waste are consistent with those in the GREET database for clean pine and willow. The main energy inputs for the life cycle analysis are



diesel fuel for the harvesting, collection and transportation of feedstock. In modern pellet mills, electric-powered motors are used to operate the mechanical equipment, while yard equipment is powered by diesel. The drying process during the pelletizing process requires energy and is typically provided by natural gas or biomass. The energy inputs for pelletizing operations are therefore a combination of diesel fuel as shown in Table 27, electricity, and biomass or natural gas.

Table 27. Diesel Inputs for Forestry Harvesting and Estimates for Lumber Mill Operations

Activity	Forest Residue	Forest Products Mill Waste	Units
Felling & Skidding	0.6	0	gal/AR ton
Landing, yarding, sorting, handling	0.25	0.25	gal/AR ton
Chipping	0.42	0.42	gal/AR ton
Totals	1.27	0.67	gal/AR ton
	2.31	1.22	gal/BD ton
	294,326	155,274	Btu/BD ton

Source: Kingsley, 2008. Numerous assessments examine diesel inputs, for example, see: Zhang, 2015; Northwest Advanced Renewables Alliance, 2016; Whittaker, 2016; Martinkus, 2017; and ANL, 2019.

The moisture content of the biomass feedstock is a significant factor in determining the energy inputs for wood pelletization, Figure 5.2. The production process requires energy to dry the feedstock to the acceptable level for pelletization. The feedstock is stored on-site before pelletization and tends to lose some moisture during this storage period. Additionally, drying energy is applied to further dry the feedstock to the level required for the pelletization process. It is estimated that 1,800 Btu (HHV) per pound of water removed is required for this process. The pellet production process is assumed to be the same regardless of the type of feedstock used.

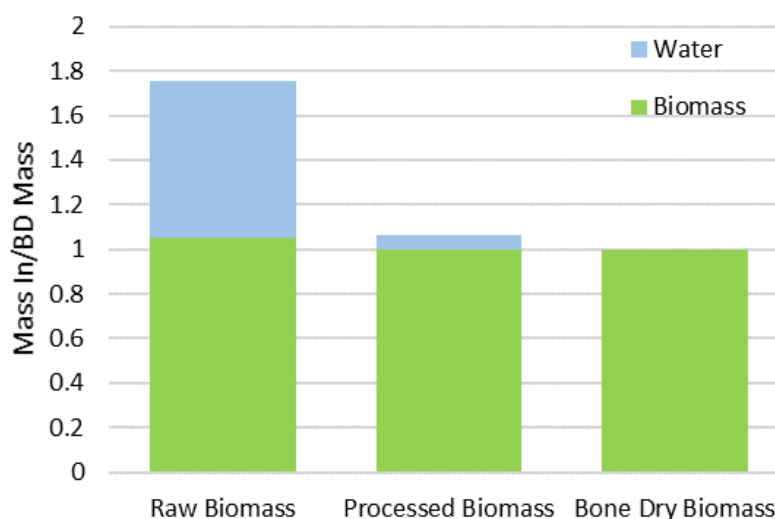


Figure 5.2. Relative moisture content of different states of woody biomass.





6. WELL TO WHEEL LIFE CYCLE ANALYSIS OF BIOMASS

The GREET model considers several biomass feedstocks including forest residue and farmed trees. The analysis described below is for the disaggregated well-to-wheels life cycle emissions of several biomass types to renewable diesel or hydrogen compared to conventional fuels.

Lumbermill residue would result in lower energy inputs for collection than forest residue. Farmed trees are not an expected feedstock. Waste biomass is also a potential feedstock. The collection and chipping energy for waste biomass is generally higher than that of energy crops. For the analysis here, energy inputs for forest residue in GREET were assumed.

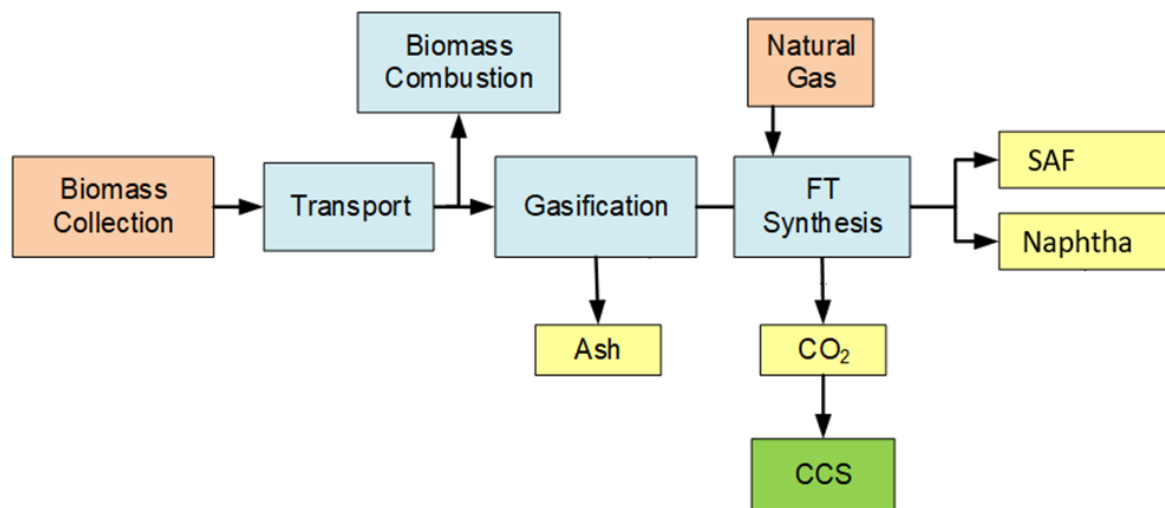


Figure 6.1. System Boundary Diagram for Biomass to Fuel. (Jiqing , et al., 2010)

6.1 Biomass Cultivation and Harvesting

The complete greenhouse gas (GHG) assessment of a biomass to biofuel pathway involves considering the life cycle emissions from biomass cultivation and harvesting. These emissions are influenced by factors such as the type of biomass, location, and specific cultivation and harvesting techniques. Studies have examined these emissions for different feedstocks, including short rotation forestry (SRF) willow, SRF poplar, hardwood residue from existing forestry operations, and waste wood available at pyrolysis oil production sites (citation here).

Researchers conducted separate life cycle assessments for willow and poplar energy crop cultivation. For willow, the assessment included inputs such as nursery stock production, fuel for farming equipment, fertilization, pest control, and equipment manufacture. In the case of poplar, operational inputs for a 16-year rotation were considered.

Analyzing woody logging residue as a feedstock involved accounting for fuel consumption during forwarding and biomass grinding, as well as equipment production.



Regarding waste wood, as it is assumed to be on-site at pyrolysis plants, there were no additional materials or energy inputs, resulting in minimal environmental impact during the biomass cultivation stage.

The summarized results of this assessment are provided below.

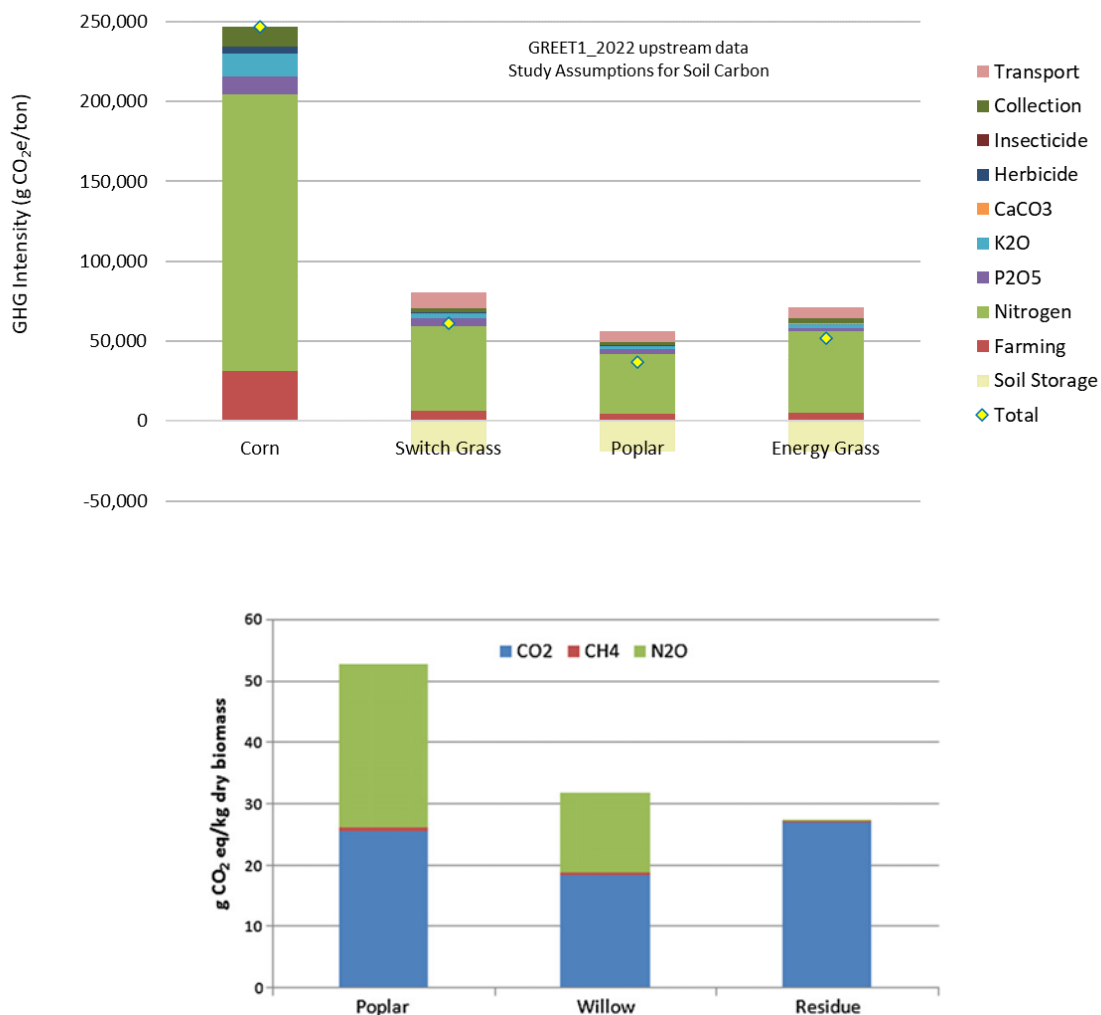


Figure 6.2. GHG Emissions of biomass harvesting (excluding transportation). GHG emissions released to produce 1 kg dry biomass feedstock¹¹.

¹¹ Source: J. Fan et al. / Renewable Energy 36 (2011) 632e641



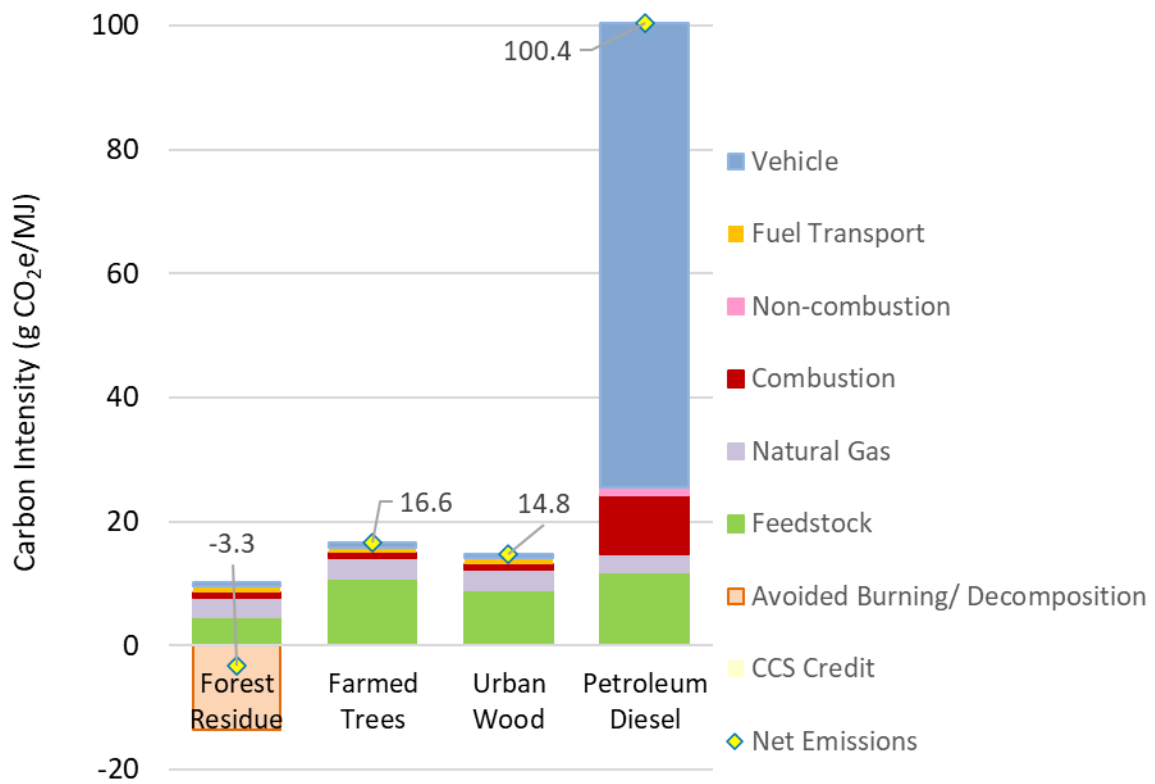


Figure 6.3. GHG Emission using Fischer-Tropsch Diesel

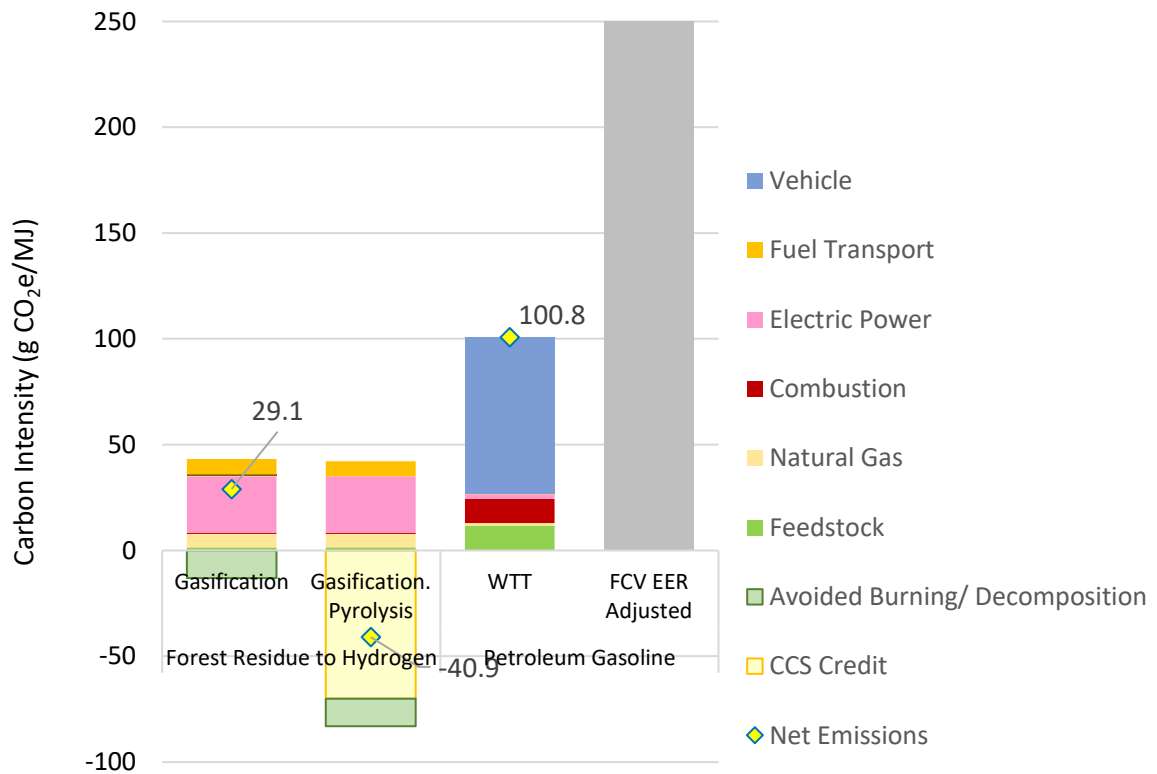


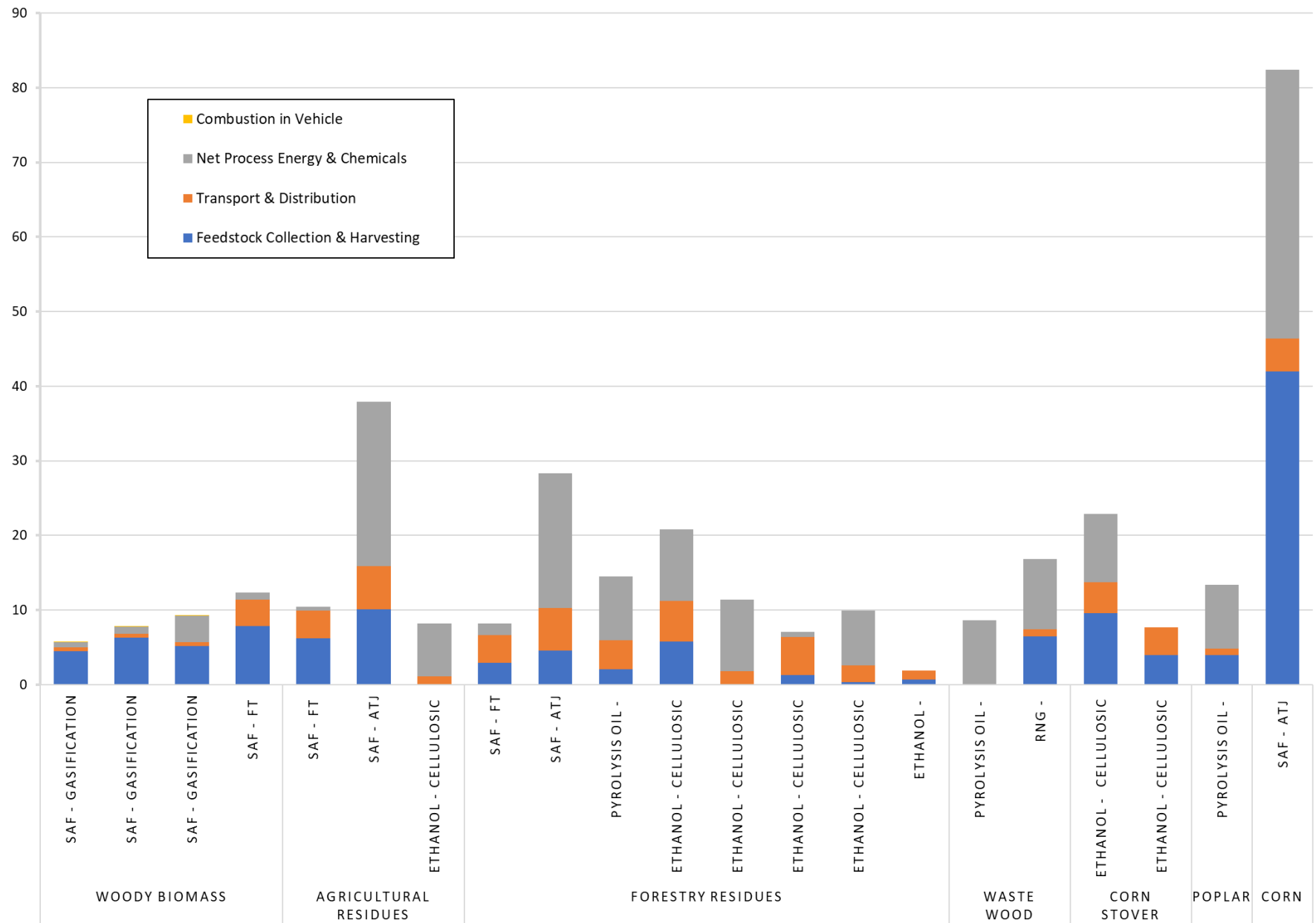
Figure 6.4. GHG emissions for hydrogen

6.2 Literature Review

As part of this analysis, a literature review was conducted on well-to-wheel life cycle assessments of biomass-to-biofuel pathways. Various studies and reports are examined that evaluate the GHG emissions of different biomass conversion technologies for the production of sustainable aviation fuel (SAF), ethanol, and renewable natural gas (RNG). The review includes research from sources such as the National Renewable Energy Laboratory, Argonne National Laboratory, and the University of Groningen. It covers a range of biomass feedstocks and conversion processes, including gasification, Fischer-Tropsch synthesis, and pyrolysis. The assessments consider factors such as carbon emissions, energy consumption, and transportation emissions to provide a comprehensive understanding of these biofuel pathways.

A chart demonstrating the results of this literature review is displayed on the next page. Notably, all biomass to biofuel pathways in the studies examined had lower well to wheel GHG emissions than fossil alternatives.





7. VERIFICATION OPTIONS

Undoubtedly, verification of the harvesting and management of biomass will be required under California LCFS. This verification is crucial for the integrity of the program, particularly in ensuring that waste feedstocks are genuine byproducts of operations, that biomass harvested from forests is done sustainably and with the goal of improving forest health, and that biomass harvested from natural forests is used to reduce the risk of wildfires.

Investors in next-generation fuels need a clear understanding of how biomass verification will operate under the LCFS to advance their plans. To establish robust verification metrics, CARB must define measurement criteria, assessment frequency, data types, validation requirements, and record-keeping practices. Measurement criteria could include factors such as carbon emissions produced during feedstock production and transportation, feedstock energy content, and land-use change associated with feedstock production. Assessment frequency will vary depending on feedstock type and origin, and data may be collected through on-site measurements, laboratory analyses, or remote sensing. To ensure data accuracy and reliability, validation requirements such as quality control procedures and independent verification may be implemented. Comprehensive record-keeping will also be crucial to promote transparency and allow for auditability if needed.

By setting up robust verification metrics for biomass feedstocks, CARB can equip developers with the appropriate tools to verify feedstocks as part of their development plans. Figure 7.1 illustrates the areas where discussion and resolution are needed in order to advance biomass to biofuel pathways. The first step is to define biomass activity, followed by aligning these activities with their alternative carbon fate. CARB must then determine how fuel pathways involving waste biomass will be verified. Finally, approved fuel pathways will be established.

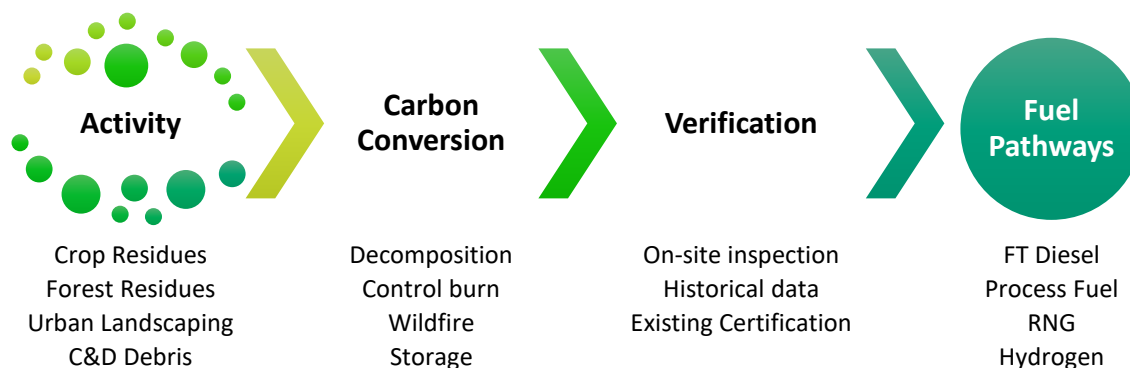


Figure 7.1. Steps to advancing biomass based on waste products into an approved fuel pathway.

7.1.1 Options for Verifying Forest Management Practices

Several options are available for verifying forest management practices. CARB may require on-site measurement, and laboratory analysis, as well as quality control procedures, independent verification, and comprehensive record-keeping to ensure data accuracy and reliability.



There are already forest certification schemes in use that may help inform verification under the LCFS. The United Nations Food and Agriculture Organization (FAO) and many countries, including Federal, State, and private forested areas, establish forest management guidelines. Here are some options for verifying forest management practices:

- **Sustainable Forest Management Practices:** Forests used to produce fuels that meet Renewable Fuel Standard (RFS) requirements must have been actively managed before December 19, 2007. Sustainable management practices are designed to ensure constant net primary productivity (NPP).
- **Forest Certification Programs:** Forest certification is a voluntary market-based approach that recognizes sustainable forest management by labeling forest and wood products from those forests as being managed under certified standards. Various certification programs exist, such as the Sustainable Forest Initiative (SFI), the Forest Stewardship Council (FSC), the Roundtable on Sustainable Biofuels (RSB-F), the Roundtable on Sustainable Biomaterials (RSB-M), and the Program for the Endorsement of Forest Certification (PEFC).
 - Sustainable Forestry Initiative (SFI) standards are commonly used in the United States and Canada, and they include measures to protect water quality, biodiversity, wildlife habitat, species at risk, and forests with exceptional conservation value. The standard applies to any organization that owns or manages forests in the United States or Canada.
 - FSC principles and criteria provide a foundation for forest management standards globally, including the US Forest Management Standard (V1.0) for forest management certification in the U.S. The RSB-F has recognized FSC forest management standards and certifications since 2013, as principles and criteria from FSC and RSB standards are aligned. In most cases, FSC-certified forests are considered to be in compliance with RSB-F's principles and criteria. In a comparison of forest certification programs, FSC is found to be more detailed and prescriptive in almost all aspects considered for forest certification (Garzon, et al., 2020).
 - The Roundtable on Sustainable Biomaterials (RSB) is a certification program that verifies the sustainability of biomass feedstocks and their supply chains. The RSB certification focuses on environmental, social, and economic aspects of sustainability, and is recognized by several sustainability initiatives

Existing sustainable forestry certification schemes are explored in the following subsections.



7.2 Verification Protocols

Table 26 provides a summary of four sustainability standards and certifications: Roundtable on Sustainable Biomaterials (RSB), Sustainable Forestry Initiative (SFI), Forest Stewardship Council (FSC), and International Sustainability and Carbon Certification (ISCC).

The four sustainability standards and certifications discussed in Table 26 share some commonalities. For instance, all of them prioritize the conservation of high biodiversity land, protect soil, water, and air quality, and promote climate change mitigation efforts. Additionally, they require responsible management practices for feedstocks or forests that avoid causing any harmful environmental impacts. Moreover, they aim to support rural and social development, while respecting the rights of Indigenous Peoples.

One key difference between these certifications is their feedstock coverage. RSB covers multiple agricultural feedstocks and forests, while SFI covers biomass used to produce renewable energy derived from trees, plants, and other biological organic matter. FSC, on the other hand, covers forest feedstocks and operations that provide environmental, social, and economic benefits. ISCC covers multiple agricultural feedstocks, such as sugarcane, cotton, corn, and wheat, and ensures that all processes are carried out without generating environmental consequences.

RSB, SFI, and FSC have similar processes that involve application, preparation for audit, and audit, with certification validity ranging from 2 to 5 years. ISCC has a one-year certification validity and requires a traceability/mass balance system in place and a list of all wood suppliers.

Table 28. Summary of sustainability standards and certifications

Certification	RSB	SFI	FSC	ISCC
Basic Information				
Feedstock coverage	Multiple agricultural feedstocks: material of biological origin produced through agricultural process and forest. Annual crops, woody biomass, crop residues ^a .	Biomass used to produce renewable energy, this includes any organic products and byproducts derived from trees, plants, and other biological organic matter, (limbs, bark and other cellulosic material, organic byproducts from wood pulping, and other biologically derived materials). ⁱ	Forest feedstocks (timber, all wood, slash, thinning, paper and other wood-based material) and operations this is refer to any responsibly managed forests that provide environmental, social and economic benefits.	Multiple agricultural feedstocks (sugar cane, carton, cotton, corn, wheat) and operations refers that all processes are carried out without generating environmental consequences.
Geographical coverage	Global	United States and Canada	Global	Global



Certification	RSB	SFI	FSC	ISCC
No. of companies certified	86 certificates have been issued of which 49 certificates are still valid ^b .	245 certificate holders meeting the SFI program's fiber sourcing or responsible procurement requirements. ^j	400 million acres of forest are FSC certified ^c .	40,549 certificates have been issued of which 7,619 certificates are still valid ^d .
Goals				
Environmental	<ul style="list-style-type: none"> ○ Preservation of high biodiversity land and high carbon stock land ○ Soil, water and air protection ○ Waste management. ○ Mitigate climate change^a. 	<ul style="list-style-type: none"> ○ Preservation of high biodiversity land. ○ Soil, water and air protection ○ Promotes reforestation.^k 	<ul style="list-style-type: none"> ○ Preservation of high biodiversity land. ○ Soil, water and air protection ○ Waste management ○ Reduction of deforestation^e. 	<ul style="list-style-type: none"> ○ Preservation of high biodiversity land, high carbon stock land, and peatlands. ○ Soil, water and air protection. ○ Good agricultural and environmental condition (GAEC) standards.
Social	<ul style="list-style-type: none"> ○ Contribution to rural and social development.^a ○ Stakeholder involvement according to Free Prior and Informed Consent (FPIC) in land acquisition. 	<ul style="list-style-type: none"> ○ Improved community structures and external relations. ○ Recognize and respect Indigenous People Rights.^k ○ Provides education to the landowners through the organizations SFI certified.^k 	<ul style="list-style-type: none"> ○ Contribution to rural and social development. ○ Improved community structures and external relations. ○ Legal and customary rights 	<ul style="list-style-type: none"> ○ Labor rights and working conditions. ○ Land use rights.
Economical	<ul style="list-style-type: none"> ○ Business plan of the economic operator must reflect a commitment to long-term economic viability^a. 	<ul style="list-style-type: none"> ○ The SFI label reflect the excellent forestry operations and non-genetically modified product. Which means an increment of price in the final product or feedstock. 	<ul style="list-style-type: none"> ○ The FSC label reflect a long-term commitment to responsible forest management, allowing you to get support from public and private organizations during many years. ○ The FSC label reflect the efficiency and effectiveness on financial standing for forestry operations. Which means an increment of price in the final product or feedstock. 	<ul style="list-style-type: none"> ○ Not applicable.



Certification	RSB	SFI	FSC	ISCC
Certification process				
How does it work?	<ul style="list-style-type: none"> ○ Application ○ Preparation for audit ○ Audit^a. 	<ul style="list-style-type: none"> ○ Select the Standard that applies to your organization ○ Complete and submit the application form ○ Audit 	<ul style="list-style-type: none"> ○ Choose certification body ○ Assessment (preparation for audit) ○ Certification report^f. 	<ul style="list-style-type: none"> ○ Registration ○ Preparation for audit ○ Audit^h.
Application	https://rsb.org/get-certified/	https://www.surveysmonkey.com/r/PLLNSJM	https://us.fsc.org/en-us/certification/certifying-bodies-in-the-us	https://www.iscc-system.org/process/registration-for-certification/
Auditing				
Requirements	<ul style="list-style-type: none"> ○ Biofuel Producer: Self Risk Assessment, Screening exercise, GHG calculations, Environmental and Social Management Plan, Chain of Custody Procedure and Claims Procedure. ○ Biofuel Blender: GHG calculation, Chain of Custody Procedure and Claims Procedure.^a 	<ul style="list-style-type: none"> ○ Small lands group certification: wood and fiber supply area plan (review of non-timber activities, determination of long-term sustainable harvest, map of the area and plan of protection). Forest management plan (practices prescribed to control pests, prescribed burns, species on the property, practices to promote the forest health. 	<ul style="list-style-type: none"> ○ Forest Management Certification: use of the forests, environmental impact (conserve biological diversity and its associated values, water resources, soils), management plan (condition of forest, yields of forest products, chain of custody, management activities) and the plantation plan to restoration and conservation of natural forests^g. 	<ul style="list-style-type: none"> ○ Traceability/mass balance system in place ○ List of all wood suppliers ○ Sustainability requirements (ISCC Principles 1-6) for all Forest Managements Units ○ GHG calculation (for wood-based biofuels processed from wood)^h
Certificate validity	<ul style="list-style-type: none"> ○ 2 years (dependent on risk class) ○ 3 months (risk class 6) 	5 years with annually audits	1 year	1 year

^a (A Guide to RSB Certification, 2020)

^b (RSB Certificates, 2022)

^c (Forest Stewardship Council (FSC), 2022)

^d (International Sustainability Et Carbon Certification (ISCC), 2022)

^e (FSC user-friendly guide to FSC certification for smallholders, 2009)

^f (Forest Stewardship Council (FSC), 2022c)

^g Missions and vision (Forest Stewardship Council (FSC), 2022b).

^h (How to become certified, 2022)

ⁱ SFI Definitions. (Sustainable Forest Initiative (SFI), 2022).

^j SFI certification program. (Sustainable Forest Initiative (SFI), 2022c)

^k Comparing SFI and FSC Certification Standards. (Sustainable Forestry Initiative (SFI), 2020)



7.2.1 SFI

United States and Canada, and it focuses on four pillars: standards, conservation, community, and education. The SFI forest management standard is designed to promote sustainable forestry practices, based on 13 Principles, 17 Objectives, 41 Performance Measures, and 141 Indicators. These requirements include measures to protect water quality, biodiversity, wildlife habitat, species at risk, and forests with exceptional conservation value. The SFI 2022 Forest Management Standard applies to any organization in the United States or Canada that owns or manages forestlands.

All SFI Standards require third-party independent certification audits by competent and accredited certification bodies, and all certification bodies must be accredited by a member of the International Accreditation Forum, including the ANSI-ASQ National Accreditation Board (ANAB) or the Standards Council of Canada (SCC). To get certified by SFI, organizations need to follow six principal steps, which include determining which SFI Standard(s) applies to their organization, completing and submitting the AFI PARTICIPATION APPLICATION FORM to SFI, preparing for the audit, getting audited, signing a SFI Trademark License Agreement, and using SFI Trademarks.

The SFI Standards include:

SFI FOREST MANAGEMENT: This is the largest single forest management certification standard in the world, and it requires measures to protect water quality, biodiversity, wildlife habitat, species at risk, and forests with exceptional conservation value. This certification is for organizations that own or have management authority for forestlands in the USA and/or Canada. This includes industrial and family forest owners, universities, conservation groups, public agencies, timber investment management organizations, and real estate investment trusts.

SFI FIBER SOURCING: This Standard is for manufacturers that source from a variety of ownerships or that don't own forestland. The SFI Small Lands Group Certification Module is designed for any organization certified to the SFI Fiber Sourcing Standard. This module applies to organizations that source roundwood or field-manufactured or primary-mill residual chips to support a forest products facility in the USA and/or Canada.

SFI CHAIN OF CUSTODY: The SFI Chain-of-Custody Standard is an accounting system that tracks forest fiber content through production and manufacturing to the end product. This standard also has measures to avoid controversial sources in the supply chain. This certification is for organizations that source, process, manufacture, handle, trade, convert, or print forest-based products globally.

SFI CERTIFIED SOURCING: This Standard contains the requirements for SFI-certified organizations to use the SFI-certified sourcing claim and label. It is the right option for



organizations that source, process, manufacture, handle, trade, convert, or print forest-based products globally.

Overall, the SFI Standards aim to promote responsible forestry practices, support rural and social development, and recognize the rights of Indigenous People. By following the certification process, organizations can demonstrate their commitment to sustainability and contribute to the protection of our natural resources.

7.2.2 FSC

The Forest Stewardship Council (FSC) is a globally recognized non-governmental organization that aims to promote sustainable forest management practices worldwide. Its inception can be traced back to the Earth Summit held in Rio in 1992, where deforestation was a pressing issue that needed immediate attention. To address this concern, a group of environmentalists, businesses, and community leaders joined forces to create the FSC.

After the first FSC General Assembly in 1993, the organization began developing a market-based approach that would improve forest practices on a global scale. The FSC's secretariat was initially established in Oaxaca, Mexico, but later moved to Bonn, Germany, in 2003. The FSC now operates in over 80 countries worldwide.

One of the FSC's primary objectives is to promote responsible forest management practices that are environmentally sound, socially beneficial, and economically prosperous. The organization has developed ten principles and 57 criteria that apply to FSC-certified forests worldwide. These principles cover a range of issues, including compliance with laws and FSC principles, tenure and use rights and responsibilities, indigenous peoples' rights, community relations and worker's rights, benefits from the forest, environmental impact, management plans, monitoring and assessment, maintenance of high conservation value forests, and plantation management.

The FSC certification program ensures that products originating from responsibly managed forests provide environmental, social, and economic benefits. The FSC has two types of certifications: Forest Management and Chain of Custody. Both types of certifications involve independent FSC-accredited Certification Bodies that verify that all FSC-certified forests conform to the requirements contained within an FSC forest management standard.

7.2.3 RSB

The Roundtable on Sustainable Biomaterials (RSB) is an independent, multi-stakeholder organization that strives to advance the development of sustainable solutions in the bioeconomy. Initiated by the Swiss Federal Institute of Technology Lausanne (EPFL), the RSB has been an autonomous organization based in Geneva since January 2013. The RSB is guided by a multi-stakeholder steering board, with each member representing one of the seven RSB "cabinets" consisting of all biofuel sectors and stakeholders, including farmers, biofuel



producers, the transportation industry, environmental and social NGOs, research institutes, governments, and investors.

The RSB is known for being a comprehensive voluntary system in promoting sustainability, demanding compliance with sustainability criteria, and promoting rural development and food security. The RSB Principles & Criteria are considered best-in-class and recognized for their comprehensive approach to addressing key sustainability issues. The 12 Principles and associated Criteria provide guidance on producing biomass, energy, and material products from bio-based and recycled carbon and renewable energy, while ensuring environmental, social, and economic responsibility.

The RSB offers various sustainability certifications for a wide range of products, approaches, and issues to verify the sustainability of their production and use. These certifications are voluntary and evaluated by an independent third party to ensure credibility. RSB certification applies to the production, processing, conversion, trade, and use of biomass and biofuels, material products from bio-based and recycled carbon, including fossil waste, as well as biofuel blenders.

For alternative fuel producers, RSB offers RSB EU RED and RSB Global Certifications. RSB EU RED certification is recommended for producers in the EU or those outside the EU selling into the European Union region, while RSB Global certification is suggested for producers who operate and sell in other regions. For non-fuel biomaterials producers, RSB offers the RSB Bioproducts Standard. Additionally, RSB offers a low Indirect Land Use Change (iLUC) certification to demonstrate low iLUC risk.

Currently, the RSB has approximately 45 active operators across America, Europe, and Asia, with most being certificated with the RSB Global certification.

RSB Certification Requirements for Woody Biomass

In the most recent proposal for the LCFS regulation, posted in December 2023, CARB included language on requirements for woody biomass to be certified by a third party (California Air Resources Board (CARB), 2024). RSB published sustainability requirements for woody biomass in December 2021 that are expected to meet the CARB criteria in the new LCFS regulation (RSB, 2021). Three primary goals of the woody biomass framework are the effective management of forests to conserve biodiversity and ecosystem services, the effective accounting of carbon extracted from the forests, and that harvesting and processing residues are true residues.

The framework is verified by examining forest management practices rather than limited to sourcing polices. General requirements for all feedstocks are shown in Table 29. Complete details related to each category as well as alien invasive species information can be found in the full RSB text.



Table 29. RSB Certification Requirements for Woody Biomass

RSB Requirements	Woody Biomass Details
End-of-life forestry materials	
Specifications	<ul style="list-style-type: none"> ○ Woody material from park and garden maintenance ○ Recycling wood ○ Woody material from orchards, construction sites, or tree hedges
Feedstock specific sustainability requirements	<ul style="list-style-type: none"> ○ Orchards require evidence for point of origin, tree species, and began operating prior to January 1, 2008. ○ Construction material cannot originate from land forested after January 1, 2008.
GHG calculation	<ul style="list-style-type: none"> ○ The GHG calculation starts from the collection at the point of origin where GHG intensity is 0 kg CO₂e/kg.
Forestry harvesting residues	
Specifications	<ul style="list-style-type: none"> ○ Slash left after logging or accumulated from a storm or fire ○ Salvage logging wood in forest management units – damaged, dying or dead trees. ○ Early/non-commercial thinnings – performed for silvicultural or ecological reasons with diameter at breast height less than 10 inches. ○ Stumps are not considered forestry harvesting residues nor is low quality roundwood.
Sustainability requirements	<ul style="list-style-type: none"> ○ Forest management must comply with RSB 12 Principles & Criteria¹² or other equivalent certification standards. ○ Soil organic carbon loss must be minimized through sufficient biomass left on the ground to maintain or improve soil health and biodiversity. ○ Requirements on areas identified as “no-go areas” that cannot be used to source biomass and include protected areas, wetlands, biosphere reserves, and ancient and endangered forests. ○ Feedstock identified as low risk for unaccounted emissions from forest carbon pool changes are eligible for certification.
GHG calculation	<ul style="list-style-type: none"> ○ The GHG calculation starts from the collection at the point of origin where GHG intensity is 0 kg CO₂e/kg.
Forestry industry processing residues	
Specifications	<ul style="list-style-type: none"> ○ Sawmill residues – slabs, chunks, bark, shavings, sawdust ○ Tall oil, brown liquor, and black liquor ○ Other residues that meet RSB Standard for Advanced Fuels requirements

¹² <https://rsb.org/framework/principles-and-criteria/>



RSB Requirements	Woody Biomass Details
Sustainability requirements	<ul style="list-style-type: none"> ○ Point of origin requires a chain of custody certification system in place.
GHG calculation	<ul style="list-style-type: none"> ○ The GHG calculation starts from the collection at the point of origin where GHG intensity is 0 kg CO₂e/kg. ○ The materials have to meet the eligibility requirements for the RSB Standard for Advanced Fuels¹³, otherwise the GHG calculation includes forest management.
Short rotation woody crops	
Specifications	<ul style="list-style-type: none"> ○ Perennial cropping systems that produce biomass or fibers with a lifetime less than 20 years and harvest every 1-5 years. ○ Species may include poplars, willows, maples, black locust, Acacia, Gmelina, Eucalyptus, among others
Sustainability requirements	<ul style="list-style-type: none"> ○ No conversion of high carbon stocks and forest land with a cut-off date of January 2008. ○ The operator must implement practices preventing invasive species from invading areas outside of the operation. ○ The plantation must not deplete surface or groundwater resources beyond replenishment capacities.
GHG calculation	<ul style="list-style-type: none"> ○ The GHG calculation starts from the cultivation of the crop, including applicable land use change. ○ The methodology should follow RSB GHG Calculation Methodology¹⁴, or RSB EU RED GHG Calculation Methodology¹⁵, or RED as incorporated in the UK Solid or Gaseous Biomass Carbon Calculator (Ofgem)¹⁶.

7.2.4 ISCC

The International Sustainability & Carbon Certification System (ISCC) is a globally recognized certification system that focuses on sustainability and carbon reduction across various industries, including agriculture, forestry, and waste management. The initiative was established as a multi-stakeholder effort in 2006 by Meo Carbon Solutions, a consultancy company, and received support from the German Federal Ministry of Food, Agriculture, and Consumer Protection (BMELV) through the Agency for Renewable Resources (FNR), as well as the German Ministry of Environment (BMU).

¹³ https://rsb.org/wp-content/uploads/2024/03/RSB-STD-01-010-RSB-Standard-for-advanced-fuels_v2.6-1.pdf

¹⁴ <https://rsb.org/wp-content/uploads/2020/06/RSB-STD-01-003-01-RSB-GHG-Calculation-Methodology-v2.3.pdf>

¹⁵ <https://rsb.org/wp-content/uploads/2020/06/RSB-STD-11-001-01-010-v.2.1-RSB-EU-RED-Standard-Adv-Fuels.pdf>

¹⁶ https://www.ofgem.gov.uk/sites/default/files/docs/2016/08/renewables_obligation_-_uk_user_guide_for_the_solid_and_gaseous_biomass_carbon_calculator.pdf



ISCC aims to promote sustainable practices and reduce carbon emissions in different industries by providing a framework for assessing and certifying sustainability and carbon reduction. The certification system includes requirements related to traceability, environmental and social impacts, greenhouse gas emissions, and waste management, among others.

ISCC operates two versions of the certification system: ISCC EU and ISCC DE. ISCC EU was formally recognized as a voluntary scheme by the European Commission on July 19, 2011, while ISCC DE was recognized by the German government before the EU version. Both versions of the scheme operate in parallel, with ISCC DE being used mainly in the German market and recognized as a voluntary scheme in Austria.

One of the key differences between the two versions of the scheme is the percentage of farms that need to be audited, which is higher in ISCC EU. ISCC DE includes specific requirements for the traceability of waste and residues, which were mandated by the German government. Other EU Member States are free to recognize ISCC DE, but most simply recognize the EC recognized version of the scheme.

7.2.5 RFS and BioMat

Current regulatory frameworks may also inform options for verifying biomass feedstocks. Table 28 provides an overview of two regulatory programs that incorporate biomass feedstocks for the purpose of energy production: the Renewable Fuel Standard (RFS) and the BioMat program.

The RFS is a federal program that requires transportation fuel sold in the United States to contain a minimum volume of renewable fuels. The program requires feedstocks, process, and fuel to meet an approved pathway. Participants need to register their company and facility in the RFS program and submit an engineering review and materials to the Environmental Protection Agency (EPA). The EPA has worked with companies to verify woody biomass feedstocks under the RFS.

In contrast, BioMat is a renewable energy feed-in tariff (FIT) established by the California Public Utilities Commission (CPUC) that covers biogas or biomass from a facility on other agricultural premises. BioMat participants need to use at least 100% of fuel from BioMAT biogas/biomass with 80% from the applicable bioenergy category. The program requires forest biomass to be “sustainable” as defined by the CPUC, which includes a specific checklist that assures the waste comes from projects associated with current forest practice act and other federal and state rules. The table suggests that BioMat has a more detailed verification process for feedstocks, particularly for forest biomass, compared to the RFS program.



Table 30. Renewable Fuel Standard and BioMat program.

Program	RFS	BioMat
Basic Information of the outline		
What is it?	Renewable Fuel Standard is a federal program that requires transportation fuel sold in the United States to contain a minimum volume of renewable fuels.	Bioenergy Market Adjusting Tariff (BioMat) is a renewable energy feed-in tariff (FIT) established by California Public Utilities Commission (CPUC).
Feedstock coverage	Biomass (Slash, pre-commercial Thinnings, tree residue, natural forest, plantation forest, logging) ^f	Biogas or biomass from facility on other agricultural premises
Geographical coverage	National	California
Principal goal	50% GHG reduction in 2022 ^a .	47MW from biomass projects ^c .
Eligibility		
Requirements	<ul style="list-style-type: none"> ○ The fuel must be a renewable fuel. ○ The feedstock must be renewable biomass. This section is broken out in two primary feedstocks types: <ul style="list-style-type: none"> - Slash: Silvicultural prescription, management, or timber harvest plan. Truck weight records for each load; if slash is removed from the forest, include mass balance of slash/roundwood extracted ^f. - Pre-commercial Thinnings: Silvicultural prescription, management, or timber harvest plan. Certifications, like SFI or FSC; For plantations: consult 40 CFR 80.1454 	<ul style="list-style-type: none"> ○ Project must be located in PG&E's service territory and be connected on the distribution or transmission system^c. ○ Must use at least 100% of fuel from BioMAT biogas/biomass with 80% from the applicable bioenergy Category^e. ○ Project may be sized 5 MW or smaller, provided that no more than 3 MW is delivered to the grid at any time. ○ The operations must start after June 1, 2013. ○ The project needs to have passed the interconnection Fast Track screens, passed Supplemental Review, completed a System Impact Study in the Independent Study Process, completed a Distribution Group Study Phase 1 Interconnection Study in the Distribution Group Study Process, or completed a Phase 1 Study in the Cluster Study Process^c.



Program	RFS	BioMat
	(d)(2); Documentation to verify ownership of the land to be thinned ^f . ○ Feedstocks, process and fuel meet an approved pathway ^d . ○ Should produce at least 32 billion gallons of renewable fuel in 2022 ^a .	○ Forest biomass must be “sustainable” as defined by the CPUC specifically for this program, as waster derived from fire threat reduction activities, fire threat clearance activities; Infrastructure clearance projects or “other” waste wood that must be analyzed through a check list that generally assures it comes from projects associated with current forest practice act and other federal and state rules.
Online application	https://www.epa.gov/fuels-registration-reporting-and-compliance-help/tutorial-creating-cdx-account	https://pgebiomat.accionpower.com/_pgebiomat/disclaimers.asp

Process to participate

How does it work?	○ Register Online ○ Assemble all documents required in §80.1450(b)(1). ○ Obtain an engineering review conducted by a third-party independent professional engineer. ○ Create a New Company Request in CDX OTAQReg to register your company and facility in the RFS program under Part 80 ^d . ○ Submit the engineering review and materials required under §80.1450(b)(1) to EPA ^d .	○ Apply online (website above) creating a Program Participation Request (PPR) ○ Once the PPR is approve BioMAT Queue Number will be assigned ^f .
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^a Overview for Renewable Fuel Standard. (Environmental Protection Agency (EPA), 2023a).

^b Frequently Asked Questions PG&E BioMAT Feed-in Tariff Program. (PG&E, 2014).

^c Bioenergy Market Adjusting Tariff, Overview. (PG&E, 2022)

^d How to register a New Renewable Fuel Producer for the Renewable Fuel Standard (RFS). (Environmental Protection Agency (EPA), 2023b).

^e Bioenergy Market Adjusting Tariff (BioMat) Public Webinar. (PG&E, 2015).

^f Practical Guide to Forestry Feedstock under the Renewable Fuel Standard. (SBF, 2024).



7.2.6 USDA Project for RFS Biomass Verification

The Renewable Fuel Standard (RFS) and RFS2 were established to increase the use of renewable fuels in the United States, with the goal of reducing air pollution and greenhouse gas emissions. RFS2 specifically requires that biofuels be derived from renewable biomass, and the EPA has strict criteria for determining what qualifies as such. To ensure that forests and other ecologically sensitive areas are not being harmed in the process, certain types of land are excluded from the definition of renewable biomass.

To comply with these regulations, Strategic Biofuels has launched a project to create a user-friendly, fraud-resistant tracking system for forestry feedstocks. This system aims to accurately and conveniently collect and transmit data from key sectors such as landowners, loggers, sawmills, and forest products manufacturers. The first phase of this project involves identifying the source and type of qualifying material harvested, developing compliance documentation requirements for each source stand of timber, establishing the point of origin and chain of custody for each load of compliant wood, and creating auditable reports for audit purposes. The second phase of the project is the development of a mobile device system that meets EPA audit requirements while being user-friendly for loggers, forestry managers, and regulators. This cloud-based system will allow for the accurate and efficient tracking of costs and information throughout the supply chain, ensuring compliance with RFS2 and other renewable fuel credit systems.

8. CONCLUSIONS

The California Air Resources Board (CARB) has the opportunity to bolster the effectiveness of its climate policies by aligning the goals of its scoping plan with existing policies, namely the California Low Carbon Fuel Standard (LCFS), and by providing clear guidance to developers on policy implementation. The LCFS is a powerful tool for reducing greenhouse gas (GHG) emissions in California's transportation sector. Alternative fuels producers receive credits under the LCFS based on the GHG reductions they achieve, as determined by a life cycle assessment (LCA) and verified by third-party reviewers.

Developers seeking to invest in infrastructure and technology for producing low-carbon next generation biomass-derived fuels face several significant challenges. These include a lack of guidance on how the net carbon balance of biomass will be assessed under California's LCFS regulation, the need to educate CARB staff on the specific alternative fate of their particular biomass feedstock, and the uncertainty around what CARB will require for verification of biomass-derived feedstocks.

This paper has addressed each of these challenges by:

- 1) Providing insights into the net carbon balance of different types of biomass
- 2) Describing the alternative fates of biomass based on category, location, and collection practices



- 3) Reviewing current verification schemes and options for each biomass category and location.
- 4) Recommending actions that would provide an immediate path forward for developers seeking to invest in low-carbon next-generation biomass derived fuels.

Investors in next-generation fuels need a clear understanding of how biomass verification will operate under the LCFS to advance their plans. To establish robust verification metrics, CARB must define measurement criteria, assessment frequency, data types, validation requirements, and record-keeping practices. Measurement criteria could include factors such as carbon emissions produced during feedstock production and transportation, feedstock energy content, and land-use change associated with feedstock production. Assessment frequency will vary depending on feedstock type and origin, and data may be collected through on-site measurements, laboratory analyses, or remote sensing. To ensure data accuracy and reliability, validation requirements such as quality control procedures and independent verification may be implemented. Comprehensive record-keeping will also be crucial to promote transparency and allow for auditability if needed.

To date, CARB has not formally identified an approach to quantifying emissions associated with certain types of biomass residues, including those from wood and nutshells. The lack of such transparent guidance impinges the ability to plan and execute biofuel projects that can deliver alternative biomass residue fates for hard-to-decarbonize sectors such as sustainable aviation fuel. As a result, these types of biomass residues may continue to emit GHG emissions associated with business-as-usual conventional fates, e.g., burning and decomposition, as uncertainty of their treatment in the LCFS increases perceived investor risk.

8.1 Recommendations

The challenges related to biomass-derived fuels are multifaceted and have been a topic of ongoing discussion among scientific and policy experts. While these challenges are complex, it is crucial to address them in order to support the development of alternative fuels and to help California achieve its environmental goals. In addition to reducing greenhouse gas emissions, the promotion of alternative fuels can also help mitigate the risks of wildfires and prevent natural resource loss.

There are several steps CARB can take immediately to advance biomass-derived fuels under the LCFS. They are outlined here:

Action:

- 195.1 • Develop a near-term solution for biogenic carbon that enables future development by treating biomass from forest residues, crop residues, forest slash, and thinnings using the GREET modeling carbon-neutral framework.
- 195.2 • Create a Tier 1 calculator framework for the conversion of biomass to synthetic fuels, ethanol, hydrogen, and CNG.
- Establish a temporary fuel pathway code that has a safety margin for carbon neutrality.



- Create a temporary fuel pathway code for biomass fuels and fuel production with CCS.
- Provide an initial 10-year implementation period based on carbon-neutral biomass.

Workshop:

- Organize annual woody biomass to energy/LCFS workshop to enhance understanding of biogenic carbon neutrality issues that builds upon the California 2024 biomass utilization workshop.

Research:

- Participate in an interagency working group to develop a Tier 1 LCFS pathway for woody biomass to fuels and power.
- Support ongoing research on forestry biomass by arranging field trips to view a range of forest management activities and slash piles.
- Establish a working group of experts to investigate the biogenic treatment of forest material.

Verification:

- Define categories of biomass feedstocks, including thinnings and slash, agricultural residue, energy crops, and urban waste.
- Review verification protocols and ensure alignment with LCFS program requirements, including RFS protocols for thinning and slash and existing forestry certification schemes such as the Sustainable Forestry Initiative (SFI) and the Forest Stewardship Council (FSC).



9. APPENDIX A

Table 31. Default CO₂ Emission Factors and High Heat Values for Various Types of Biomass Fuel.

Fuel type	Default high heat value	Default CO ₂ emission factor
Coal and coke	mmBtu/short ton	kg CO ₂ /mmBtu
Anthracite	25.09	103.69
Bituminous	24.93	93.28
Subbituminous	17.25	97.17
Lignite	14.21	97.72
Coal Coke	24.80	113.67
Mixed (Commercial sector)	21.39	94.27
Mixed (Industrial coking)	26.28	93.90
Mixed (Industrial sector)	22.35	94.67
Mixed (Electric Power sector)	19.73	95.52
Natural gas	mmBtu/scf	kg CO ₂ /mmBtu
(Weighted U.S. Average)	1.026×10^{-3}	53.06
Petroleum products - liquid	mmBtu/gallon	kg CO ₂ /mmBtu
Distillate Fuel Oil No. 1	0.139	73.25
Distillate Fuel Oil No. 2	0.138	73.96
Distillate Fuel Oil No. 4	0.146	75.04
Residual Fuel Oil No. 5	0.140	72.93
Residual Fuel Oil No. 6	0.150	75.10
Used Oil	0.138	74.00
Kerosene	0.135	75.20
Liquefied petroleum gases (LPG) ¹	0.092	61.71
Propane ¹	0.091	62.87
Propylene ²	0.091	67.77
Ethane ¹	0.068	59.60
Ethanol	0.084	68.44
Ethylene ²	0.058	65.96
Isobutane ¹	0.099	64.94
Isobutylene ¹	0.103	68.86
Butane ¹	0.103	64.77
Butylene ¹	0.105	68.72



Fuel type	Default high heat value	Default CO ₂ emission factor
Naphtha (<401 deg F)	0.125	68.02
Natural Gasoline	0.110	66.88
Other Oil (>401 deg F)	0.139	76.22
Pentanes Plus	0.110	70.02
Petrochemical Feedstocks	0.125	71.02
Special Naphtha	0.125	72.34
Unfinished Oils	0.139	74.54
Heavy Gas Oils	0.148	74.92
Lubricants	0.144	74.27
Motor Gasoline	0.125	70.22
Kerosene-Type Jet Fuel	0.135	72.22
Asphalt and Road Oil	0.158	75.36
Crude Oil	0.138	74.54
Petroleum products - solid	mmBtu/short ton	kg CO ₂ /mmBtu.
Petroleum Coke	30.00	102.41.
Petroleum products - gaseous	mmBtu/scf	kg CO ₂ /mmBtu.
Propane Gas	2.516×10^{-3}	61.46.
Other fuels - solid	mmBtu/short ton	kg CO ₂ /mmBtu
Municipal Solid Waste	9.95 ³	90.7
Tires	28.00	85.97
Plastics	38.00	75.00
Other fuels - gaseous	mmBtu/scf	kg CO ₂ /mmBtu
Blast Furnace Gas	0.092×10^{-3}	274.32
Coke Oven Gas	0.599×10^{-3}	46.85
Fuel Gas ⁴	1.388×10^{-3}	59.00
Biomass fuels - solid	mmBtu/short ton	kg CO ₂ /mmBtu
Wood and Wood Residuals (dry basis) ⁵	17.48	93.80
Agricultural Byproducts	8.25	118.17
Peat	8.00	111.84
Solid Byproducts	10.39	105.51
Biomass fuels - gaseous	mmBtu/scf	kg CO ₂ /mmBtu
Landfill Gas	0.485×10^{-3}	52.07
Other Biomass Gases	0.655×10^{-3}	52.07
Biomass Fuels - Liquid	mmBtu/gallon	kg CO ₂ /mmBtu



Fuel type	Default high heat value	Default CO ₂ emission factor
Ethanol	0.084	68.44
Biodiesel (100%)	0.128	73.84
Rendered Animal Fat	0.125	71.06
Vegetable Oil	0.120	81.55

¹ The HHV for components of LPG determined at 60 °F and saturation pressure with the exception of ethylene.

² Ethylene HHV determined at 41 °F (5 °C) and saturation pressure.

³ Use of this default HHV is allowed only for: (a) Units that combust MSW, do not generate steam, and are allowed to use Tier 1; (b) units that derive no more than 10 percent of their annual heat input from MSW and/or tires; and (c) small batch incinerators that combust no more than 1,000 tons of MSW per year.

⁴ Reporters subject to [subpart X of this part](#) that are complying with [§ 98.243\(d\)](#) or [subpart Y of this part](#) may only use the default HHV and the default CO₂ emission factor for fuel gas combustion under the conditions prescribed in [§ 98.243\(d\)\(2\)\(i\)](#) and [\(d\)\(2\)\(ii\)](#) and [§ 98.252\(a\)\(1\)](#) and [\(a\)\(2\)](#), respectively. Otherwise, reporters subject to subpart X or subpart Y shall use either Tier 3 (Equation C-5) or Tier 4.

⁵ Use the following formula to calculate a wet basis HHV for use in Equation C-1: $HHV_w = ((100 - M)/100) * HHV_d$ where HHV_w = wet basis HHV, M = moisture content (percent) and HHV_d = dry basis HHV from Table C-1.



10. APPENDIX B – C- MODEL

Table 3: Description of Forest Silvicultural Treatments

Treatment	Label	Description
Remove 100%	RM100	Clear-cut 100% of standing trees
Snags	Snags	Remove 100% standing dead wood
Thin from Below by 20%	TFB20	Remove 20% of basal area starting with smallest DBH trees
Thin from Below by 40%	TFB40	Remove 40% of basal area starting with smallest DBH trees
Thin from Below by 60%	TFB60	Remove 60% of basal area starting with smallest DBH trees
Thin from Below by 80%	TFB80	Remove 80% of basal area starting with smallest DBH trees
Thin from Above by 20%	TFA20	Remove 20% of basal area starting with largest DBH trees
Thin from Above by 40%	TFA40	Remove 40% of basal area starting with largest DBH trees
Thin from Above by 60%	TFA60	Remove 60% of basal area starting with largest DBH trees
Thin from Above by 80%	TFA80	Remove 80% of basal area starting with largest DBH trees
Proportional Thin by 20%	TP20	Remove 20% of basal area proportionally across all tree sizes
Proportional Thin by 40%	TP40	Remove 40% of basal area proportionally across all tree sizes
Proportional Thin by 60%	TP60	Remove 60% of basal area proportionally across all tree sizes
Proportional Thin by 80%	TP80	Remove 80% of basal area proportionally across all tree sizes

Figure 4: Forest Biomass Resource Size Classes

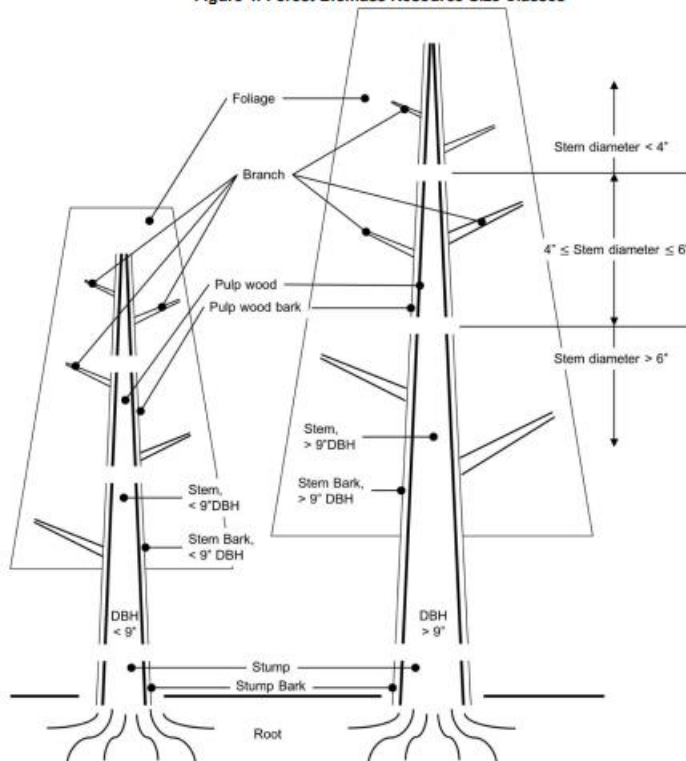
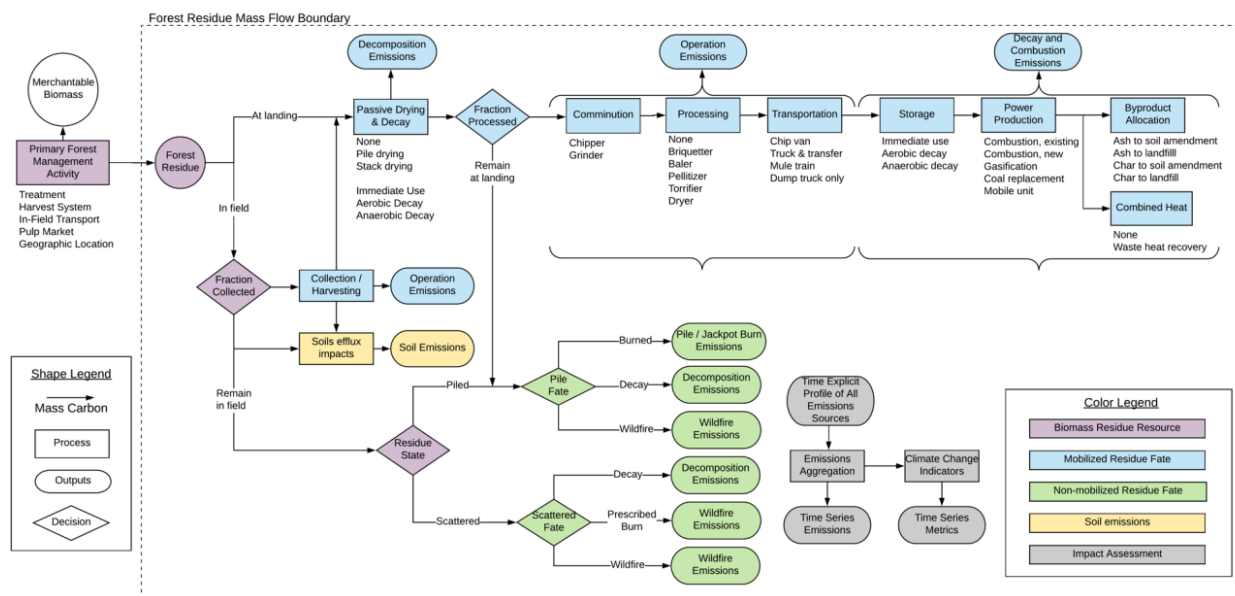


Figure 2: Forest Residue Mass Flow Boundary



11. LCA REPORT - BIOMASS

The following Report was published in Biomass Magazine in February 2024:

Pathways for Negative Carbon Intensity Biomass Fuels

Prepared by Anna Redmond and Stefan Unnasch | Life Cycle Associates

Overview

California generates millions of tons of wood waste from its farms and forests annually, but less than 20% is repurposed for commercial use¹⁷. The majority is left to decay in place or burned, contributing to greenhouse gas (GHG) emissions and air pollution. California's wildfire prevention efforts, which aim to reduce biomass fuel loads on one million acres of land each year, will exacerbate the state's wood waste problem.

Converting wood waste into biofuels can reduce overall emissions to the atmosphere as shown in Figure 1. Utilization of biomass residues would not only avoid the negative impacts of current disposal practices, but also drive rural economic development, technological innovation, and further emissions reductions by replacing fossil fuels.

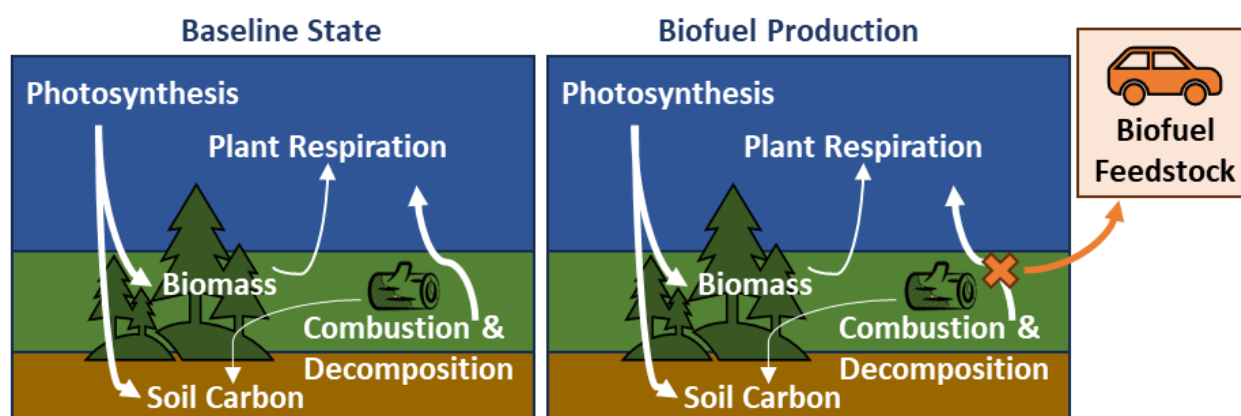


Figure 11.1. The Biogenic Carbon Cycle. Arrows are not drawn to scale.

Renewable fuels such as hydrogen, biomethane, ethanol, and sustainable aviation fuel are promising options for replacing conventional transportation fuels and reducing CO₂ emissions. Adding carbon capture and storage (CCS) to these fuel production facilities can provide even greater carbon dioxide removal, a key goal of Gov. Newsom and the California Air Resources Board. Co-producing biochar, a carbon-rich material that can be sequestered in the soil, can further reduce the emissions impact of a biofuel system. Another approach involves the utilization of lignin for the production of biomaterials or use as a petroleum bitumen substitute¹⁸.

Previous studies have explored the life cycle carbon intensity (CI) of various biomass-to-biofuel pathways, encompassing diverse feedstocks, technologies, and end products, such as including wood waste to RNG

¹⁷ California Department of Resources Recycling and Recovery. <https://calrecycle.ca.gov/condemo/wood/>

¹⁸ <https://www.biofuelsdigest.com/bdigest/2021/06/06/lignin-leads-the-way-worlds-first-lignin-bio-asphalt-road-lignins-array-of-applications-and-more>.



via anaerobic digestion¹⁹, biomass to electricity via pyrolysis²⁰, and woody biomass to sustainable aviation fuel via gasification and Fisher-Tropsch synthesis.²¹

11.1 System Boundaries

Quantifying the carbon intensity (CI), or the amount of CO₂e emissions per MJ of fuel, of a biofuel involves a comprehensive approach known as Life Cycle Assessment (LCA). LCA evaluates the environmental impact of a product or process across its entire life cycle, from the extraction of raw materials to its eventual disposal.

To gauge the CI biofuels, an LCA begins by establishing baseline data and cataloging the energy and materials consumption of all involved processes, including carbon capture, transportation, storage, and monitoring. Subsequently, they calculate the corresponding GHG emissions released into the environment. Finally, they assess the cumulative environmental effects within predefined system boundaries stemming from the biofuel system.

In the case of a waste and residual biomass to biofuel system, system boundaries include:

- ✧ Biomass production and collection, including direct and indirect land use change
- ✧ Transportation of biomass to the facility
- ✧ Biomass preparation, including biomass chipping or grinding
- ✧ Biofuel production
- ✧ CCS at biofuel production site
- ✧ Co-products, such a biochar
- ✧ Fuel Combustion in vehicle

In some cases, if the biomass were to be transported to an alternate disposal site in the baseline, the net difference for the transportation to the facility may be compared to the baseline and accounted for.

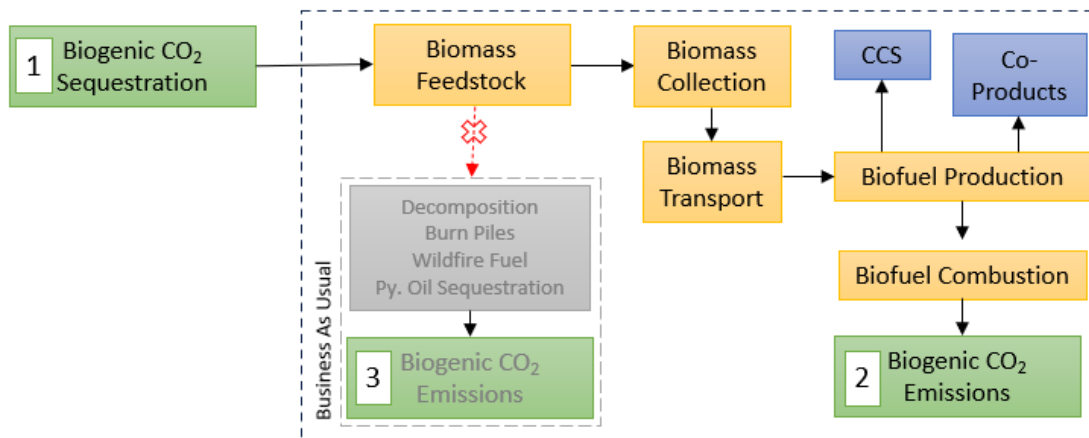


Figure 11.2. Example system boundary diagram for waste biomass to biofuel system. In this accounting scheme biogenic CO₂ sequestration (1) occurs outside of the system boundary. The sequestration occurs with or without the biofuel system's existence. The biofuel will be credited for the biogenic CO₂

¹⁹ <https://www.gti.energy/wp-content/uploads/2019/02/Low-Carbon-Renewable-Natural-Gas-RNG-from-Wood-Wastes-Final-Report-Feb2019.pdf>

²⁰ Fan, J., Kalnes, T. N., Alward, M., Klinger, J., Sadehvandi, A., & Shonnard, D. R. "Life cycle assessment of electricity generation using fast pyrolysis bio-oil.

²¹ <https://www.nrel.gov/docs/fy22osti/82703.pdf>



emissions that would have occurred in the absence of the biofuel systems (3). This can be represented by subtracting box (2) from box (3).

11.2 Carbon Intensity Calculations

To calculate the net CO₂e emissions from a biomass to biofuel system, we first need to establish an LCA baseline. This baseline is a comparison of the greenhouse gas emissions from the biofuel project to the emissions from the way that the biomass fate in the absence of the project. For example, if the biomass would be left to decompose in the field, the baseline scenario would include the emissions from methane production.

We also need to consider the timing of emissions in the LCA. For example, if the biomass would decompose over time, we should consider the cumulative emissions from the biomass over its lifetime. However, if the biomass would decompose quickly or combust, we can safely ignore the timing of emissions.

For this pathway example we will consider only feedstocks that would have otherwise combusted, such as wildfire abatement residues or agricultural residues that would have been disposed of in burn piles.

Combustion of biomass can occur for various reasons, including:

Agricultural burning: Farmers burn crop residues left in fields after harvest, as well as prunings from orchards and vineyards, to clear land, dispose of waste, and control weeds, diseases, and pests. In some cases, such as rice and pear cultivation, burning is the most efficient and effective method for disease control.

Forest residue burning: The U.S. Forest Service conducts controlled burns of piles of woody debris, commonly referred to as slash, to reduce hazardous fuels in forested areas. These piles are formed from the leftover woody materials following tree thinning or cutting activities.

When biomass is burned, all of the carbon that was sequestered in the biomass is released into the atmosphere over a short period of time. This can be modeled as a single time pulse. The biogenic carbon released during burning is equal to the biogenic carbon that would be released from the biofuel during vehicle combustion. Therefore, the emissions from avoided burning and vehicle combustion cancel each other out, and the feedstock can be considered biogenic carbon neutral.

11.2.1 GHG Analysis

The GREET model considers various woody biomass feedstocks, such as forest residue and farmed trees. The life cycle GHG emissions for forest residue to FT diesel are shown in Figure 3 with two different accounting systems. First all of the carbon flows are shown including the net biogenic uptake and CO₂ released from the process. In the pathway without CCS, process emissions plus fuel combustion equal the biogenic carbon into the process. GREET treats the net biogenic carbon flow as neutral assuming that removal and additional growth balance. The RFS also requires that forest thinnings used for biofuel production result in increased growth of surrounding trees. When CO₂ from processing emissions is stored the net emissions are reduced. The biogenic process emissions are no longer emitted and the net uptake results in a credit. The identical results are achieved with a biogenic carbon neutral accounting system. The biogenic uptake credit is omitted and stored CO₂ is treated as a credit. The latter accounting system is represented for the well to tank emissions in the GREET model. CCS represents a significant fraction of the CI reduction and results in a very low CI. The extent of CCS is variable with the proposed process. For example, a lower level of CO₂ storage could be achieved if only concentrated CO₂ sources are captured. This approach would simplify the CO₂ recovery efforts. Also, grid power could be used to operate equipment. Both of these process changes would affect system complexity, cost, and GHG emissions.



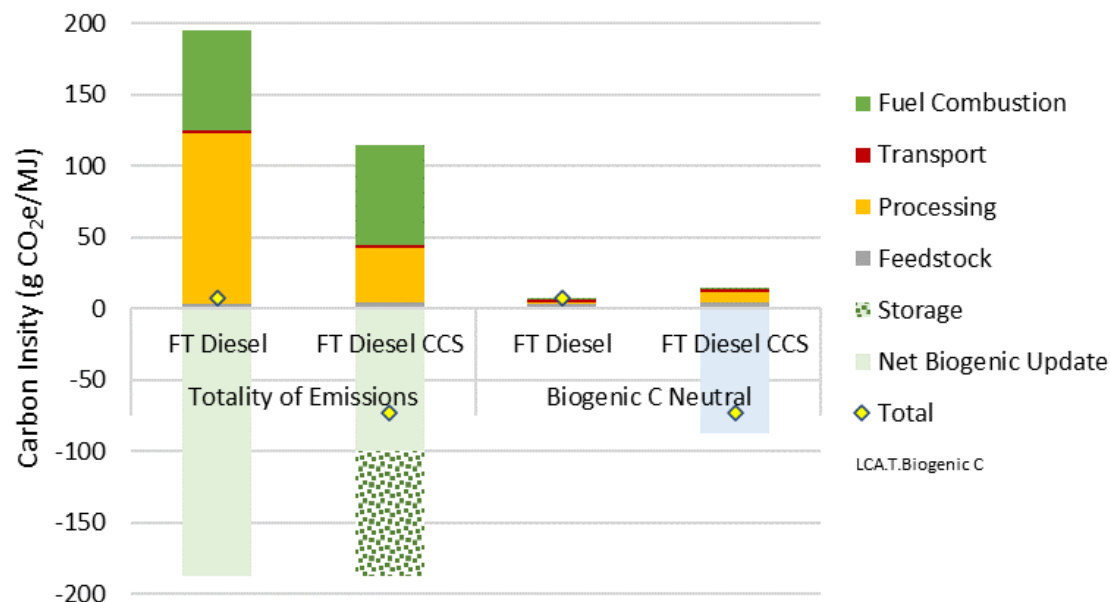


Figure 11.3. Life Cycle GHG emissions for forest residue to FT diesel with totality of emissions and biogenic carbon neutral accounting system. FT diesel with CCS achieves a negative CI.

The model is configured with a range of fuel pathways including gasification, pyrolysis, and fermentation technologies. The model examines numerous fuel pathways including hydrogen, FT diesel and jet, pyrolysis fuels, renewable natural gas, and ethanol. GREET explicitly models CCS for several fuel pathways and treats the storage of organic residue from pyrolysis and anaerobic digestion as a storage credit. All of the CO₂ storage options provide a route for a carbon negative pathway whether CO₂ is stored as a gas or as a soil additive or other product. The factors influencing life cycle GHG emissions encompass energy inputs, yields, and carbon storage strategies for biomass-to-fuel conversion technologies.

Table 32 presents a range of carbon-negative technologies, offering a basis for evaluating the impact of biomass conversion to fuels. Each technology includes parameters such as biomass-to-fuel yield, power consumption, natural gas consumption, carbon storage technology, and carbon capture efficiency. The default approach in the GREET model accounts for Fischer-Tropsch conversion without any carbon storage. Other cases examined include gasification, pyrolysis, and fermentation technologies. These methods produce a spectrum of fuels with varying strategies for carbon storage.

The information presented in this table draws from an array of sources to provide comprehensive background details. These sources include the GREET model, ongoing project announcements, and scientific literature.



Table 32. Fuel Options with a Pathway to Negative Carbon Intensity

Feedstock	Conversion Technology	Fuel	Carbon Storage	CI (gCO ₂ e/MJ)
Forest Residue	Gasification + FT	Diesel	none	5 to 25
Forest Residue	Gasification + FT	SAF	CCS	< -50
Forest Residue	Gasification + PSA	Hydrogen	CCS	< -50
Forest Residue	Pyrolysis	Diesel	BioChar	< -50
Ag. Residue	Gasification + FT, H ₂ Boost	SAF	CCS	< -50
Ag. Residue	Fermentation	Ethanol	Lignin Product	< -50



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August 27, 2024

Mr. Matt Botill
Chief, Industrial Strategies Division
California Air Resources Board
1001 I Street Sacramento, California 95812

Ms. Rajinder Sahota
Deputy Executive Officer
Climate Change & Research
California Air Resources Board
1001 I Street Sacramento, California 95812

Comments on LCFS 15-Day Changes

Dear Mr. Botill and Ms. Sahota,

Thank you for the opportunity to provide comments on the proposed modifications to the text of the LCFS amendment issued August 12, 2024 (the "15-day Changes"). Be8 is the largest biodiesel producer in Latin America with two plants in southern Brazil, a production facility in Paraguay, and a subsidiary in Switzerland. As an international renewable energy company, Be8 implements new energy matrices through a circular innovation ecosystem. In February 2022, the company became the first Brazilian biodiesel producer to export to the United States under the Renewable Fuel Standard (RFS) Program, according to the reporting ID 82361.



1. The 2025 Step-Down and AAM

196.1 We appreciate CARB's increasing the one-time step-down from 5% to 9% in 2025. As for the AAM, we are concerned that its first potential triggering remains as in the 45-day package with 2028 the first year for which it can amend CI reduction targets. Instead, we recommend that 2025 performance should be able to trigger the AAM, which would then be able to impact CI targets in 2027.

196.2 We believe the AAM should be allowed to trigger as early as possible, to guard against the case where the step-down is not sufficient to address the current credit bank oversupply. This is especially this case since CARB did not include the more aggressive step-down in 2025 as recommended by many stakeholders in comments on the 45-day package.

2. The Cap on Credits on Biomass-Based Diesel ("BBD") from Soy and Canola

196.3 We were surprised by the inclusion of the 20% cap on credit generation for BBD produced from soy and canola. As CARB made clear in its April 10th LCFS workshop (the "Workshop") such a cap will likely result in fossil diesel replacing renewable diesel and biodiesel in the California fuel pool, causing deleterious health effects for Californians living in disadvantaged communities near heavy-duty trucking corridors. We also believe the cap is unnecessary.

a. As CARB made clear in the Workshop, soybean oil BBD will become deficit generating by 2033 at the latest and perhaps 2030 if the AAM mechanism is triggered twice. The use of SBO as a feedstock will phase out then, rendering the cap unnecessary.

b. Furthermore, as CARB explained in the Workshop, the science doesn't exist to justify a cap on crop-based biofuels at this time.

c. What's more, as CARB also made clear in the Workshop, the LCFS already contains guardrails that disincentivize the use of crop-based feedstocks through



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the inclusion of an indirect land use change CI penalty and sustainability requirements. The amended LCFS will contain stringent sustainability requirements including certification by an internationally recognized body and third-party verification.

d. Additionally, as the 2022 Scoping Plan sets forth, and CARB has reiterated in the amendment proceeding, including in the Workshop, internal combustion engines will be on California roads for years to come - the heavy-duty fleet turns over slowly. What's more, heavy-duty trucking is extremely difficult to electrify, and projections are that there will not be enough hydrogen production or refueling infrastructure anytime in the foreseeable future.

As the Scoping Plan noted, the answer in the transition period is the use of low carbon liquid fuels like BBD for the heavy-duty trucking sector. (Today BBD only accounts for about 75% of the California diesel pool.)

While the LCFS incentivizes the use of waste-based feedstocks to make BBD due to the iLUC penalty on crop-based feedstocks, and the majority of BBD used in California is produced from waste-based feedstocks, there are clear signs that there will not be enough of them by 2030 or 2033 to supply the market. This will be especially true as renewable diesel production continues to skyrocket.

196.4

The most problematic waste-based feedstock is used cooking oil ("UCO"). More than ½ of the UCO used to produce US BBD comes from China. EPA recently announced that it is investigating at least two biofuel producers amid concerns they are using virgin palm oil disguised as allowable UCO as feedstocks to generate RINs. The EU is also investigating the same issue.



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Without valid Chinese UCO there will not be sufficient feedstocks for the necessary RD production unless producers can generate LCFS credits on the crop-based RD they produce.

3. The possible end of BBD fuel pathways

196.5

A second surprise in the 15-day Changes is the inclusion of a provision allowing for the possibility of CARB not accepting fuel pathway applications for BBD starting on January 1, 2031. Again, this provision was not workshopped or discussed before the 15-Day Changes.

Since CARB has made clear that there will not be electrification of heavy-duty trucking for many years to come, this provision doesn't make sense, even if the decision to do so is within the Executive Officer's discretion. It just adds another layer of uncertainty to the LCFS, undermining the very purpose of the regulation.

If CARB continues to insist on this type of provision, the triggering mechanism should be limited to the number of ZEV or near-ZEV classes 7 & 8 vehicles, i.e., the heavy-duty trucking categories, since these are the ones that are hard to electrify.

4. The 15-Day Changes reflect an out-of-date GTAP-BIO model and data bases to determine iLUC

196.6

On p. 10 of the Notice, CARB described its proposed changes to Table 6, Land Use Change Values for Use in CI Determination as follows:

In section 95488.3(d), Table 6, staff proposes to add specification of the geographic region to Table 6 identifying where land use change (LUC) carbon intensity was modeled for specific feedstock/fuel combinations. **Table 6 LUC values were estimated through the GTAP and AEZ-EF modeling framework developed by CARB with input from an expert**



working group in 2010 and were updated during CARB's re-adoption of the LCFS program in 2015.

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It was at this time that CARB assessed the iLUC for soy BBD at its current value of 29.1. However, as Dr. Farzad Taheripour et al explain in their June 2023 report entitled *Biodiesel induced land use changes: An assessment using GTAP-BIO 2014 data base*, CARB's assessments of LUC value were made using an earlier version of the GTAP-BIO model than is used today, as well as a 2004 database. However, the 2004 data base has been updated twice since then, once in 2011 and again in 2014. In addition to updating the data base, the Purdue GTAP team has also greatly improved the GTAP-BIO model to consider intensification due to multiple cropping and/or conversion of idled land to crop production.

Therefore the 2004 data base and model CARB has been using are already seriously out-of-date, and CARB will be compounding the problem in the upcoming amendment by continuing to use them. Since the Scoping Plan requires CARB to use "the best available science" when computing emissions from crop-based feedstocks, we therefore request that CARB use the current GTAP-BIO model and 2014 data base to calculate iLUC for such feedstocks.

196.7

Furthermore, we request that CARB continue to accord an equivalent iLUC value to Argentine soy as the iLUC value for US soy BBD. In addition to the same iLUC value we also request that CARB continue to accord Argentine soy farming emissions an equivalent value to those of US soy.

5. Eliminating fossil jet fuel as a deficit generator

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In the 45-day text there was a provision adding fossil jet from in-state jet fueling as a deficit generator. Without prior discussion, CARB removed the provision from the 15-Day



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cont. Changes. We request that CARB add the provision back into the document sent to the CARB Board for adoption consideration.

6. **Sustainability Requirements for Biomass**

196.9 Please clarify whether wood chips used as process energy is intended to be included in the requirements of the first sentence of section 95488.8(g)(1)(A), i.e., "Biomass used in fuel pathways must only be sourced on land that was cleared or cultivated prior to January 1, 2008, and actively managed or fallow, and non-forested since January 1, 2008." If so, we request that it not be, or else it will be impossible for any biofuels producer to use wood chips as process energy.

Regarding Section § 95488.9: Special Circumstances for Fuel Pathway Applications, specifically item (g) Sustainability Requirements for Biomass, Be8 makes the following comments:

Given the proposed requirement for biomass certification from point of origin to the first gathering point, Be8 recommends:

- 196.10 a. **Phase-in Implementation and Mass Balance System:** To ensure a smooth transition, CARB should consider a phased-in approach incorporating a mass balance system. This system, similar to the ISCC EU System Document 203, would enable accurate tracking and accountability throughout the biomass supply chain, enhancing transparency and ensuring compliance.
- b. **Specific Certification Requirements:** For biomass used in process energy, CARB staff should clearly outline applicable certifications and their criteria. This will
- 196.11 provide biomass suppliers with the necessary guidelines to meet compliance requirements within the proposed timeline.



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196.12

c. **Deforestation Monitoring and Satellite Imagery:** To verify that biomass is sourced from land cleared or cultivated prior to January 1, 2008, CARB should specify the use of satellite imagery. Programs like ISCC and RenovaBio have successfully employed this method, utilizing third-party verification and satellite imagery with high spatial resolution (e.g., Landsat-8 or Sentinel-2).

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d. **Deforestation Evaluation and Biomass Exclusion:** For areas identified as deforested after January 1, 2008, the regulation should clarify whether all biomass from the property should be excluded or only the portion originating from the deforested area.

196.14

e. **Default Emission Factors for Woodchips:** Given the established default emission factor (0.03 kg/CO₂eq/Kg) for woodchips in programs like RenovaBio and ISCC, CARB staff should explain why this value would not be considered or provide an alternative default. This would support the use of woodchips as a renewable process energy source.

Be8 is committed to contributing to sustainable biomass management and advocates for the use of established methodologies to achieve our collective goals. By implementing the above recommendations, CARB can effectively regulate biomass use in fuel pathways while promoting environmental sustainability and reducing emissions.

In closing, we note that there is sufficient time before the November Board meeting for CARB to issue a second 15-day package. We request that CARB do so in view of new and unexpected provisions in the 15-Day Changes.

Sincerely,

DocuSigned by:

 8804ADA29A2B4A6
 Ricardo Franzen Reckziegel
 Commercial Director



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August 27, 2024

Carolyn Lozo
Chief, Transportation Fuels Branch
California Air Resources Board
1001 "I" Street
Sacramento, CA 95814

Via electronic submission

Transportation Fuels Branch Chief Lozo:

Consolidated Grain and Barge Co. (CGB) appreciates this opportunity to comment in response to the California Air Resources Board's (CARB) proposed 15-Day Changes to the Proposed Amendments to the Low Carbon Fuel Standard (LCFS) Regulation (15-Day Changes or Proposal). We truly hope you consider our points in your final approval.

Consolidated Grain and Barge Co. operates over 110 facilities that handle grain, process soybeans and provide logistics.

197.1

CGB strongly encourages CARB to follow its own prior modeling and conclusions CARB presented in its workshop on April 10, 2024, which show that an artificial cap on vegetable oil feedstocks is unwarranted and would only increase fuel prices and harm air quality. With the implementation of a cap on biomass-based diesel (BBD) feedstocks, a phaseout of BBD pathways, and even more restrictive and costly traceability and verification system, this proposal will only lead to more combustion of fossil diesel fuel, higher fuel prices at the pump, and poorer air quality. It may also lead to a surge of more imported foreign feedstocks such as Used Cooking Oil (UCO) and tallow - some of which may not be legitimate - being used to fuel California instead of local U.S. grown options - all at the expense of U.S. farmer, the U.S. crusher and the California taxpayer. Increasing the demand for UCO will have an impact on the habits of consumers in the world to reduce the reuse of cooking oil and therefore lower the overall sustainability of the system.

CARB should therefore reject the imposition of a vegetable oil cap and support a targeted, risk-based approach to sustainability requirements which does not penalize sustainable U.S. fuels and feedstocks at the expense of foreign imports which may not be legitimate.

At a minimum, CGB as well as NOPA believe CARB should take the additional time and effort to more fully consider the important issues involved and give parties the chance to more fully respond to the proposal.

While CGB has endeavored to identify all of the issues to date in this comment letter, 15 days is not a sufficient amount of time to fully address CARB's proposed vegetable oil cap and other significant and unexpected changes in the proposal. FOR these reasons CGB strongly recommends that CARB extend the comment period and hold an additional public workshop on these potential changes.

Background

Oilseed processing operations in the US yield protein-rich meal for human and animal nutrition, as well as vegetable oil that is used as an ingredient in food manufacturing and as a feedstock for renewable fuels such as biodiesel, renewable diesel and sustainable aviation fuel (SAF). These sustainably produced biofuels help reduce carbon dioxide equivalent (CO₂e) greenhouse gas emissions and the carbon intensity of transportation fuels in use today.

CARB's Own Analysis Supports the Elimination of a Cap on Vegetable Oils

While the intention behind CARB's proposal is to diversify feedstock sources and promote sustainability, it will have the opposite effect, outweighing its potential benefits. First and foremost, capping the use of vegetable oil will significantly increase fuel costs. Because vegetable oil is currently one of the most efficient fungibles and cost-effective feedstocks, limiting their use will constrain the supply of renewable diesel. Renewable diesel and biodiesel are crucial components of California's efforts to reduce greenhouse gas emissions and transition to cleaner energy sources and this artificial limitation will create a supply-demand imbalance, driving up the costs of renewable diesel production and, consequently, the price at the pump for California consumers.

Moreover, CARB's goal of 100 percent renewable liquid fuels with the proposed feedstock constraints in place is unrealistic and impractical. The renewable diesel industry is still developing, and waste feedstocks are not available in sufficient quantities to meet the state's ambitious targets. By capping vegetable oil usage, the proposal risks stalling the progress made to reduce carbon emissions by creating a bottleneck in renewable diesel production. In fact, CARB's own analysis supports this assessment.

CGB supports CARB's findings presented at the April 2024 workshop that renewable diesel and biodiesel have a positive impact on both consumers and the environment. CARB's "Staff Report: Initial Statement of Reasons" (ISOR) specifically modeled an alternative (Alternative 1) which "includes several policy mechanisms that have the effect on limiting the number of credits created from existing low-CI pathways" including "a limit on total credits from diesel fuels or sustainable aviation fuel produced from virgin oil feedstocks." The report's impacts are glaring – and each of them are attributed to more fossil diesel use in lieu of renewable diesel:

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- **Increased Fuel Costs:** Alternative 1 had total costs of \$162 billion, 1 percent more than the scenario without a vegetable oil cap and similar policies. According to CARB, "The main reason is that diesel fuel is a larger part of the fuel mixture and continues generating large amounts of in-state deficits through 2046. This is because renewable diesel produced from virgin oil feedstock is phased out . . . and more fossil diesel is needed to fuel the remaining vehicles with internal combustion engines."

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- **Increased Emissions:** Alternative 1 had greater emissions of greenhouse gases, particulate matter (PM2.5) and nitrous oxide (NOx) than the baseline. The higher NOx and PM2.5 emissions in particular were attributed specifically to reduced renewable diesel - CARB found that "Alternative 1 increases NOx emissions by an additional 10,981 tons and increases PM2.5 emissions by 2,773 tons. Alternative 1 has more NOx and PM2.5 emissions than the proposed amendments because this scenario uses less renewable diesel than the proposed amendments."
- **Fewer Health Benefits:** In line with its higher emissions, Alternative 1 also had correspondingly lower health benefits. CARB found that "Alternative 1 has a valuation of health benefits at \$1.58 billion compared to the proposed amendments with a valuation of \$4.98 billion, a difference of \$3.4 billion less in health benefits. The lower avoided health impacts of Alternative 1 are primarily associated with increases in PM2.5 over the baseline due to lower utilization of renewable diesel."

CARB Staff justifiably rejected Alternative 1, citing the fact that it "relies more heavily on fossil fuels...than the proposed amendments. As a result, [Alternative 1] does not achieve the same level of NOx and PM2.5 emissions reductions as the proposed amendments and potentially exacerbates existing air quality challenges in the State."

Additionally, the ISOR included an analysis, and the rejection, of another proposal by CARB's Environmental Justice Advisory Committee which included a cap on vegetable oils set at 2020 levels. CARB found that "due to limitations on lipid biofuels and dairy biogas, the Comprehensive EJ Scenario results in higher volumes of fossil diesel being used than any of the other scenarios evaluated." However, despite the demonstrated negative economic and health impacts of a vegetable oil cap, CARB's 15-Day Changes seek to accelerate those adverse impacts through additional regulatory requirements and market limitations on crop-based feedstocks. The additional restrictions will effectively create a decreasing volumetric cap as the price of compliance to maintain market access becomes cost prohibitive.

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CARB's analysis therefore appears to be at odds with its own prior findings. The ISOR concludes that just the imposition of a cap on vegetable oil feedstocks will increase fossil diesel use. Yet, CARB's proposal summary states that "this [vegetable oil cap] allows for California to displace up to 100 percent of the State's fossil diesel demand with cleaner alternative diesel." This will not be possible with the combined establishment of a cap on feedstocks, a phaseout of new BBD pathways, and the imposition of even more costly traceability and verification measures. CARB has not explained why it is rejecting or ignoring its prior conclusions in the ISOR.

The proposed phasing out of new BBD pathways by 2031 is also concerning and unwarranted. CARB has a stated goal to achieve 100 percent renewable diesel, and phasing out new pathways would be unnecessary at best and counterproductive at worst. If the market becomes saturated, new pathways would no longer be needed and applications for new pathways will stop on their own. If the market has not yet achieved 100 percent saturation, then additional pathways are likely to be needed to achieve CARB's goal. The inclusion of this provision only serves to send a market signal that will limit both near and long-term supplies of feedstocks and fuel necessary to achieve the climate goals of the LCFS.

Making these significant policy adjustments without more solid footing sends the wrong signal to the market that the LCFS program is subjective and unpredictable, particularly at a time when the fuel supply chain works toward to goal the California has set decarbonizing the transportation fuel supply. As a result, this proposal could impact investments from the same companies who have committed to climate smart agricultural practices and invested in dedicated energy crops like pennycress, camelina, carinata and winter canola. These investments represent a new wave in renewable energy production, based on the

promise of a predictable market which rewards sustainability and carbon reduction – not artificial caps and arbitrary prohibitions which would stymie innovation.

CGB urges CARB to eliminate the proposal's cap on vegetable oil feedstocks. In its place, we continue to recommend implementing policies that encourage the responsible production and use of renewable feedstocks while addressing concerns about deforestation through targeted risk-based measures.

The Proposal Contradicts the Requirements and Purposes of AB 32, the LCFS, and other California Laws

CARB's proposal to minimize biomass-based diesel used to comply with the LCFS flies in the face of the purposes of AB 32 and is inconsistent with several of its explicit requirements. To begin with, AB 32 requires that CARB design its LCFS regulations in a way that "maximizes benefits for California's economy, improves and modernizes California's energy infrastructure and maintains electric system reliability, maximizes additional environmental and economic co-benefits for California, and complements the state's efforts to improve air quality." Cal Health and Safety Code § 38501(h). But by minimizing RD and biodiesel production through a vegetable oil cap and related proposals, CARB would reduce environmental co-benefits and harm air quality. Because RD achieves significant NOx and PM2.5 reductions relative to fossil diesel, a cap that artificially reduces RD in the market will reduce the environmental benefits of the LCFS. As discussed above, that is borne out by CARB's own modeling in its ISOR.

AB 32 also requires CARB to meet GHG emissions limits in a way that "minimizes costs." A cap that artificially distorts the market inherently increases costs because regulated parties cannot choose the economically optimal way to comply with the obligations of the program. Again, this is supported by CARB's analysis in its ISOR that found increased costs in a scenario with a vegetable oil price cap.

AB 32's purposes are further embodied by its explicit requirements to minimize costs and maximize the total benefits to California. Cal Health and Safety Code § 38562. *See also id.* (Requiring CARB to "consider cost-effectiveness" and "minimize the administrative burden of complying with its regulations"); *id.* § 38560 (requiring CARB to issue "regulations in an open public process to achieve the maximum technologically feasible and cost-effective greenhouse gas emission reductions"). And CARB has designed its LCFS regulations accordingly by focusing solely on reducing the "carbon intensity of the transportation fuel pool," and taking a technology-neutral approach that allows various compliance mechanisms in order to maximize carbon intensity reduction. *See* 17 CCR §§ 95480, 95484. A vegetable oil price cap and freeze of vegetable oil pathways do the opposite – they create inefficiencies in the LCFS that add costs without corresponding improvements in GHG reductions. Indeed, without a vegetable oil cap, the market is optimally incentivized to comply in a way that both lowers costs and maximizes greenhouse gas reductions. A vegetable oil cap artificially skews that incentive, so the program will either need to be more costly to achieve the same level of GHG reductions or achieve less GHG reduction at the same cost.

CARB's proposal provides little basis or explanation for its abrupt shift in policy. To the extent there is any, it is CARB's statement that it expects that ZEVs will reduce diesel demand in "coming decades." But that speculative assertion is unsupported and ignores technical challenges with electrifying the heavy-duty sector. It also ignores another instruction in AB 32 to for CARB to design its regulations in a manner that "encourages early action to reduce greenhouse gas emissions." Cal Health and Safety Code § 38562. Biodiesel and renewable diesel are available to decarbonize trucks and other heavy-duty vehicles *now*, and it is illogical and arbitrary for CARB to miss out on those benefits in favor of speculative benefits in the future.

Finally, the proposal is inconsistent with other California laws designed to improve air quality and the environment, including California's State Implementation Plan ("SIP") under the Clean Air Act. In CARB's most recent SIP submission, it reiterated the imperative of reducing NOx and PM2.5. CARB, Proposed 2022 State SIP Strategy (Aug. 12, 2022). CARB noted in particular the impact of PM2.5 emissions from mobile sources on environmental justice communities and found that it is "imperative that we optimize our control programs to maximize emissions reductions and provide targeted near-term benefits in those communities that continue to bear the brunt of poor air quality." *Id.* at 2. CARB's proposal to eliminate a source of near-term PM2.5 improvement for the *possibility* of greater future electrification runs directly counter to the SIP's objectives.

CARB Should Take a Targeted Risk-Based Approach to Sustainability Requirements While Increasing Scrutiny on Waste Feedstocks

CARB's continued recognition that some geographic regions carry a higher risk for deforestation is commendable. However, the proposal doubles down on a one-size-fits-all approach which, according to CARB's Recirculated Draft Environmental Impact Analysis (EIA), would "create an even stronger incentive to utilize waste feedstocks," without any additional analysis of direct or market-mediated effects from such a policy, nor any additional proposed compliance requirements to ensure waste feedstocks are not fraudulent.

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Moreover, CARB's proposal would further disadvantage regions of crop-based feedstock production with low-risk of deforestation (U.S. and Canada) that are already subject to multiple compliance programs, thereby favoring feedstocks produced in regions with a significantly higher risk of fraud or deforestation.

At CARB's April workshop, staff noted additional measures which were under consideration to address potential fraud in sourcing waste feedstocks, including "additional detailed traceability, verification and/or enforcement of waste feedstocks to avoid fraud." Yet, despite additional proposals that would accelerate waste feedstock demand, the 15-Day Changes inexplicably included none of those measures.

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CGB believes that heightened scrutiny, oversight, and traceability to ensure the integrity of imported feedstocks for the CARB LCFS. CGB recommends stepped up enforcement of laws for imported feedstocks while exploring all possible viable options in the long term to ensure the origin and content of imports are legitimate. CGB supports paperwork and in-person audits, potential testing, and stronger attestations which will ensure the continued integrity of low carbon fuel programs. CGB urges CARB to include increased measures into its final rule to ensure foreign feedstocks are in fact legitimate and traceable. CARB should work in close coordination with federal officials who all touch imported feedstocks in some capacity such as the U.S. Department of Agriculture, Environmental Protection Agency (EPA), U.S. Trade Representative and U.S. Customs and Border Protection. CGB also encourages CARB to work with other countries who have experienced their own instances of fraudulent activity as it relates to imports in their own low carbon fuel programs such as the European Commission.

Further, implementing a targeted, risk-based approach to the proposal's sustainability criteria offers several advantages. It allows CARB to prioritize resources and regulatory efforts where they are most needed, ensures that sustainability criteria are effectively applied without imposing unnecessary burdens on low-risk regions or established sustainability programs, and ensures sufficient supplies of low-carbon fuels for the California market.

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CARB appears eager to incorporate an EU policy paradigm without accounting for the risks brought upon the EU market. In the wake of EU policy to limit crop-based feedstocks and increase crediting for waste feedstocks under the Renewable Energy Directive (RED II), policymakers have struggled to address concerns about fraudulent waste feedstocks,¹ while significant imports of Chinese biodiesel recently led the Commission to place substantial provisional import duties² of up to 36.4 percent.

CGB believes that CARB should not outsource sustainability certifications to the European Commission. CARB should recognize U.S. national, state, industry programs that meet the same intended goal of stopping deforestation and conversion. It is critical that CARB provide a tiered approach to feedstocks, fuels, and regions based on risk.

Regions identified as having the lowest risks of deforestation associated with crop-based feedstocks, such as the United States and Canada, crop-based feedstocks should be deemed to be in compliance with CARB's proposed sustainability criteria.

In the event CARB is unwilling to deem U.S. and Canadian feedstocks compliant, for regions where crop-based feedstocks comply with another established sustainability system, such as the Renewable Fuel Standard (RFS) Canada's Clean Fuel Regulation (CFR), or energy tax credit provisions in the Inflation Reduction Act (IRA), CARB should permit some level of aggregate compliance. These programs offer established frameworks for verifying sustainable practices and are a practical and effective way to achieve CARB's environmental goals without sacrificing any sustainability gains.

Further it is critical to note that planting decisions for crops to be harvested in late 2025 are happening now and will be made prior to CARB's proposal being finalized which means the timeline to begin implementing the sustainability certification criteria which specifically calls for "geographical shapefiles or coordinates of plot boundaries" by 2026 is simply not possible based on how the agriculture supply chain and crop harvest cycle works. For these reasons CGB strongly believes that a deadline beyond 2027 is more reasonable for the first phase of compliance should CARB determine to go down this path.

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While biofuels represent one significant market for vegetable oil, they are by no means the sole destination for these products. Given the diverse end uses of vegetable oil and meal, oilseed processors must carefully evaluate the return on investment when considering participation in an expensive sustainability certification program like the one CARB is proposing. California represents an important market for biofuels, but it may constitute only a fraction of the overall market for oilseed products. In this context, the costs associated with obtaining and maintaining sustainability certifications for a market that CARB seems intent on phasing out, may outweigh the benefits for many processors, particularly those with limited exposure to the California market.

For these reasons, CGB continues to urge CARB's inclusion of enhanced traceability and enforcement measures on waste feedstock imports and maintains that a targeted, risk-based approach would streamline compliance requirements while ensuring that sustainability criteria are met, and recognizing biofuels produced in compliance with existing U.S. programs is a practical and effective way to achieve

¹ Kelly Norways, "[New biofuel data triggers fresh fraud concerns over EU imports](#)," S&P Global, December 14, 2023

² Kelly Norways, "[EU imposes anti-dumping duties targeting cheap Chinese biodiesel imports](#)," S&P Global, August 16, 2024

197.5
Cont. this goal without sacrificing any sustainability gains. Should CARB proceed down the path to implement sustainability criteria, ample time to implement and comply beyond 2027 is essential.

Land Use Change (LUC)

197.6 While CGB strongly supports free trade and open markets, currently the CARB LCFS are driving demand for imported waste feedstocks. These programs are built on carbon intensity modeling that considers feedstocks such as used cooking oil (UCO), tallow, and greases as “waste.” CGB believes there is room for improvement when it comes to modeling waste feedstocks. In most instances the waste feedstock lifecycle begins when it is deemed “waste,” however key factors are not considered such as was that waste initially from a product that was grown on deforested land, for example. CGB notes that the environmental impacts of a product’s entire life cycle for waste feedstocks should be considered.

Imported feedstock volumes into the U.S. have skyrocketed in 2023 and 2024, displacing domestically produced feedstocks. One pound of imported feedstock displaces one pound of domestically produced soybean oil or 5 pounds of soybeans. From Jan 1, 2023 - June 30, 2024, the US imported a total of 7.9 billion pounds of UCO and tallow. Those 7.9 billion pounds of imported feedstocks displace the soybean oil crushed from an equivalent of over 650 million bushels of soybeans.³

As CARB noted at its April workshop and again in its recirculated EIA, “waste-based feedstocks, like UCO and animal fat, do not have additional LUC scores that are added to their CI value and made up 84% of all biomass-based diesel in the program from 2011 through 2022.”

197.6
Cont. However, non-waste feedstock carbon intensity modeling already includes direct and indirect land-use change values and CARB notes that existing modeling “may not be accurate for applicants sourcing feedstocks from outside 2015 analysis area.”

CGB appreciates CARB consideration of assigning more conservative land use change values for high-risk feedstocks in regions with higher LUC risk than, for example, North American feedstocks currently modeled in Table 6 of the LCFS regulation. However, as the science on LUC continues to evolve, CARB should recognize that there are instances in which LUC should be reduced, not just the instances where LUC should be increased. In CARB’s proposal the regulatory flexibility and updated scientific modeling is afforded only to feedstock/fuel combinations not listed in Table 6. Further, the proposal only permits an increase in the LUC penalty. The final regulation should permit the flexibility to reflect when science shows the penalty should be decreased, in addition to when LUC should be increased.

CGB requests CARB to reassess its LUC model, particularly regarding soybean oil, given the evolving data from models like Argonne GREET’s Carbon Calculator for Land-Use and the Land Management Change from Biofuels Production (CCLUB) Model. CARB’s most recent modeling of LUC for BBD was done almost a decade ago, and produced a score of 29.1 gCO₂/MJ, which is significantly higher than the more recent findings from the 2023 R&D Argonne GREET Model with CCLUB and the 2024 40B SAF GREET model with CCLUB which estimate a value of 12.5 and 12.2 gCO₂/MJ for soybean oil – a nearly 60% decrease from CARB’s current value.

AB 32 requires CARB to use the “best available economic and scientific information” in designing its LCFS regulations. Cal Health and Safety Code § 38562. CARB should therefore utilize the most recent science

³ USDA GATS/US Census Bureau

for all feedstock/fuel pathways and should not limit modeling updates to carbon intensity values only when the scores are worse, not better. To do so would undermine the scientific integrity underlying the basis of the entire LCFS program – to achieve the greatest carbon reductions based on unassailable science.

CGB encourages CARB to update its LUC model with the latest science for all feedstock/fuel pathways. This adjustment would not only ensure that CARB's regulations remain grounded in the latest science but would also promote fairness and consistency within the industry.

Request for Additional Time for Public Input

CGB notes that in the 15-Day Changes, the proposed cap on vegetable oil was the first time stakeholders had any opportunity to review these provisions or its concept. Given the precedent-setting nature of this program in the U.S., and the potential for significant cost and compliance burden to stakeholders, CGB requests that CARB, as it did on February 14, take additional time to allow stakeholders to properly vet the intent, impact, and implications of the proposed requirements. Specifically, CGB recommends that CARB at a minimum both extend the period for written comments and hold another public workshop.

Conclusion

In conclusion, CARB analysis, market and scientific data collectively demonstrate that consideration of a cap or limitation on crop-based feedstocks is unwarranted and in fact contradict AB 32, the LCFS regulations, and other California laws. Further, doing so unexpectedly and contrary to the reasonable expectations of regulated parties would undercut the necessary investments that are being made to support low carbon feedstocks and further feedstock expansion.

CGB also continues to encourage CARB to adopt a targeted, risk-based approach to implementing sustainability criteria under the LCFS. By accurately assessing deforestation risk, leveraging existing sustainability frameworks, and implementing targeted measures for high-risk regions, CARB can achieve its environmental objectives while also supporting a sustainable and resilient biofuels industry.

CGB is eager to continue working with CARB to support the role of agriculture in diversifying the fuel supply through more sustainable feedstocks, thereby supporting cleaner fuel options in California and beyond. We appreciate this opportunity to comment and look forward to collaborating with CARB and other relevant stakeholders.

Sincerely,

A handwritten signature in black ink that reads "Thomas J. Malecha". The signature is written in a cursive, flowing style.

Thomas J. Malecha
Executive Vice President

August 27, 2024

Clerks' Office, California Air Resources Board
1001 I Street,
Sacramento, California 95814

RE: Low Carbon Fuel Standard Amendments (15-Day Changes)

Dear California Air Resources Board Members and Staff,

Thank you for the opportunity to provide feedback on the Low Carbon Fuel Standard (LCFS) 15-day Changes. We value the leadership of the California Air Resources Board (CARB) to support and advance the transition to zero emission freight. The undersigned companies (Forum Mobility, Einride, Volterra Power, Gage Zero, EV Realty, TeraWatt Infrastructure, Zeem Solutions, and Prologis) represent providers of charging infrastructure for heavy-duty trucks, including shared depots that serve multiple fleets at a single location.

California's LCFS remains one of the most important tools the state has to support the transition to zero emission freight. LCFS directly supports transportation electrification by facilitating infrastructure deployment, reducing fueling costs, and incentivizing the purchase of zero-emission vehicles. The proposed amendments build on this in many key ways. Most importantly, the proposed heavy-duty fast charging infrastructure (HD-FCI) program has the potential to be the single most important program in helping to deploy the charging infrastructure necessary for California to meet its zero emission transportation goals mandated by Governor Newsom's EO N-79-20 and furthermore advanced by recent regulations such as the Advanced Clean Trucks (ACT) and Advanced Clean Fleets (ACF) rules. As noted in our previous comments, the HD-FCI provision addresses utilization risk in the early phases of the market, providing an elegant way to solve the "chicken or egg" problem that is currently hindering infrastructure deployment. This is an innovative and groundbreaking proposal that will really help catalyze private sector investment.

We greatly appreciate the coordination and collaboration with CARB staff and Board Members throughout the LCFS amendment process. While there are lingering concerns regarding biofuel crediting and a resulting market imbalance depressing credit values, we support the 15-day changes and the overall LCFS program. Our coalition has provided extensive feedback throughout the process and we commend staff for making several important adjustments to help ensure that the HD-FCI program reaches its full potential. Below are comments on specific sections, including some areas where clarifications would be beneficial for all stakeholders as we look toward implementation early in 2025. Where relevant, our group has provided proposed language to help avoid confusion and to ensure the program is utilized to the maximum benefit.

Heavy-Duty Fast Charging Infrastructure

The 15-day changes added important flexibility to HD-FCI program parameters, helping better align the program with industry and fleet needs while maintaining appropriate guardrails to ensure the integrity of the program. We appreciate the thoughtful discussions throughout this process and applaud CARB staff for increasing flexibility on geographic location and site specifications (e.g., removing the 10 FSE cap and adjusting the minimum nameplate capacity). These changes will make the program more effective. As a follow-up to our past communications with staff, we respectfully request the following confirmations, clarifications, and minor amendments for the HD-FCI provision:

1. 5 Mile Corridor Requirement

We strongly support the proposed amendment to allow site eligibility within 5 miles from any ready or pending Federal Highway Administration (FHWA) Alternative Fuel Corridor. This added flexibility is essential to enable infrastructure deployment in key locations while avoiding the added costs, delays, and siting complexities that would be triggered by a more restrictive requirement. We appreciate CARB staff's clarification that it is 5 mile distance as measured on an aerial point-to-point radius basis or "as the crow flies" in our meeting on August 23, 2024 and respectfully request written clarification and confirmation of this interpretation in CARB's responses to comments.

198.1

If amendment language is needed, we recommend the following:

Proposed Language

Section 95486.4(a)(1): The distance requirement is limited to shared HD-FCI sites and extended to five miles aerial point-to-point radius from any ~~ready~~ or pending FHWA Alternative Fuel Corridor.

2. Shared HD-FCI Site 12-hour Reservation

198.2

We greatly appreciate CARB's recognition of the fact that shared, multi-fleet charging hubs will play an important role in meeting fleet charging needs. Including these sites in the HD-FCI program with appropriately tailored rules and requirements will drive private investment in infrastructure deployment and ensure the HD-FCI program meets fleet and industry needs across a broad spectrum of use cases. We applaud CARB for acknowledging that shared, multi-fleet sites will need access controls, reservations, and flexible payment and contracting arrangements. The proposed language appropriately sets different access and payment requirements for shared, private, and public sites in recognition of the inherent differences in fleet needs and business models. The draft regulations contain language ensuring that **sites** are in fact shared and open to multiple fleets, while enabling individual **stalls** to be reserved in a way that works for fleet operators. Per our meeting on August 23, 2024, we appreciate CARB staff's clarification that the prohibition on reservations over 12 hours at shared HD-FCI sites is at the multi-fleet depot site level and does not preclude longer reservations (i.e., more than 12 hours) for individual charging stalls. The ability to provide longer-term reservations for individual charging stalls is important for meeting fleet needs, but does not detract from the fact that sites overall will continue to be "shared," serving multiple fleets in one location. We respectfully request written confirmation and clarification that the 12-hour restriction is at the site level in CARB's responses to comments.

If amendment language is needed, we recommend the following:

Proposed Language

Section 95486.4(b)(4)(D): ~~The FSEs at a~~ A shared HD-FCI charging site cannot be reserved for one HDV fleet for more than 12 hours each day. Longer reservations for individual FSEs are permitted so long as the site is shared and open to multiple fleets.

3. 2.5% Program Cap for HD-FCI

As per our original comments, we continue to believe that the needs of the heavy duty sector would be better served by a 5% program cap for HD-FCI. It is our understanding that the cap on the HD-FCI program is based on estimated potential FCI credits specifically in the HD-FCI program and that the LMD program has a separate 5% cap. We appreciate the clarification from staff that it is in fact CARB's intent to have separate 2.5% program caps for HD-FCI and LMD-FCI. While this is the most natural read of the language, written confirmation and clarification would help clear up any uncertainty among stakeholders.

198.3 If amendment language is needed, we recommend ensuring throughout the regulatory text that the generic term “FCI” (absent a program-specific prefix such as “HD”) is only used in reference to the “legacy” light duty program currently in place. When discussing HD-FCI or LMD-FCI, the full acronyms (e.g., with “HD-” and “LMD-” modifiers) should be used to avoid confusion. We also recommend the following to align with language in similar sections for HRI and LMD-FCI:

Proposed Language

Section 95486.4(b)(3)(A)(2): If estimated potential HD-FCI credits from all approved HD-FCI FSEs exceed 2.5 percent of deficits in the most recent quarter for which data is available, the Executive Officer will not approve additional HD-FCI pathways for HD-FCI FSEs and will not accept additional HD-FCI applications until estimated potential HD-FCI credits for approved HD-FCI FSEs are less than 2.5 percent of deficits.

198.4 In a similar vein, as CARB considers the application review and verification processes, we recommend designing safeguards to ensure that stations approved for the heavy duty FCI program are in fact primarily serving heavy-duty vehicles while retaining flexibility for sites that are mixed-use.

4. Charging Station Verification

198.5 The proposed verification requirements would add cost and administrative burden for modest benefit. We support CalETC’s proposed modifications and rationale on charging station verification via desktop review by third party verifiers.

Program Stringency and Sustainability

198.6 We appreciate CARB’s proposal to modify the 2025 carbon intensity target from a 5% to a 9% step down to help rebalance the market, address the oversupply of credits, and make additional progress toward California’s climate and clean air goals. We also acknowledge that there has been significant stakeholder concern and debate over the sustainability of certain biofuel pathways as well as the carbon reductions attributed to those fuels. The proposed limit on credits for biomass-based diesel produced from virgin soybean and canola oil is a step in the right direction on this front, and we commend CARB for taking an initial step to address stakeholder concerns. However, the market response to the stringency and sustainability provisions to date has been muted. We support the proposed amendments overall and look forward to program implementation in early 2025, but we also encourage CARB staff and Board Members to continue refining the program as needed to better support the State’s mandates for a transition to zero emission transportation.

Conclusion

The parties represented in this infrastructure coalition are appreciative of the opportunity to submit comments on CARB’s proposed 15-day changes. We acknowledge that the development process for this critical regulation has taken quite a bit of time and collaboration with the industry to ensure the program is crafted in a way that it will be successful and we have greatly appreciated the opportunity to provide our feedback. The LCFS remains a vital tool for advancing our transportation electrification goals and regulations - particularly given current budget shortfalls and electricity rate affordability concerns - and we appreciate the opportunity to work with staff on updates and clarifications to align the program with state priorities.

Sincerely,

Adam Browning
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August 27, 2024

The Honorable Liane Randolph
Chair, California Air Resources Board
Low Carbon Fuel Standard Program
1001 I Street
Sacramento, CA 95814

RE: Low Carbon Fuel Standard 15-Day Amendments

Dear Chair Randolph and Members of the California Air Resources Board,

DTE Vantage (DTE) appreciates the opportunity to provide the following comments on the August 12, 2024 Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information for the Proposed Low Carbon Fuel Standard (LCFS) Amendments (15-Day Package). DTE is a developer, owner, and operator of biomass, co-generation, and landfill gas electricity facilities in California and nationally, supplies renewable natural gas (RNG) to the state, and participates in the LCFS program.

The LCFS program has encouraged our company to invest millions of dollars in support of California's decarbonization goals by virtue of its historically strong market signal. We are thankful that the California Air Resources Board (CARB) incorporated stakeholder input and took steps in this package to increase the ambition of the program's targets, which we believe are necessary for achieving the state's objectives for reduced emissions in the transportation sector and attracting further investment and innovation.

We also support CARB's inclusion in the proposal of a full credit "true up" after annual verification and believe this modification more accurately accounts for the climate benefits of low carbon fuels.

- 199.1 We are concerned with newly proposed steps to reduce the number of crediting periods for avoided methane emissions from three to two, which will undercut the economics for a number of existing projects. This change unfairly penalizes projects and developers that were early movers in the LCFS program and which invested in decarbonization projects with the understanding that there would be three crediting periods. The continued inclusion of a 4x penalty for instances where a verified CI score is higher than the certified score is also troubling and imposes an outsized penalty on dairy digester projects that have inherent CI variability from year to year. We are also concerned that changes to impose deliverability restrictions into the program via a gas system map are problematic will serve as a barrier to existing low carbon fuels.
- 199.4
- 199.5

We remain grateful for CARB's extensive efforts to solicit feedback from stakeholders who are deeply invested in the LCFS's success, and we respectfully provide additional comments for its consideration.

Increasing Program Stringency Will Accelerate California's Transportation Decarbonization Goals and Enable the Growth of Low Carbon Fuels

Throughout the LCFS amendment process, DTE and other stakeholders have emphasized the need for CARB to clarify the market signal to low carbon fuel producers by tightening the program's targets. We are encouraged by the 9% stepdown that has been included in the 15-Day package, however, based on our own modeling and the independent analysis done by ICF, we continue to believe that CARB should consider even more stringent reduction goals to address the current LCFS market imbalance.

Reversing the tides of the growing credit bank is necessary to stabilize the investment signal needed to bring additional projects online that will fulfill California's economy-wide goals for greenhouse gas (GHG) reductions and meet the state's SB 1383 goals for methane reduction. We remain concerned that if the credit bank continues to swell beyond its current size, credit pricing will remain below the point needed to incentivize new investments or support the continued operations of existing projects.

DTE's internal modeling suggests that the currently proposed changes to the LCFS program are not sufficient to address the growing credit bank. **We anticipate the rate of credit generation will continue to grow in the short- and medium-term as a result of renewable diesel refinery conversions and an increasing adoption of electric light-duty vehicles. The cumulative LCFS credit bank now stands at ~26 million surplus credits, and though credit prices have stabilized, are still hovering around all-time lows. Based on the updated targets included in the 15-Day package, we estimate that the credit bank could increase to over 70MM credits by 2030 absent additional changes. Therefore, we encourage CARB to target at least a 40% CI reduction by 2030 to address the credit surplus.**

Additionally, we reiterate our support for an auto-acceleration mechanism (AAM) to increase CI target stringency if warranted, as was previously proposed by CARB. Unfortunately, the proposed timeline in the 15-Day Package would delay implementation until at least 2028, effectively limiting this important tool from addressing oversupply. We would recommend CARB adopt the AAM as soon as 2025 to ensure that efficient and prompt actions are taken to balance the market.

Avoided Methane Crediting Remains a Key Policy for Enabling RNG Projects and Maximizing GHG Capture

For projects breaking ground before January 1, 2030, the 15-Day Package institutes limits on the crediting period for avoided methane emissions projects to two consecutive 10-year crediting periods instead of three. Avoided methane crediting is a necessary tool for covering the operating

expenses for many existing agricultural and organic waste diversion projects, where profitability is intricately linked with CI scores driven by the avoided methane calculation. Reducing the number of available crediting periods will necessarily decrease the available timeframe for recovering capital costs and justifying investments, and we do not believe CARB has demonstrated a rationale for changing this fundamental policy for driving methane capture projects.

For DTE, this proposed change is particularly problematic for our existing projects that utilized a large portion of their initial crediting period under previous beneficiaries within CARB's Cap and Trade program. Our window to recover costs for these projects would be drastically reduced if CARB proceeds with eliminating the third crediting period. Until an alternative market exists to support continued methane abatement at agricultural operations, DTE Vantage asks that CARB reverse its proposal to phase-out the third avoided methane crediting period.

The "True up" Concept Improvements to Reflect Actual CI Performance are Important for Accurately Capturing the Climate Benefits of Low Carbon Fuels but are Incomplete

199.3 The inclusion of a full credit "true up" to include temporary pathways and reflect actual CI performance for all pathways is an important update included in the 15-Day Package, as it recognizes the complete climate benefits of low carbon fuels projects and will reduce the financial impacts project developers currently experience while waiting for provisional pathway applications to be approved.

DTE's hope is that this true up mechanism can be extended into a pathway's provisional period and beyond, however. As pathway CI scores fluctuate within normal ranges of variation from year to year, the most logical true up mechanism would allow pathway holders to true up, both positively and negatively, each year at the conclusion of their annual fuel pathway report period.

CARB's Proposed Remedy of a 4x Penalty for CI Exceedance is Excessive and will Disproportionately Impact Agriculture Facilities

DTE supports CARB's continued diligence to ensure the integrity of the LCFS program, and we support reasonable measures to recoup any excess credits that may be created as a result of updated CI scores through the aforementioned true up concept. However, we remain concerned with the continued inclusion of a 4x penalty for adjustments in instances when the verified CI is greater than the certified CI for a pathway. Digester-sourced biogas projects have an inherent amount of CI variability that is difficult for a pathway holder to manage and predict. The incorporation of avoided methane emissions as part of the CI calculation of these fuels means that factors outside of the pathway holders' control (e.g. livestock population, manure collection, weather) may result in variations in biogas production, and lead to notable changes in the digester pathways' annual CI scores.

Imposing a 4x penalty for adjustments not resulting from misconduct is unwarranted and unfair. DTE would support a mechanism where the party refunding excess credits received but

199.4
Cont.

continues to oppose the 4x penalty, which is unnecessarily punitive and has not been justified by any history of problems within the program. DTE strongly encourages CARB to eliminate this multiplier penalty. Conversely, as previously mentioned, providing a full true up mechanism whereby excess credits are refunded back to CARB and additional credits are awarded following a review showing that a lower CI score was warranted would be an acceptable solution to the inherent variability in dairy manure digester pathways.

Proposed Changes to Demonstrate Deliverability into the California Market Impose Unnecessary Barriers

199.5 cont.

The provision included in the 15-Day Package directing the Executive Officer to establish a gas system map identifying pipelines that flow into California a minimum of 50% of the time is difficult to understand, appears to misunderstand the interconnected and dynamic nature of the North American gas pipeline system (e.g. what if the pipeline changes to being 51% away from California the next year?), and will only serve as an additional barrier to future RNG project investment. California's energy markets will continue to rely on imports and exports to properly function and we would ask that CARB refrain from implementing additional unwarranted deliverability restrictions on RNG projects.

Conclusion

199.6

DTE Vantage appreciates the opportunity to provide additional comments on the 15-Day package. We commend CARB for its efforts to engage the public throughout the amendment process, and we hope it considers another 15-Day Package to the Proposed Rule to further strengthen the LCFS program. As the Agency implements final changes to the rulemaking, we strongly encourage CARB to implement the following modifications:

199.7

- Strengthen the CI reduction target to at least 40% by 2030,

- Effectuate the auto-acceleration mechanism in 2025,

- Reverse the elimination of the third avoided methane crediting period,

199.8

- Maintain the full credit "true up" provisions while removing the onerous 4x penalty for CI exceedance, and

199.9

- Avoid unnecessary deliverability requirements into the California market.

Thank you for your consideration of our comments.

Sincerely,



Philip O'Neil

Vice President – DTE Vantage



August 27, 2024

The Honorable Liane Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Subject: Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information for the Proposed Low Carbon Fuel Standard Amendments

Dear Chair Randolph,

200.1 The Resource Recovery Coalition of California (RRCC) is grateful for the opportunity to provide comments on the proposed LCFS amendments. RRCC represents waste and recycling haulers, processors and composters who support the LCFS and have significantly reduced their emissions by utilizing low carbon fuels in their vehicles and programs. We along with many other stakeholders strongly support more stringent carbon reduction targets, including a more aggressive target in 2025. However, we are concerned that the proposed definition of “food scraps” is advertantly restrictive and would impede progress in achieving our organic diversion targets under SB 1383.

As proposed, the definition of “food scraps” would exclude many sources and forms of food scraps. We urge CARB to define “food scraps” as follows.

200.2 “Food scraps” is the portion of municipal solid waste (MSW) that consists of inedible or post-consumer food collected from locations which include, but are not limited to, residences, **commercial and industrial enterprises**, hospitality facilities, institutions and grocery stores. Feedstocks that are **source separated at the point of generation and that are** not typically landfilled do not qualify as Food Scraps, which include: fats, oils, or greases (FOG), liquids at the point of collection, and materials from industrial food manufacturing and distribution facilities **that can be used as animal feed, as set forth in Chapter 6 of Food and Agricultural Code (FAC), commencing with Section 14901 et. seq and Title 3, Division 4, Chapter 2, Subchapter 2 commencing with Article 1, Section 2675 of the Code of California Regulations.”**

You might also consider a simpler definition, as follows.

“Food Scraps” is the portion of municipal solid waste that consist of inedible, post-consumer or production food wastes that would otherwise be landfilled.



RESOURCE RECOVERY COALITION OF CALIFORNIA

200.3 We also note that the proposed amendments include a definition for “recovered organics” that does not appear to be used anywhere else in the proposed regulation. We ask that CARB clarify how this definition is intended to be utilized in the regulation. The following definition of “recovered organics,” if necessary, would more accurately represent the manner in which organic waste is recovered from the waste stream.

“Recovered Organics” is the organic fraction of ***mixed*** municipal solid waste that is ***source separated at the point of generation or otherwise*** manually or mechanically separated from the waste stream, typically at a materials recovery facility, ***anaerobic digestion facility, compost facility***, or transfer station.

Thank you for your consideration of our comments. Should you have any questions, please do not hesitate to reach out.

Sincerely,

Veronica Pardo
RRCC Executive Director



August 27, 2024

California Air Resources Board
1001 I Street
Sacramento, California 95814
Via electronic submittal

Re: Comments on Proposed 15-day Changes, Proposed Amendments to the Low Carbon Fuel Standard (LCFS) Regulation

Dear Chair Randolph and Board Members,

Thank you for the opportunity to offer our input regarding 2024 Proposed Low Carbon Fuel Standard (LCFS) Amendments. We appreciate the workshops and meetings and all the staff work that has culminated in these proposed amendments.

201.1

We urge you to change critical aspects of the Proposed LCFS Amended program that undermine California's climate goals and that directly harm historically disadvantaged, low income and frontline communities.

We urge CARB to:

201.2

1. Remove the incentives to pollute that occur as a result of subsidies for avoiding methane emissions.

201.3

2. End the flawed policy of giving credits for "avoided methane emissions" in 2024 and limit the LCFS carbon intensity scores to no less than zero.

201.4

3. The proposed 20 percent cap is a small step in the right direction toward capping lipid-based biofuels. A better approach would be to limit the volume rather than the share of vegetable oil used for fuel.

201.5

4. While we applaud the increase in stringency of the 2025 LCFS target we urge CARB to put bio-based jet fuel and gasoline back in and avoid backtracking on climate ambition.

1. Remove the incentives to pollute that occur as a result of subsidies for avoiding methane emissions.

201.2
cont.

Subsidies can have unintended consequences in the long run. They encourage existing firms to increase their production capacity and attract new market entrants seeking to capitalize on the subsidies. Paradoxically, this often leads to an overall increase in pollution, contrary to the policy's intended goal. Finally, subsidies transfer wealth to polluters. Subsidy programs effectively transfer wealth from public coffers to polluting entities. This not only strains government budgets but also contradicts the "polluter pays" principle, a cornerstone of environmental economics.

2. End the flawed policy of giving credits for 'avoided methane emissions' in 2024 and limit the LCFS carbon intensity scores to no less than zero.

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cont.

Under the current LCFS regulations, producers of livestock biomethane are given a large negative carbon intensity score, since it is assumed that anaerobic digesters capture all the emitted methane. However, a recent study¹ by Food and Water Watch, as outlined in their report 'The Proof is in the Plumbing' (January 2024), reveals substantial methane leaks originating from these anaerobic digesters. The plumes of leaked methane are so large that, by [Carbon Mapper](#)'s definition, the digesters qualify as super-emitters. This is deeply troubling, underscoring the direct contradiction between the current flawed LCFS carbon intensity assignments and California's Clean Energy and Air Quality objectives.

This policy distortion results in an inequitable and socially inefficient distribution of credits favoring compressed natural gas (CNG) trucks over zero-emission vehicles (ZEV), granting more credits to methane-based, polluting hydrogen than to zero-emission green hydrogen, and allocating LCFS credits to large Concentrated Animal Feeding Operations (CAFOs) over smaller more sustainable farms.

Since the economic value of LCFS credits increases with a more negative carbon intensity measure, it is imperative for California to reevaluate its practice of awarding credits for "avoided methane emissions." The existing flawed accounting method, which assigns a carbon intensity range of -102.79 to -790 for factory farm gas, makes no sense compared to the carbon intensity of zero for an electric car powered by solar panels. Does this really make any sense? To ensure the alignment of incentives with environmental priorities, CARB must discontinue its practice of crediting dairy biogas in the LCFS.

The current CARB proposal is to continue with negative crediting of dairy biogas used directly in the LCFS until 2040² and until 2045 if used for hydrogen fuel cells. This provision must be changed and the crediting for avoided methane emissions discontinued as soon as possible.

3. The proposed 20 percent cap is a small step in the right direction toward capping lipid-based biofuels. A better approach would be to limit the volume rather than the share of vegetable oil used for fuel

201.4
cont.

The 20 percent proposed cap is a step in the right direction but its effect is limited since the total volumes of bio-based diesel fuel has been and will likely continue growing rapidly. So, this cap will have limited effect on the incentives for diversion of food to fuel. The increases in the consumption of biofuels, such as soy oil, intensifies the competition for land resources used for food production, thereby worsening global food insecurity and raising food prices. Unchecked growth in the biofuel market poses a significant risk of increasing global deforestation, especially as there are limits on waste oil collection and reuse, necessitating expanded production of soy oil and other oil substitutes like palm oil.

Another option and a better policy would be to treat fuels above the 20 percent limit as equivalent to fossil diesel both in the LCFS and in Cap and Trade policy. This suggestion by Dr. Jeremy Martin of UCS, is how a similar cap is implemented in Germany.

4. While we applaud the increase in stringency of the 2025 LCFS target, we urge to put bio-based jet fuel and gasoline back in and avoid backtracking on climate ambition.

201.5
cont.

We commend CARB for strengthening the LCFS 2025 target and lowering it one time by 9% to address the oversupply of LCFS credits in the market. This is a modest step forward to address the ongoing climate crisis which is approaching a critical [cliff](#). This year is on track to be the hottest year on record and there are record wildfires, floods, extreme heat and these are only going to get worse. As UN Secretary-General Antonio Guterres said on June 5, 2024, we are at a “Moment of Truth”.

This is not the time to reduce and retract our climate ambition – we need to be bold and act aggressively. The removal of bio-based jet fuel and gasoline is a move in the wrong direction.

Thank you for the opportunity to provide feedback and comments on the Proposed 15-day Changes, Proposed Amendments to the Low Carbon Fuel Standard (LCFS) Regulation.
Respectively Submitted,

Ellie Cohen
Chief Executive Officer
The Climate Center



August 23, 2024

Chair Randolph and Members of the Board
California Air Resources Board
1001 I Street,
Sacramento, California 95814
Via Electronic submittal

Re: Proposed Low Carbon Fuel Standard Amendments

Dear Chair Randolph and Members of the Board:

On behalf of Pacific Environment, thank you to the California Air Resources Board (CARB) for soliciting stakeholder input on the potential changes to the California Low Carbon Fuel Standard (LCFS) and for all the hard work that went into it.

Pacific Environment is a 501(c)(3) public-benefit corporation, headquartered in San Francisco, with regional offices in Anchorage, Alaska, and Chongqing, China. Pacific Environment has earned rare permanent consultative status at the International Maritime Organization (IMO), the United Nations' entity that sets international shipping law. At the IMO, Pacific Environment has played a lead role in advocating for a new international regulatory regime (called the "Polar Code") to regulate ship traffic, pollutant emissions, and waste dumping in Arctic waters.

Pacific Environment appreciates the opportunity to comment on the proposed LCFS Amendments. In our full comments below, we address 3 points as outlined here:

- 202.1 1) The need for a subsequent immediate opening of another LCFS revision process, unrestricted in scope to proactively address revisions needed as the program matures;
- 202.2 2) Time limits for indirect accounting of electrolytic hydrogen to quarterly time periods to ensure low-CI standards are met and emissions are not induced by hydrogen generation during peak demand periods; and
- 202.3 3) The need for a rapid review and update of the OPGEE model to account for unique characteristics and impacts of Alaska North Slope oil exports.

Begin Another Period of LCFS Rulemaking with no Restrictions on Scope

- 202.4 Pacific Environment urges CARB to open another period of rulemaking immediately at the close of the current revisions period. The length of time needed to address this round of revisions and the number of comment letters submitted indicate the high level of interest across stakeholders with a diverse range of opinions and analyses to discuss.

202.4
cont. A number of topics were unable to be fully addressed in this round of revisions. Creating a protocol of frequent revisions will allow for greater attention to any remaining unresolved issues and any future ones that may arise as the program continues to grow.

202.5 In addition, Pacific Environment urges CARB staff and Board to include marine fuel eligibility within the next round of LCFS revisions. Marine fuel remains a highly polluting source within California waters and air basins, harming numerous environmental justice communities across the state and contributing to nonattainment of federal air quality standards. In addition, the industry is slow to adopt and develop low-carbon intensity (CI) and zero criteria air pollutant fuels and technologies without clear regulatory support and frameworks in place.

Inclusion of marine fuels within the LCFS would provide important support to a developing industry of low-CI fuels and provide needed relief to California communities statewide.

Limit Book-and-Claim Accounting to Quarterly and Move towards Hourly for Electrolytic Hydrogen

202.6 The revised 15-day Amendments released by CARB move to allow indirect accounting for Low-CI Hydrogen through book-and-claim methods across 3 quarters for reporting periods. Pacific Environment urges CARB staff to limit accounting periods for low-CI electricity used to produce low-CI hydrogen to the same quarter time period for reporting. Allowing use across 3 quarters would permit hydrogen produced during peak demand periods with the highest CI score to claim low-CI and a highly coveted sustainability score completely disconnected from the reality of emissions generated due to the electricity demand in producing hydrogen.

Green hydrogen is a promising solution for decarbonizing hard-to-abate sectors, like ocean shipping, if done appropriately. The federal government and recent academic research indicate that hourly matching is the gold standard to ensure power drawn from the electricity grid used to generate hydrogen as a transportation fuel does not increase demand during high emissions generating periods.

A time limit of 3 quarters might be reasonable for direct electrification of transportation end uses given the efficiencies gained and the increased deployment of renewable energy within the grid. But that same time period is not appropriate for electrolytic hydrogen given the much larger energy demands to generate the equivalent amount of energy for transportation use. Electrolytic power demand for hydrogen production could far outstrip the existing and projected increases in renewable energy to serve the grid, increase emissions from greater reliance on fossil fuel plants,

202.6
cont.

and further extend the lifetime of fossil fuel plants used to serve the grid in periods of high power demand.

Unless there is a time period set for a transition to one-quarter or even more granular time periods, there is a risk of investment signals to be sent for increased hydrogen production in the state that places greater demands on the electric system during a time of strong load growth and difficulty matching the pace of development through renewable energy generation.

The LCFS guidance on book-and-claim accounting already has provisions for deliverability and additionality of low-CI electricity, but time matching through limiting quarters available for credit use and retirement remains a critical and unaddressed part of the LCFS revisions. We urge CARB to adopt best practices and signal intent to limit credit matching to one quarter and progressively shorter time periods to hourly in 2028 as the federal government has set.

The three pillars requirements of incrementality, temporal matching, and deliverability will build a robust hydrogen industry that is truly clean and lasts beyond the expiration of 45V. These requirements will ensure the buildout of a durable hydrogen industry that fulfills 45V's goal of reducing carbon emissions and accelerating the clean energy transition.

Cleaning California Oil Imports to Do No Harm

202.7

Pacific Environment offers the following comments on the revised **Oil Production Greenhouse Gas Emission Estimator (OPGEE) Model** and data inputs released Feb. 21, 2023:

1. CARB should accelerate the adoption of the more robust Version 3.0b of the OPGEE model released Feb. 21, 2023.
2. CARB should implement a **rapid review/update process** to update CARB reporting from OPGEE data/modeling to reflect field specific contemporary peer review literature as it becomes available.
 - a. "Climate justice delayed is climate justice denied." Accurate and current data of the emissions is critical to understanding the nature and extent of the climate challenge. In 1954 oil companies knew that what they were doing had an adverse impact on the climate.¹ Their failure to disclose the nature and extent of their knowledge of those impacts is an indictment of their self interest in preserving profits despite horrific impacts on people and the environment. **CARB has a responsibility to use timely, accurate data.**
 - b. CARB should strive to "level the playing field" among oil producers and accelerate the reporting of field specific clean energy resources to encourage energy developers to strive for lower life cycle emissions.

¹ <https://www.desmog.com/2024/01/30/fossil-fuel-industry-sponsored-climate-science-1954-keeling-api-wspa/>

3. CARB should support OPGEE model **data updates to reflect the unique challenges of Arctic oil and gas development** highlighted in the peer review literature, including:
 - a. Exploration & Development (§6.1 to §6.2.2.3)
 - i. CARB should allocate the GHG emissions estimates associated with **unsuccessful exploration activities** at the field level. If the emissions estimate from unsuccessful exploration activities cannot be directly assigned to a producing field, the CARB should assign those emissions to regional or national oil producing provinces. For example, Shell conducted and abandoned exploration activities in Alaska's Chukchi Sea. The emissions associated with those activities could be assigned to Alaska's North Slope, Alaska as a whole, or the U.S.
 - ii. CARB should task the OPGEE team with conducting a peer review literature for **Alaska North Slope land use impacts related to tundra disturbances and acceleration of melting permafrost and associated methane/biogenic carbon emissions.**
 - iii. CARB should task the OPGEE team to review **field drilling and development data for Alaska's North Slope field data** in OPGEE data tables to verify:
 1. that the drilling energy consumption estimates reflect the **high level of energy consumption** required to drill through typically **thick permafrost strata.**
 2. that the **well completion activities** associated with working in **thick permafrost** are reflected in the emissions estimates.
 3. that the **field development emissions** data adequately include the **risk of gas leakage around inadequately completed and monitored wells** [CD-1 Pad, Alpine Field, Alaska North Slope, March 4, 2022]
 4. that the **hydraulic fracturing energy consumption and associated emissions** estimates reflect the **higher level of energy consumption required in the typically lower temperature North Slope oil producing strata near thick permafrost strata**, especially for viscous and heavy oil prospects that are being developed at shallower depths.
 5. that the **energy expenditures and GHG emissions** that arise from the **extraordinary surface use activities necessary to protect the fragile tundra ecosystem, e.g., snow/ice roads**, are adequately reflected in emissions estimates.
 6. that the GHG emissions associated with **surface disturbances of highly thermally sensitive tundra which leave trails in the tundra which accumulate surface water which in turn absorb heat during the increasingly warming climate and accelerate the thermal degradation of permafrost which in turn releases high concentrations of methane** are adequately reflected.
 - b. Production (§6.4 through §6.53)
 - i. CARB should task the OPGEE team with reviewing the data associated with the use of **miscible injectant (CH₄, CO₂ mixture) for enhanced oil recovery**

- on Alaska's North Slope to verify that the data adequately accounts for **CH₄ and CO₂ leakages**.
- ii. CARB should task the OPGEE team with reviewing the data associated with the use of **polymer flooding for enhanced oil recovery of viscous and heavy oils** on Alaska's North Slope to verify that the data adequately accounts for the life cycle emissions of those activities to produce viscous and heavy oils.
- c. Fuel Cycle & Embodied Emissions (§7)
- i. CARB should task the OPGEE team with reviewing and verifying the **assumptions underlying the co-production credit for prospective LNG exports from Alaska**, i.e., the "natural gas displaces coal" vs. "natural gas could be substantially displaced by renewables." Verify the estimates for the **magnitude and direction of the savings/cost of natural gas vs. coal** supply chains, especially considering the energy intensive LNG supply chain associated with Alaska's North Slope natural gas, either an 800-mile pipeline + LNG or arctic ice breaking LNG tankers. We note that commentary research on coal v. natural gas supply chains suggests that any LNG advantage evaporates with more rigorous analysis.² Adding an 800-mile pipeline clearly disadvantages that supply chain compared to a local coal supply.
 - ii. CARB should task the OPGEE team with reviewing and verifying the OPGEE model and field specific data to ascertain the extent to which GHG emissions associated with the **long energy intensive supply chain for mobilization, transport and storage of equipment and materials** associated with Alaska's North Slope are taken into account. In addition, subsequent GHG emissions associated with landfilling and recycling materials from Alaska's North Slope – including the emissions associated with **dismantlement, removal and restoration fossil fuel lease obligations** – should be included in the embodied emissions accounting or a separate category.
- d. Venting, Global Warming Potential & Fugitive Emissions (§8, §9.1, §10.2.3.1)
- i. CARB should task the OPGEE team with reviewing and incorporating contemporary flaring emissions data **by field** instead of **country** to more accurately reflect highly variable CH₄ emissions. See for example the data within OCI+ (Oil Climate Index + Gas)³.
 - ii. CARB should **adopt the 20-year Global Warming Potential (GWP) for CH₄** as the default and require OPGEE to adopt the 20-year GWP for CH₄.
4. CARB should require the OPGEE team to **divest itself of funding sources that create the appearance of conflict of interest**, e.g., Aramco and Chevron.

² See for example the working paper of Robert Warren Howarth, "The Greenhouse Gas Footprint of Liquefied Natural Gas (LNG) Exported from the United States," Department of Ecology & Evolutionary Biology, Cornell University, Ithaca, NY 14853 USA. In review at a peer-reviewed journal; Submitted October 24, 2023; Revised January 13, 2024; Subject to further revision before publication as a peer-reviewed article.

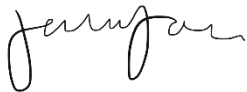
³ See the OCI+ methodology page, which includes a description of the flaring emissions data developed by a team that includes members from the Colorado School of Mines. <https://ociplus.rmi.org/methodology#opgee>

202.7
cont.

5. CARB should avoid the trap of only updating the data in the OPGEE model when ALL fields have ALL data input fields updated with field-specific data as this will create a perverse incentive for dirty oil producers to refrain from reporting field-specific data while cleaner oils fail to get credit for cleaner field-specific data – skewing comparisons between fields as well as underestimating aggregate emissions.
6. CARB should **independently audit and verify data provided by the field operators** to ensure reliable reporting of the data that drives emissions estimates.

Thank you for your consideration of these comments. We would welcome the opportunity to discuss them with respective staff, and we look forward to continued participation and discussion to further strengthen the LCFS.

Sincerely,



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Kay Brown

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CC: Steve Cliff
Members of the Board

August 27, 2024

Chair Liane Randolph and Board Members
California Air Resources Board
1001 I Street
P.O. Box 2815
Sacramento, CA 95812

Re: Proposed 15-day Change Amendments to the Low Carbon Fuel Standard Regulation

Submitted to <https://ww2.arb.ca.gov/applications/public-comments>

Dear Chair Randolph and Honorable Board Members:

Thank you for the opportunity to comment on ARB's Proposed 15-Day Changes to the proposed amendments. ChargePoint appreciates the ongoing work of the California Air Resources Board (ARB) Staff to manage and amend the LCFS to help advance investment in low carbon fuels and infrastructure in California. While we do have specific concerns with how the Proposed 15-Day Changes treats verification of on-road EV charging, we otherwise support the package and appreciate ARB's ongoing work on this important policy. The LCFS has been and remains an important tool for decarbonization, and we applaud the ARB for continuing to hone this important policy.

About ChargePoint

Since 2007, ChargePoint has been committed to making it easy for businesses and drivers to go electric with one of the largest electric vehicle (EV) charging networks and a comprehensive portfolio of charging solutions. ChargePoint's cloud subscription platform and software defined charging hardware is designed internally and includes options for every charging scenario from home and multifamily to workplace, parking, hospitality, retail, corridor, and fleets of all kinds.

Summary

- 203.1 - Provide an alternative path for verification of Quarterly Fuel Transaction Reports (QFTRs) for on-road EV charging that: 1) relies on third-party certifications to ensure accurate metering and 2) uses a desktop review to verify reporting without requiring site visits
- 203.2 - Recommend re-classifying all multi-family chargers as non-residential, regardless of parking space designation.
- 203.3 - Recommend strengthening Automatic Acceleration Mechanism (AAM) and allowing earlier implementation.
- 203.4 - Strongly support ARB's proposed changes to the heavy-duty FCI pathway
- 203.5 - Strongly support CARB's decision to increase the near-term step-down to 9% starting in 2025 and the discretion given to the Executive Officer to make future changes to supply eligibility, but share concerns of others that these amendments alone may not address the more fundamental problem of oversupply

Verification of on-road EV charging

203.6

The 15-day changes continue to impose a verification process designed for liquid/gaseous fuels to EV charging. ChargePoint has had several meetings with ARB staff over the summer during which we have discussed the shortcomings of relying on the current approach without considering how different a use case EV charging is and implored staff to allow for an alternative process that recognizes several key differences between EV chargers and other kinds of fuels. Most notably, we have discussed with staff that a verification process for EV charging does not benefit from site visits or re-calibration requirements, and how removing these from the proposal and allowing an alternative, desktop-based approach, would prevent significant and unnecessary costs being borne onto the industry. We cannot stress this enough.

Fuel supplied in the form of electricity takes a fundamentally different path from production to use than conventional liquid fuels. Liquid fuels originate from a set of relatively few, large sources, which produce and deliver large quantities of fuel in California that can be tracked with metering at the production sources. By contrast, electricity is produced from a distributed set of grid-connected resources and only becomes a transportation fuel when dispensed via a charging station. The relevant metering that records electricity used for transportation is therefore not restricted to a set of large facilities but is instead spread across hundreds of thousands of individual charging stations spanning the state.

To reflect the fundamental differences in fuel supply dynamics and efficiently provide reasonable certainty about volumes reported in quarterly fuel transaction reports (QFTRs), ARB should provide an alternative set of verification requirements for EV charging reporting that considers the differing risks and realities of EV charging, while at the same time leverages existing industry standards. This alternative does not need to completely replace the existing verification structure for EV charging QFTRs but can serve as another verification option for reporting entities. For the alternative verification path, we recommend that ARB:

- 1) *Leverage existing industry certifications to establish charging meter accuracy, which also removes any calibration requirements.*

The fundamental purpose of verification is to confirm that claims of electricity reported matches the amount of fuel that has actually been dispensed. For liquid fuels, tampering with a flow meter may lead to misreports of actual fuel dispensed. By contrast, the embedded meters within EV chargers are regulated by state and national specification programs that provide assurances that the meter accuracy data generated directly by chargers.

The California Type Evaluation Program (CTEP) and the National Type Evaluation Program (NTEP) both provide accuracy certifications for metering in EV charging products. The certification thresholds for accuracy are derived from the California Code of Regulations¹ and the National Institute of Standards and Technology (NIST) Handbook 44, which

¹ CCR Title 4 Division 9 Chapter 1, Sections 4000, 4001, and 4002.11. See: https://www.cdfr.ca.gov/dms/pdfs/CA_EVSE_Regulation_Reference_Document.pdf

publishes accuracy requirements for EV charging equipment.² Chargers certified by CTEP are certified to have:

- Level 2 – 1% in factory, 2% in the field
- Level 3 – 2.5% in factory, 5% in the field³

Both CTEP and NTEP have accuracy thresholds that are equivalent to or are stricter than the +/-5% accuracy threshold that CARB is proposing. Furthermore, the California Department of Food and Agriculture's (CDFA) Division of Measurement Standards (DMS) already uses C/NTEP as a certification standard for ensuring accuracy in commercial EV chargers. County Weights and Measures offices are tasked with enforcing compliance with these standards via registration and field testing. Given that there is an existing regulatory framework for enforcing accuracy standards in EV charging, reviewing meter accuracy via site visits within LCFS would be duplicative.

For charging use-cases that fall outside of DMS jurisdiction, such as private fleet charging, many of these devices' make/model will still very likely be C/NTEP certified, and reporting entities will be able to demonstrate this via certifications. For example, a ChargePoint CP6000 series charger – which is NTEP certified - used for private fleet charging in L.A. is the same from a meter accuracy standpoint as another CP6000 unit used for commercial charging in San Diego.⁴ For the minority of charging station make/models that have not obtained C/NTEP certification, these stations should be allowed to demonstrate accuracy via independent testing. Given that the specification the device is built to is the same regardless of use case (fleet, commercial, or private), for purposes of determining charging data accuracy within LCFS, it does not make sense to differentiate verification of meter accuracy by use case.

Perhaps most importantly, embedded electricity meters within EV chargers are fundamentally different devices than flow meters and are not subject to the same wear, corrosion, and accumulation of residue that can cause inaccuracy or drift in liquid or gaseous meters. Many EV charging stations, including ChargePoint's devices, are calibrated in the factory, sealed, and unalterable in a manner that makes recalibration impossible specifically to preserve the meter's accuracy and guard against tampering. Taken together, this means that applying requirements to recalibrate could necessitate a complete device replacement and add immense cost of compliance for program participants without reducing the risk of misreporting. Some charging operators/providers may drop out of the LCFS altogether rather than replacing devices.

² NIST Handbook 44 establishes the standards for Electric Vehicle Fueling Systems in Section 3.40. Handbook 44 (2024) is available at: <https://www.nist.gov/publications/specifications-tolerances-and-other-technical-requirements-weighing-and-measuring-15>

³ The specifications for DC devices receiving NTEP certification are slightly different and will become more stringent in 2025. Recent changes to NIST Handbook 44 will allow for tolerance of 5% in the factory and in the field for DC devices installed before January 1, 2025, with enforcement starting January 1, 2028. DC devices installed after January 1, 2025, will be expected to meet tolerances of 1% in factory and 2% in the field starting that date.

⁴ DMS oversees accuracy for devices used for a commercial purpose, i.e., an exchange that involves the sale of goods. See California Business and Professions Code § 12500

There is an existing and robust regulatory framework to ensure charging devices are accurate, which renders in-person visits to confirm meter accuracy duplicative and unnecessary. To the extent that ARB intends to verify the meter accuracy of chargers within LCFS verification, ARB should leverage existing metering certification standards and allow chargers holding CTEP, NTEP, or verified accuracy equivalency to be deemed accurate for all devices of a certified make/model— rather than expecting meter accuracy to be verified via in-person site visits via recalibration requirements for each individual device. Charging devices installed before the effective date of DMS regulation should be eligible to provide data to demonstrate their accuracy applicable to all devices of the same model.

- 2) *Use a desktop review to ensure reporting integrity and remove the requirement for site visits for verification of Quarterly Fuel Transactions Reports (QFTRs) for entities reporting on-road EV charging.*

With the accuracy of electricity metering for chargers established, verification for EV charging reporting should be focused on a review of data produced by charging meters rather than the meters themselves. For EV charging, a comprehensive review of data management and handling procedures does not require in-person site visits.

Site visits are intended to provide verifiers with an opportunity to see a fuel production facility, assess its metering, and determine if there is reasonable risk that the facility is not accurately or truthfully reporting fuel quantities. This makes sense when a reporting entity is reporting fuel that comes from a small handful of facilities, or even one facility, and a verifier can travel to a few locations and verify large fuel quantities reported by the entity. However, for EV charging, there is not one or even a small handful of facilities – there are hundreds or thousands. Given the number of locations, a site visit to EV charging “facilities” is impractical, as it would require verifiers to travel to specific EV charging stations dispersed across the state. Aside from being an added cost on a nascent industry, which may even erase all value earned under the program for some smaller reporting entities, visiting a handful of EV charging sites is not an effective way to assess the material risks of misreporting.

Any altering of data from a particular charging station is likely to occur once the data has been transmitted electronically, not at the site of the charging station, and would thus seemingly be addressed by a visit to a “central records location.” However, the central records location for most EV charging network operators is likely to be interpreted as their primary office space, which will likely lack any physical fueling records. The records for EV charging networks are all maintained electronically, mostly in cloud-based storage where the closest thing to a records location would likely be a data center with little connection to the operations of the EV company.

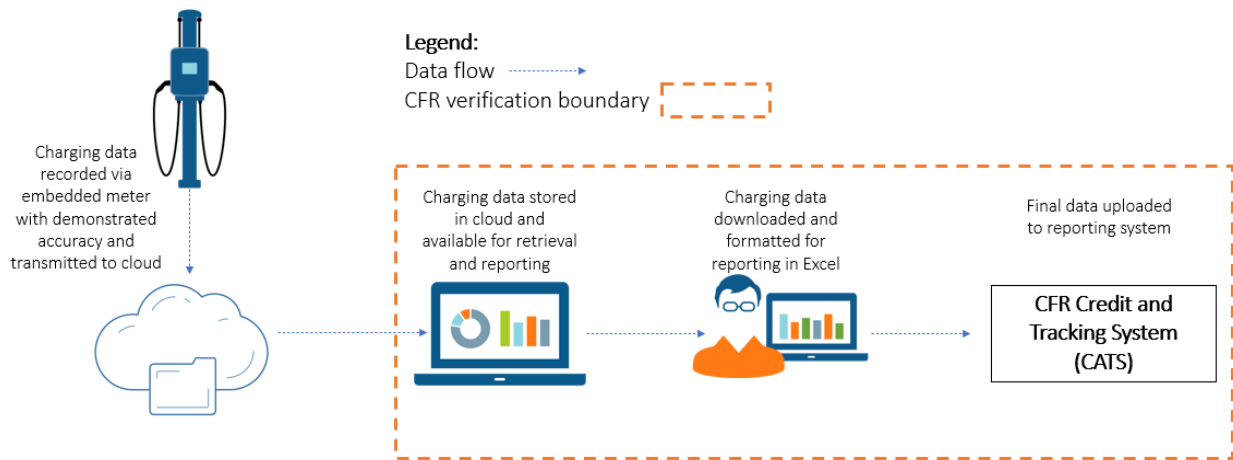


Figure 1 Block diagram outlining Canada's Clean Fuel Regulation reporting process

Rather than require site visits to facilities (chargers) or records locations (offices), verifiers can conduct interviews with key personnel, review IT schematics, quality control protocols, network-level certifications, trace raw metered data from inception to reporting, and gain a reasonable degree of confidence in reported charging data all via a desktop review. The orange dotted box in Figure 1 above illustrates how the scope of a desktop review can focus on appropriate data handling and management. Verifiers can also assess the security of data transmission from the station to the cloud, as the Canada CFR requires.

Site visits do not reasonably address the risks of misreporting, so EV charging should be exempt from site visit requirements. Data produced by chargers with meters demonstrated to be accurate by device type can then be reviewed by verifiers under a desktop/remote approach.

Summary

With charging meter accuracy able to be demonstrated by established certification standards and data integrity demonstrated by desktop reviews of charging data management, on-road EV charging QFTRs can be reasonably verified without a need for meter calibrations or site visits. Verifiers may assess two primary areas:

- Proof of product level C/NTEP or similar certification across the set of chargers being used for reporting to demonstrate data accuracy
- Management and data handling procedures for reporting electricity quantities to demonstrate data integrity

Both items combined ensure that data is accurate, untampered with, and properly reported.

Credit generation at multi-family residences

203.7

ChargePoint fully supports the proposal to allow multi-family housing to be classified as non-residential charging if parking spaces are not dedicated or restricted as this will help catalyze more investment in multifamily charging. **However, we recommend that parking spaces that are dedicated/restricted also be categorized as non-residential charging, which would allow the station owner to claim credits from these stations as well.** We see two issues with continuing to treat dedicated/restricted parking spaces as residential:

- 1) *Determining whether parking spaces are dedicated/restricted poses immense tracking challenges.*

Parking spaces may not have static dedicated/restricted classifications. Property owners could conceivably change their parking arrangement, which would then require a reallocation of credit generation rights under the current proposal. Furthermore, parking space use cases – in the context of EV charging – are generally not tracked or recorded in any scalable way that would allow for ready determination of classification by individual parking space, and any classification will likely be self-reported. This creates a large issue with verifying the status of parking spaces. Classifying all multi-family charging as non-residential would relieve this tracking burden, ultimately providing for better uptake in the multi-family space, which is an area critically in need of charging infrastructure investment.

- 2) *Regardless of parking configuration, the property owner/developer is likely to be the entity financing and owning/operating the stations.*

Multi-family units are often rental units, so residents typically would not directly participate in the purchase of stations. Given that the property developer/owner is the entity that will bear the cost, the most effective way to incentivize station installation is to provide LCFS value directly to those property developers/owners. Arbitrarily deciding whether to provide value to a property owner based on their parking configuration choice seems like an irrelevant issue and would slow down the installation of stations at multi-family units. Furthermore, even in multi-family housing where the members own their units, the process for installing EV chargers requires coordination across common areas and in some cases collective payment for the system. Given this coordination, the homeowners associations will typically be involved in developing and potentially financing some or all of the project. In this case, the homeowner's association or the owners are the critical entity for making station installation happen, so they should see the benefit from LCFS revenues to drive investment.

To address these two issues, we propose that CARB remove the dedicated/restricted delineation and instead classifies all charging at multi-family housing, regardless of parking configuration, as non-residential.

By allowing multifamily station owners (i.e., property owners and developers) to claim credits for chargers regardless of difficult to determine parking restrictions, it will better align the benefits of

203.7
cont. the LCFS with the cost of multifamily EV charging and help unlock critical new financing for this segment in need of investment.

Fast Charging Infrastructure (FCI) Credits

203.8 We would like to specifically thank ARB for taking the time over the summer to work with the charging industry on honing the FCI pathways, specifically the heavy-duty (HD) pathway. This being a new pathway with several critical differences than the existing light-duty (LD) FCI pathway, we appreciate how ARB collaborated with industry and took a thoughtful approach to the HD pathway that in the end is more workable and will result in faster HD electrification.

For the proposed light and medium duty (LMD) FCI pathway, we support how ARB combined light and medium duty into one pathway, separate from HD, which better matches the differences in use cases. We also appreciate how ARB accommodated shared public/private sites within the pathway, as we see more of the market trending towards this model.

Automatic Acceleration Mechanism (AAM)

203.9 ChargePoint supports the proposal to establish the AAM but recommends that CARB make the mechanism stronger. As proposed, the AAM would not have been triggered in any of the years after the 2018 amendments. These years include 2022, a year when the credit market price declined by ~50%. The AAM should be designed specifically to counteract this type of negative price movement, so a mechanism that would not have reacted in 2022 is not strong enough. **To strengthen the mechanism, we recommend that ARB amend the first condition of the AAM to be reached when the credit bank to average quarterly deficit ratio is greater than 2.5.** With this update the AAM would have been triggered in 2022 but not any of the other years following the 2018 amendments. Since these other years saw price increases or modest declines, the new threshold suggests a balanced mechanism that reacts only to large price decreases.

203.10 **Furthermore, we recommend that the AAM be allowed to trigger starting in 2026 based on 2025 data.** The AAM is based on aggregate market data and can be operationalized immediately without needing to wait for the impact of other amendments to occur. Also, the market price continues to remain at low levels and the credit bank continues to build. If the AAM were in place currently, it would have been activated based on 2023 data with the current triggering conditions, so evidently the market is in a state that would benefit from AAM activation as soon as possible.

Near and long-term solutions to address the oversupply in the credit market

203.11 We strongly support ARB's decision to increase the stringency of the CI curve by 9% starting in 2025 to slow the growth of the bank and help support low carbon fuel suppliers in California and would even suggest ARB increase the step-down by as much as 12%. We also support ARB's proposal to give the Executive Officer greater discretion in the future to limit or adjust the use of certain pathways should California's transportation market evolve or new information answers important land use change questions regarding biofuels. This discretion should help streamline future changes to the program without rulemaking should they be necessary. In the interim, time will tell if

the amendments in the 15-Day Proposal will be sufficient to restore balance to the credit market. Recent research into earlier proposed amendments to the LCFS by UC Davis concludes that even with more stringent short term CI targets, renewable diesel will continue to dominate credit supply and crowd out investment in zero and near-zero carbon technologies⁵. These findings are supported by research by the International Council on Clean Transportation⁶. ARB's proposed percentage-based cap on soybean and canola-based biomass-based diesel (between the Summary of Proposed Modifications and the proposed regulatory text, it is unclear if the 20% limit applies to only *virgin* soy and canola-oil or all soy and canola), while a good first step, may not have its intended effect if non-soy and canola feedstocks continue to supply more renewable diesel, as they have in recent years (CARB LCFS data on biomass-based diesel feedstocks). The precipitous decline in credit prices has affected investment in electrification; it has made infrastructure financing more difficult and pushed out investment in fleet electrification. While we support ARB's proposal to increase program stringency in the short-term and believe this will have a positive effect on electrification investment, it remains to be seen if these amendments will address the more fundamental issue of oversupply in the long run.

Conclusion

In conclusion, with the exception of the proposed language on verification of on-road EV charging, ChargePoint supports the 15-Day Proposal and thanks staff for all the hard work put into this rulemaking. We oppose the current framework for verifying EV charging on the grounds that certain aspects are redundant, and if approved, will either result in significant and unnecessary costs to the industry, or a drop in EV charging-participation under the LCFS. We again urge ARB to allow for an alternative approach, similar to what we have proposed here, that is better suited to the EV charging use case. We stand ready to work with staff to clarify our recommendations or help think through implementation challenges. Please feel free to reach out for a discussion or if you have any questions.

Thank you,

Evan Neyland
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Evan.Neyland@chargepoint.com

⁵ Colin Murphy and Jin Wook Ro. "Updated Fuel Portfolio Scenario Modeling to Inform 2024 (California) Low Carbon Fuel Standard Rulemaking". University of California Davis Policy Institute for Energy, Environment, and Economy. February 2024.

⁶ O'Malley, J. et al. "Setting a Lipids Fuel Cap Under the California Low Carbon Fuel Standard". International Council on Clean Transportation. August 2022.

August 27, 2024

Rajinder Sahota
California Air Resources Board
1001 I Street
Sacramento, CA 95815

RE: Comments on the Proposed Modifications (15-Day Changes) to the Proposed Low Carbon Fuel Standard (LCFS) Amendments

Dear Ms. Sahota:

We represent a group of distinct businesses and perspectives related to the Low Carbon Fuel Standard (LCFS) and the State's various climate change-related programs. Individually, we each have specific priorities and recommendations for the program, which we may address in separate comment letters. Collectively, however, we agree that the LCFS is a critical program for achieving the State's methane reduction, transportation electrification, and other climate change related goals.

204.1

We strongly support the program and encourage CARB to adopt amendments at the November 8, 2024, Board meeting, including those that extend the program through 2045, step-down program stringency by at least 9% in 2025, create an auto acceleration mechanism to automatically strengthen program stringency when market conditions warrant, and expand fast charging and hydrogen refueling capacity crediting to include heavy-duty vehicles and applications. In addition to myriad other items, these are important proposed amendments that will strengthen the program and allow it to continue to flourish and drive additional investment and availability of low carbon fuels and infrastructure in California.

204.2

204.3

Additionally, we write in our shared capacity to request minor amendments through additional 15-Day Changes to enable biogas-to-electricity and hydrogen-to-electricity electric vehicle (EV) charging projects, which can uniquely support both the state's methane reduction and transportation electrification goals. Specifically, we strongly encourage additional amendments that would:

204.4

- Allow for book-and-claim accounting of biomethane and hydrogen for electric vehicle charging when that biomethane or hydrogen is used for clean, distributed electricity generation produced remote from the source of biogas or hydrogen production.
- Establish temporary carbon intensity scores for biomethane-to-electricity and hydrogen-to-electricity EV charging pathways.

204.5

These minor, targeted changes would go a long way towards enabling additional methane reductions and accelerating progress towards the state's transportation electrification goals, especially in heavy-duty applications where infrastructure-related challenges and delays may be most significant. They would align with CARB's intent to support transitioning biomethane resources from current applications to stationary sources and zero emission vehicle (ZEV) fuels. And they would serve to provide equal treatment among ZEV fuel pathways by allowing for book-and-claim eligibility of biomethane-to-electricity and hydrogen-to-electricity pathways, just as currently is proposed for biomethane-to-hydrogen pathways and as currently exists for CNG, LNG and L-CNG pathways.

Onsite microgrids, biogas can accelerate transportation electrification

California has aggressive transportation electrification goals, including for medium- and heavy-duty (MHD) fleets. These fleets can be difficult to electrify on timelines envisioned by CARB regulations, in no small part because developing charging infrastructure for MHD vehicles and fleets can be extremely capacity and energy intensive. This makes them very time consuming to connect to the grid – a process that can take several years.

Projects in this predicament look to on-site generation with energy storage as a solution to meet fleet electrification objectives ahead of utility connections, with the added benefit of additional resiliency for critical fleet operations when the utility connection is eventually established in parallel. However, due to the exceptional energy intensity of industrial MHD charging projects on limited footprints, dispatchable power-dense on-site generation such as fuel cells or linear generators developed by Mainspring and Hyliion, sometimes can be the only feasible technical solution that can fit the available real estate and meet the energy demand.

Recently, Prologis Mobility and Performance Team, a Maersk company that operates electric vehicles across the country, demonstrated a unique solution to this challenge by developing the world's largest electric vehicle (EV) charging project powered by a self-sufficient microgrid using Mainspring technology with dual hydrogen and natural gas capabilities.¹ The project was completed in five months, rather than years it would have taken otherwise, and allows the fleet to electrify quickly, while interconnection to the electricity grid proceeds. Once the project is directly interconnected to the grid, the added resiliency for electric vehicle fleet operations during periods of grid stress or power outage will be critical. The infrastructure also preserves partial infrastructure flexibility for expanding to support fuel cell vehicles in the future. This is a replicable model that can serve to accelerate progress toward the State's ZEV goals.

Utilizing renewable fuels, such as dairy biomethane and renewable hydrogen, would add to the benefits of the project, including further supporting the State's short-lived climate pollutant reduction and Scoping Plan goals. However, under the current proposed rules of the LCFS, while book-and-claim accounting can be used for biomethane in a compressed natural gas truck or to produce hydrogen for use in a fuel cell vehicle, it cannot be used to generate electricity remote from a digester or biogas source, including onsite for use in an EV. This current approach not only hinders broader deployment of innovative strategies like microgrids to accelerate EV deployment in MHD fleets, but it also disadvantages electricity-based pathways compared to other pathways and directs biomethane to less efficient and higher emissions end uses. The Appendix demonstrates that using natural gas in a linear generator for EV charging results in a 97% NOx emissions reduction compared to an equivalent diesel fleet.

Provide equal access to book-and-claim accounting for EV charging

We urge CARB to propose additional 15-Day Changes that would ensure equal access (similar to the provisions outlined for hydrogen in the proposed regulations) to book and-claim accounting for biomethane used to produce electricity for EV charging employing efficient and low emissions technologies, such as linear generators or fuel cells, that operate remote from the source of biogas production. Specifically, we urge the following amendments **(in bold underline)** to the regulation:

¹ <https://www.prologis.com/insights/success-stories/north-americas-largest-heavy-duty-ev-charging-hub-powered-microgrid>

- **Section §95488.8(i)(2)(A):**
 - RNG injected into the common carrier pipeline in North America (and thus comingled with fossil natural gas) can be reported as dispensed as bio-CNG, bio-LNG, or bio-L-CNG, or as an input to hydrogen production **or to fuel cell or linear generator electricity generation for remote EV charging**, without regards to physical traceability.
- **Section 95488.8(g)(1)(A)(2):**
 - Biomethane supplied using book-and-claim accounting pursuant to section 95488.8(i)(2) and is claimed as feedstock in pathways for bio-CNG, bio-LNG, bio-L-CNG, hydrogen via steam methane reformation **or other methods, and to fuel cell or linear generator electricity generation for remote EV charging**;
- **Section §95488.8(i)(2):**
 - (2) *Book-and-Claim Accounting for Pipeline-Injected Biomethane Used as a Transportation Fuel or to Produce Hydrogen **or to Generate Electricity***. Indirect accounting may be used for RNG used as a transportation fuel or to produce hydrogen **or to generate electricity** for transportation purposes (including hydrogen that is used in the production of a transportation fuel), provided the conditions set forth below are met:

(A) RNG injected into the common carrier pipeline in North America (and thus comingled with fossil natural gas) can be reported as dispensed as bio-CNG, bio-LNG, or bio-L-CNG, or as an input to hydrogen production **or to fuel cell or linear generator Electricity generation for remote EV charging**, without regards to physical traceability. Entities may report natural gas as RNG within only a three-quarter time span. If a quantity of RNG (and all associated environmental attributes, including a beneficial CI) is pipeline-injected in the first calendar quarter, the quantity claimed for LCFS reporting must be matched to natural gas sold in California as RNG no later than the end of the third calendar quarter. After that period is over, any unmatched RNG quantities expire for the purpose of LCFS reporting.

(B) Biomethane reported under fuel pathways associated with projects that break ground after December 31, 2029, injected into the common carrier pipeline, and claimed indirectly under the LCFS program for use as bio-CNG, bio-LNG, or bio-L-CNG in CNG vehicles or as an input to hydrogen production **or to fuel cell or linear generator Electricity generation for remote EV charging** for transportation purposes, must demonstrate compliance with the following requirements:

1. Starting January 1, 2041 for bio-CNG, bio-LNG and bio-LCNG pathways, and January 1, 2046 for biomethane used as an input to hydrogen production **or to fuel cell or linear generator Electricity generation for remote EV charging**, the entity reporting biomethane must demonstrate that the pipeline or pipelines along the delivery path physically flow from the initial injection point toward the fuel dispensing facility at least 50 percent of the time on an annual basis. Notwithstanding the above, if the Executive Officer approves a gas system map by July 1, 2026, to support implementation of deliverability, then the entity reporting under bio-CNG, bio-LNG and bio-L-CNG pathways for CNG vehicles must demonstrate the physical flow listed above after December 31, 2037. The Executive Officer will only approve a gas system map if it includes identification of transcontinental and connected pipelines posted on a local, state or federal

government website, for which the gas flows to CA at least fifty percent of the time on an annual basis, and will be based on directional flow data from 2020 to 2023. Entities may report natural gas as RNG within only a three-quarter time span. If a quantity of RNG (and all associated environmental attributes, including a beneficial CI) is pipeline-injected in the first calendar quarter, the quantity claimed for LCFS reporting must be matched to natural gas sold in California as RNG no later than the end of the third calendar quarter. After that period is over, any unmatched RNG quantities expire for the purpose of LCFS reporting.

(D) Starting January 1, 2041, for bio-CNG, bio-LNG and bio-L-CNG pathways, (unless the accelerated timeline is activated by the criteria described in section 95488.8(i)(2)(B)1.) and January 1, 2046, for biomethane used as an input to hydrogen production **or to fuel cell or linear generator Electricity generation for remote EV charging**, to substantiate RNG quantities injected into the pipeline for dispensing as bio-CNG, bio-LNG, or bio-L-CNG under fuel pathways associated with projects that break ground after December 31, 2029, the pathway application and subsequent Annual Fuel Pathway Reports must include the documents required by section 95488.8(i)(2)(C) as well as the following documents.

- **Section §95488.8(i)(3):**

Book-and-Claim Accounting for Pipeline-Injected low-CI Hydrogen Used in FCV and Alternative Fuel Production **including fuel cell or linear generator Electricity generation for remote EV charging**. Indirect accounting may be used for low-CI hydrogen used in FCVs or to produce alternative fuel for transportation purposes provided the conditions set forth below are met:

- (A) Low-CI hydrogen is injected into a dedicated hydrogen pipeline physically connected to California.
- (B) The well-to-wheel carbon intensity of low-CI hydrogen does not exceed 55.00 gCO₂e/MJ of gaseous hydrogen or 95.00 gCO₂e/MJ if transported as liquid before pipeline injection. If hydrogen is produced from steam methane reforming of natural gas, book-and-claim accounting of biomethane may be used to meet the carbon intensity thresholds.
- (C) Low-CI hydrogen is produced from production facilities that become operational or expand production after December 31, 2022.
- (D) Low-CI hydrogen can be reported as dispensed to FCVs or as an input to transportation fuel production **including fuel cell or linear generator Electricity generation for remote EV charging**, without regards to physical traceability. Entities may report low-CI hydrogen using a monthly balancing period substantiated by contractual documents. After that period is over, any unmatched low-CI hydrogen quantities expire for the purpose of LCFS reporting. Any unmatched quantities of hydrogen must either use a default emission factor for hydrogen provided in the Tier 1 CI Calculator for renewable diesel if hydrogen is used as process input in biofuel production, or use the CI calculated from the Tier 1 CI

204.11
cont.

calculator for hydrogen by considering natural gas as feedstock if hydrogen is used in fuel cell vehicles.

- (E) To substantiate low-CI hydrogen quantities injected into the pipeline for dispensing in FCVs or as an input to alternative fuel production **including fuel cell or linear generator Electricity generation for remote EV charging**, the pathway application and subsequent Annual Fuel Pathway Reports must include the following documents linking the environmental attributes of low-CI hydrogen in kg with corresponding quantities of hydrogen in kg withdrawn from the pipeline: unredacted monthly invoices showing the quantities of low-CI hydrogen (in kg) sourced and the contracted price per kg; 162 and the unredacted contract by which the fuel pathway holder obtained the environmental attributes.

Establish a temporary carbon intensity (CI) for biogas-to-electricity and hydrogen-to-electricity pathways

204.12

No temporary CI exists for dairy biogas-to-electricity pathways, which arbitrarily disadvantages dairy digester projects contributing to California’s SB 1383 goals and providing renewable electricity for EV charging. The lack of a temporary CI for these pathways adds unnecessary costs and delay to these projects, which are already more challenging than other dairy biogas pathways given that they are not currently eligible to participate in the federal Renewable Fuel Standard. Dairy biogas-to-electricity pathways directly align with the priorities of the LCFS program, which as referenced in the ISOR and quoted in previous comments,² include supporting electric and hydrogen truck refueling, supporting methane emissions reductions and deploying biomethane for best uses across transportation.

204.13

A similar oversight exists in the electricity pathway involving hydrogen. CARB should correct these oversights and treat biogas-to-electricity pathways that utilize efficient and low emissions fuel cell or linear generator technology equally to CNG, LNG, LNCG and FCV pathways by updating Table 8 as follows:

Table 8. Temporary Pathways for Fuels with Indeterminate CIs

<i>Fuel</i>	<i>Feedstock</i>	<i>Process Energy</i>	<i>CI (gCO₂e/MJ)</i>
<u>Electricity</u>	<u>Dairy Manure and Swine Manure</u>	<u>Grid electricity/solar and wind electricity, natural gas, and/or parasitic load</u>	<u>-300</u>
<u>Electricity</u>	<u>Landfill gas or Municipal Wastewater Sludge</u>	<u>Grid electricity/solar and wind electricity, natural gas, and/or parasitic load</u>	<u>130</u>
<u>Electricity</u>	<u>Food Scraps, Urban Landscaping Waste, or Other Organic Waste</u>	<u>Grid electricity/solar and wind electricity, natural gas, and/or parasitic load</u>	<u>90</u>

² See CalBio’s February 20, 2024, comment letter on the Low Carbon Fuel Standard Rulemaking Package: <https://www.arb.ca.gov/lists/com-attach/6967-lcfs2024-BWYCZVM+BTRWOVI9.pdf>

204.13
cont.

<u>Electricity</u>	<u>Electrolysis of Water using zero-CI or Negative-CI electricity and using linear generators or fuel cells</u>	<u>Gaseous hydrogen transport distance of less than 500 miles or liquid hydrogen transport distance of less than 2,000 miles or pipeline injection</u>	<u>110</u>
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We firmly believe that these two changes will strengthen the LCFS in alignment with CARB’s priorities by supporting additional investment in methane reduction efforts and EV charging projects. These projects, which incorporate onsite renewable electricity generation, will boost resiliency and expedite the deployment of EV charging infrastructure, particularly in areas facing transmission and distribution upgrade delays. Thank you for your consideration of these comments and recommendations.

Sincerely,

Alexis Moch
Vice President, Government Affairs
Prologis

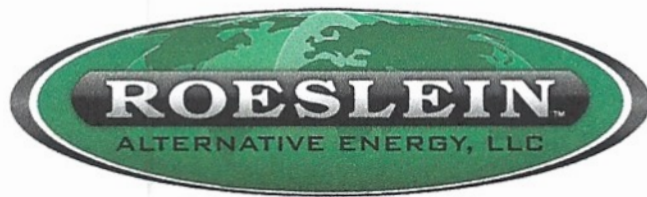
Bobby K. Cherian
Senior Vice President, Government Affairs
Hyliion

Kent Leacock
Senior Director, Public Affairs
Mainspring

Appendix



Memo - Denker
Facility Emissions Cor



August 27, 2024

Mr. Matt Botill
Chief, Industrial Strategies Division
California Air Resources Board
1001 I Street Sacramento, California 95812

Ms. Rajinder Sahota
Deputy Executive Officer
Climate Change & Research
California Air Resources Board
1001 I Street Sacramento, California 95812

Comments on the LCFS 15-day text:

Dear Mr. Botill and Ms. Sahota,

Thank you for the opportunity to provide comments on the proposed modifications to the text of the LCFS amendment issued August 12, 2024 (the "15-day Changes"). Roeslein Alternative Energy ("RAE") was founded in 2012 as an operator and developer of renewable energy production facilities that convert agricultural and livestock substrates and feedstocks, along with renewable biomass feedstocks, into renewable natural gas and sustainable soil amendments and co-products. At RAE, we provide market-based solutions to meet the competing demands of renewable energy production, ecological services, and wildlife habitat restoration while enhancing the sustainability of food, feed, fuel, and fiber production.

The Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information (the "Notice") accompanying the 15-day Changes specifies that staff is required to respond to comments received during the comment period that are responsive to the Notice, documents added to the record, or changes detailed in Attachments A-1.1 and A-2.1 thereto. Included as one of the documents in the record is CARB's *Compliance Offset Protocol Livestock Projects – Capturing and destroying Methane from Manure Management Systems. Adopted on November 14, 2014* (the LOP").

We are writing today to comment on the LOP as follows:

CARB should amend the LOP to add beef cattle manure as a type of livestock manure that can generate LCFS avoided emissions credits.

The LOP was created for California Cap-and-Trade ("C&T") and not the LCFS.

While CARB uses the methodology set forth in the LOP for the purpose of calculating the carbon intensity of LCFS dairy and swine manure ("DSM") pathways, the LOP was not created

for the LCFS, but rather for another one of CARB's regulations, California Cap-and-Trade ("C&T").

When C&T went into effect in 2012, it included as a means of **cost containment** the ability for covered entities to offset their annual compliance obligations through a limited number of offset credits. CARB included the avoidance of methane emissions that occurs by installing anaerobic digestion in DSM management operations as a type of offset credits a covered entity could acquire.

205.1 cont.

The quantification of such offsets was based on a forerunner of the LOP, a livestock offset protocol created by the Climate Action Reserve ("CAR"). Version 1.0 of CAR's protocol was entitled "Livestock Project Reporting Protocol Capturing and combusting methane from manure management systems Version 1.0 June 2007" (CAR LOP V1).

CAR LOP V1 expressly referred to beef cattle manure as a type of livestock manure that could produce offset credits, along with dairy and swine manure. For example, on p. 3 it states, "project developers could be livestock owners and operators, such as dairy cattle, **beef cattle**, or swine farmers. [Emphasis added.] On p. 43 it contains the following table:

Table C.1: Livestock Population Data for the U.S. and California, 2002

	US		California			
	# Farms	# Animals	# Farms	# Animals	% of US Farms	% of US Animals
Dairy	91,989	17,013,361	2,793	2,806,357	3.0%	16.5%
Beef	796,436	34,431,060	12,497	879,582	1.6%	2.6%
Hogs	78,895	60,405,103	1,521	163,465	1.9%	0.3%

Source: U.S. Department of Agriculture National Agricultural Statistics Service (2004)

(It is worth noting that the above table shows that in June 2002, California had more than five times as many beef cattle as hogs, and yet swine manure is covered by the LOP and beef cattle manure is not.)

To quantify the methane emissions reductions for the offsets, CAR LOP V1 used values contained in the section 10.4 (Methane Emissions from Methane Management) of Chapter 10 (Emissions from Livestock and Manure Management) of Volume 4 of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. The Guidelines are hereinafter referred to as the IPCC 2006 Guidelines.

Section 10.4 contains all necessary values for dairy, swine and beef cattle manure, including values for when the manure decomposes in a pasture/range/paddock, in solid storage or on a dry lot, or when the manure is collected in a liquid or slurry form.

CAR's LOP V1 was subsequently amended. By the time CARB adopted its first Livestock Offset Protocol in October 2011 (the "LOP #1"), CAR had arrived at LOP V3.0. CARB based LOP #1 on CAR's LOP V3.0. (LOP #1 was virtually identical to CAR LOP v 3.0, with the addition of certain minor changes required to make it comply with California regulatory requirements.)

While CAR LOP V1 did not limit the types of livestock manure to be covered by it to dairy and swine manure, the LOP #1 did. While a search of the record did not show why CAR imposed that limit, a review of CAR's FAQs on its Livestock Projects Protocol page provides a clue.

See FAQ #5: "Is an anaerobic digester at a beef farm eligible?"

CAR answered as follows:

"A: No, only swine and dairy manure are eligible waste streams. *Beef farms were not included in the performance standard analysis because it was unknown whether it is common practice to anaerobically treat beef cattle waste*, meaning that when a digester is installed and digesting beef cattle waste, there may not be any project emission reductions compared to the baseline (no methane avoidance)." [Emphasis added.]¹

It appears that CAR had not done the research necessary to determine whether it was a common practice to anaerobically digest beef cattle manure, and just assumed the answer. (We asked CAR but were not able to find anyone there who remembers why the limitation was included.) CARB apparently accepted CAR's work without making the determination itself even though CAR's FAQ answer does not make sense. See the discussion in the 2nd from the last paragraph on p. 6 *infra*.

CARB subsequently amended LOP #1, with the amended version adopted on November 14, 2014. It is that version of the LOP that CARB has included as a document in the Notice.

Subsequently CARB incorporated the LOP into the LCFS without conducting any analysis as to whether it was appropriate to do so, and even though the purpose of offset credits under C&T is different than the purpose of the LCFS credits. CARB is on track to compound that error by amending the LCFS again with C&T's 2014 LOP incorporated yet again.

SB 1383 was enacted since the creation of the LOP

Not only was the process of LOP incorporation into the LCFS improper, but 10 years have passed since the last amendment of the LOP. There have been significant developments affecting methane emissions from manure management since then. One significant change was the enactment of SB 1383, *Short-lived climate pollutants: methane emissions; dairy and livestock; organic waste: landfills*, on September 19, 2016.

¹ <https://www.climateactionreserve.org/how/protocols/waste/us-livestock/livestock-project-protocol-faqs/>.

SB 1383 required CARB to begin implementing California's comprehensive short-lived climate pollutant strategy "to achieve a reduction in the statewide emissions of methane by 40 percent ... below 2013 levels by 2030."

Section 4 of SB 1383 requires CARB, in consultation the Department of Food and Agriculture (CDFA), to, subject to certain conditions precedent, "adopt regulations to reduce methane emissions from **livestock manure management operations and dairy manure management operations**, consistent with ... the strategy, by up to 40 percent below the **dairy sector's and livestock sector's** 2013 levels by 2030." [Emphasis added.]

205.1 cont.

Therefore, the California legislature expressly directed CARB to adopt regulations to reduce methane emissions from **livestock** management operations **separately from AND in addition to** reducing methane emissions from **dairy** manure management operations. In fact, virtually every time the statute refers to reductions in methane emissions from dairy manure management in SB 1383, it separately references livestock manure management. It is therefore clear that the legislature was targeting reductions in methane emissions from **livestock other than dairy cattle** when it passed SB 1383.

As a result of SB 1383 CARB, CDFA and other relevant California agencies convened a Dairy and Livestock GHG Emissions Working Group (Working Group). One of the subgroups, Dairy and Livestock Subgroup #2: Fostering Markets for Digester Projects, was convened to "to review circumstances, identify barriers, and make recommendations toward advancing digester development to reduce **dairy** manure methane emissions", and in fact only made recommendations relevant to dairy methane emissions when it issued its report on October 12, 2018, notwithstanding the inclusion of "Livestock" in the subgroup name. [Emphasis added.] Therefore, **to date, CARB has not addressed methane emissions from livestock manure management (other than dairy manure) in either laws or regulations.**

Beef cattle is the top livestock commodity category in California after dairy products

The question thus arises as to what "livestock" the legislature was referring to in SB 1383. To answer that question, we turn to the CDFA's 2022-2023 California Agricultural Statistics Review, https://www.cdfa.ca.gov/Statistics/PDFs/2022-2023_california_agricultural_statistics_review.pdf.

It is instructive to look at the list of the Top 20 commodities in California from 2020 – 2022. The top commodity in the state was "dairy products, milk", but in 4th place, and **the top livestock commodity after dairy** in the CDFA Statistics Review, was "**cattle and calves**" in 2022, up from 5th place in 2020 & 2021.

See the below table:

Top 20 Commodities in California, 2020-2022

Commodity	Value and Ranks ²					
	2020		2021		2022	
	\$1,000	Rank	\$1,000	Rank	\$1,000	Rank
Dairy products, Milk	7,265,456	1	7,571,411	1	10,397,493	1
Grapes	4,488,553	4	5,209,355	3	5,535,442	2
Miscellaneous crops ²	4,552,240	3	4,966,148	4	5,525,930	3
Cattle and calves	2,736,559	6	2,898,877	6	3,627,208	4

Dairy and dairy products accounted for 59.8 percent of the total livestock and livestock product receipts, while cattle and calves accounted for 20.8 percent of the state's total livestock receipts in 2022.

Therefore, the legislature almost certainly had beef cattle in mind when it passed SB 1383. Yet CARB has not taken any action with respect to beef cattle manure. A way to do so is to add beef cattle manure to the LOP.

A significant amount of beef cattle manure decomposes anaerobically today

Furthermore, whether or not it was a common practice for beef cattle manure to be anaerobically digested when LOP #1 was adopted in 2011, it is much more common now. In fact, in Iowa, the number of beef cattle housed in barns where the manure is collected and digested doubled from 2010 to 2018. There are now more beef cattle housed in barns than in open feed lots in Iowa.²

That change has not happened because beef cattle farmers get incentives like LCFS credits. Rather it is because of improvements in barn design. Housing cattle in barns keeps them dry in the cold, wet winter. Keeping cattle warm and dry in the winter is considered more humane and doing so results in better productivity, feed efficiency, and performance.

However, when beef cattle are housed in barns, their manure does not decompose aerobically when stored, and will thus generate methane emissions unless anaerobically digested. Therefore, CARB should want to incentivize the installation of anaerobic digesters on beef cattle farms where the manure decomposes anaerobically.

Furthermore, there is no reason to exclude beef cattle manure from the LOP since the amount of the avoided emissions credit is a function of the amount of methane generated under the conditions in which the manure is collected and stored, per Section 10.4 of Volume 4, Chapter 10 of the IPCC 2006 Guidelines. If the manure on such a beef cattle farm would decompose

² See the attached slide with the data.



aerobically, avoided emissions credits will not be generated and the farmer will not be incentivized by the LCFS.

205.1 cont.

In closing, we anticipate that CARB will receive many comments on the 15-Day Changes. It is therefore possible for the agency to issue a second 15-day package before the November Board meeting. Since the values CARB needs to update the LOP already exist in Chapter 10.4 of the IPCC Guidelines³, it would be simple to amend the LOP to include beef cattle manure in the second 15-day package. We urge CARB to do so.

Sincerely,

A handwritten signature in black ink that reads "Bryan J. Sievers". The signature is written in a cursive, flowing style.

Bryan Sievers
Director of Government Relations
Roeslein Alternative Energy

³ Attached are tables from Chapter 10.4 providing the applicable values for dairy, swine and beef cattle manure. The values for dairy and swine manure found in the LOP are taken directly, without modification, from Chapter 10.4.

Comment Log Display

Here is the comment you selected to display.

Comment 206 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

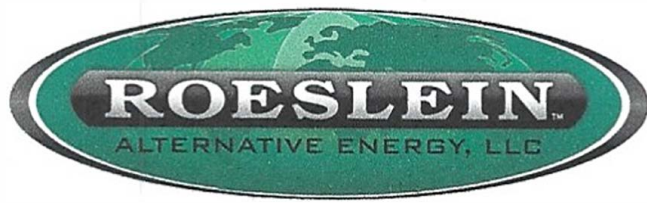
First Name	Bryan
Last Name	Sievers
Email Address	bsievers@roesleinae.com
Affiliation	Roeslein Alternative Energy
Subject	RAE Comments on 15-Day Changes including Livestock Offset Protocol
Comment	<div>Please see attached comments from Roeslein Alternative Energy which includes comments regarding the Livestock Offset Protocol and inclusion of beef cattle manure.</div>
Attachment	www.arb.ca.gov/lists/com-attach/7541-lcfs2024-B3UAZwRgVFgKPQUw.pdf
Original File Name	RAE 15-Day Comment Letter_LOP_08272024_FINAL.pdf

**Date and Time Comment Was
Submitted**

2024-08-27 17:52:17

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)



August 27, 2024

Mr. Matt Botill
Chief, Industrial Strategies Division
California Air Resources Board
1001 I Street Sacramento, California 95812

Ms. Rajinder Sahota
Deputy Executive Officer
Climate Change & Research
California Air Resources Board
1001 I Street Sacramento, California 95812

Comments on the LCFS 15-day text:

Dear Mr. Botill and Ms. Sahota,

Thank you for the opportunity to provide comments on the proposed modifications to the text of the LCFS amendment issued August 12, 2024 (the "15-day Changes"). Roeslein Alternative Energy ("RAE") was founded in 2012 as an operator and developer of renewable energy production facilities that convert agricultural and livestock substrates and feedstocks, along with renewable biomass feedstocks, into renewable natural gas and sustainable soil amendments and co-products. At RAE, we provide market-based solutions to meet the competing demands of renewable energy production, ecological services, and wildlife habitat restoration while enhancing the sustainability of food, feed, fuel, and fiber production.

We Appreciate the Increased Step-Down from the 45-Day Text

206.1

We want to start the letter by expressing our appreciation for CARB's increasing the amount of the one-time step-down in 2025.

Although 9% is much improved from the 5% contained in the 45-day text, however, we are concerned that it might not be sufficient to cause the necessary depletion of the credit bank. That's because CARB maintained 2028 as the first year for which the AAM can amend CI reduction targets.

206.2

The AAM Should Be Able to Trigger Earlier

Instead, the AAM should be able to be triggered as early as possible and therefore are advocating for 2025's performance to be the first year for which it can be triggered



CARB Should Restore the Third 10-Year Crediting Period for the Avoided Emissions Credit.

206.3

The 15-Day Changes backtracked on the 45-day text when they reduced the total number of crediting periods for avoided methane emissions from three to two for some subset of projects breaking ground before January 1, 2030. Given SB 1383 and CARB's acknowledgement in the August 22nd dairy workshop that more mitigation measures are necessary for methane emissions derived from dairy manure, we were surprised to see CARB make this change. Like many other DSM project developers, we rely on LCFS revenues for 3 full 10-year crediting periods - DSM projects are expensive to build and operate. CARB should restore three 10-year crediting periods for projects breaking ground before January 1, 2030.

The True-Up from the Temporary to the Provisional CI Score Should Not Have to Wait Until Verification

206.4

We appreciate that the 15-Day Changes included a credit "true up" from the Temporary CI score to the provisionally certified score. This is an important change. However, it still does not go far enough since the true up only occurs after verification.

Rather the true-up should occur when credits are posted by CARB for the quarter in which provisional certification occurs. There is no good reason to make fuel pathway holders wait until after annual verification. The LCFS disincentivizes a fuel pathway holder from ending up with a verified CI greater than the provisional CI, and that will especially be the case if CARB's proposed exceedance penalty goes into effect with the LCFS amendment.

The 4-to-1 Penalty Should be Eliminated or Greatly Reduced

206.5

We believe the 4-to-1 penalty is overly punitive and unnecessary, and we therefore believe it should be removed altogether or greatly reduced.

In closing, we note that there is sufficient time before the November Board meeting for CARB to issue a second 15-day package. We urge CARB to do so.

Sincerely,

A handwritten signature in black ink, reading "Bryan A. Sievers". The signature is written in a cursive, flowing style.

Bryan Sievers
Director of Government Relations
Roeslein Alternative Energy

August 27, 2024

Hon. Liane M. Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, California 95814

Re: Proposed Low Carbon Fuel Standard Amendments

Dear Chair Randolph:

Thank you for the opportunity to comment in response to the 15-day package of proposed modifications to the 2024 Low Carbon Fuel Standard ("LCFS") amendments that the California Air Resources Board ("CARB") released on August 12, 2024.

In Part I, we provide background on how Bunge's sustainability focus informs our comments and helps the LCFS succeed. We also offer general comments on the 15-day package, supporting the proposed 9-percent increase in stringency and reiterating our opposition to a vegetable oil cap. In Part II, Bunge recommends that CARB confirm and clarify that winter canola will be considered a distinct feedstock from more common spring canola for purposes of the proposed cap, because indirect land use change ("ILUC") and other concerns with spring canola do not apply to lower-risk winter canola. Finally, in Part III, Bunge addresses issues with the sustainability guardrails and requests that CARB implement its farm boundary and attestation requirements in 2028 at the earliest.

I. Background and General 15-Day Package Comments

Bunge is a leading oilseed processor. Bunge buys and processes agricultural commodities, then turns them into products used in the food industry, animal feed, and renewable diesel. Bunge is also a leader in sustainability, embracing climate-focused decision making and setting ambitious goals. For instance, we are well on our way to meeting our commitment to eliminate deforestation and native vegetation conversion from our supply chains in 2025. Bunge's robust traceability and monitoring systems give us significant insight into our supply chains. In addition, we are using technology and data to scale our efforts in geographies where deforestation is a higher risk. As described in our 2024 Global Sustainability report, thanks to these systems we have already achieved 100 percent traceability in our direct supply of soy in priority areas in South America. We achieved 97.7 percent traceability in our indirect supply of soy in Brazil's high-risk areas in 2023. Bunge is also working with farmers to incentivize sustainable practices.

Bunge has long supported the LCFS, and we are proud of the role we have played in its success. The LCFS has increased volumes of low-carbon fuels—including the biofuels that Bunge helps produce by supplying feedstocks to biofuel producers—such that California’s overall petroleum fuel use has fallen by 1.3 billion gallons since 2019. Meanwhile, the carbon intensity (“CI”) of the state’s transportation fuels has declined 12.63 percent from 2010 levels.

207.5 We support the ambitious 9-percent stepdown in the CI benchmark that CARB proposed in the 15-day package. Low-carbon liquid fuels will be instrumental in achieving this goal. Indeed, biofuels will be especially critical in the near term, serving as drop-in fuels and displacing fossil fuels for existing internal combustion engine vehicles while electric vehicle adoption expands.

207.6 However, Bunge was disappointed to see CARB propose a cap on canola oil and soybean oil in its 15-day package. In previous comments, we have consistently opposed the idea of imposing a cap on crop-based fuels. We reiterate our opposition to the proposed cap here. CARB staff repeatedly raised land conversion as the main issue with crop-based fuels at the April 2024 workshop. Staff stated then that CARB would adopt sustainability certifications rather than capping lipid-based fuels, citing concerns that limiting cleaner drop-in fuels would instead promote continued fossil fuel use and thus undercut CARB’s climate, health, and air quality goals. We share those concerns, and do not believe those concerns can be squared with a cap. Still, Bunge appreciates the gravity of land-conversion risk. To address this we have made industry-leading progress on the issue through our voluntary efforts, while participating in sector-wide initiatives to create common alignment and scalability on deforestation goals. We continue to believe that the issues CARB seeks to address with a cap are better handled through other means, such as sustainability certifications.

II. CARB Should Confirm that Winter Canola Will Be Considered Separate from Spring Canola.

207.7 Bunge encourages CARB to clarify that winter canola, which is a cover crop with a completely different ILUC risk profile than spring canola, will not be considered under the broader canola umbrella for purposes of the proposed cap and other canola LCFS provisions.

The proposed LCFS modifications that CARB released in its 15-day package specifically impacted canola in two primary ways. First, the 15-day package provided that “[b]iomass-based diesel produced from soybean oil and canola oil is eligible for LCFS credits for up to twenty percent combined of total biomass-based diesel annual production reporting, by company,” and that any further quantities will be assigned the CI of the diesel pool or, if higher, the CI for the applicable fuel pathway.¹ Second, the 15-day package proposed to modify Table 6 to add

¹ CARB, LCFS 15-Day Package: Proposed Regulation Order at 37, § 95482(i) (Aug. 12, 2024), https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_atta-1.pdf.

geographic specifications for each listed feedstock LUC value.² This included specifying that, for canola biomass-based diesel, the assigned LUC value of 14.5 gCO₂/MJ is applicable only to the feedstock as produced in North America.³

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However, the proposed cap should not apply to *winter* canola due to the rationale that appears to animate CARB's proposed cap and the nature of the Table 6 LUC value clarifications. Bunge thus asks CARB to confirm and clarify that it is *spring* canola oil that the agency is referring to in the cap and Table 6, and that winter canola will be deemed a distinct feedstock.

A. Land Conversion Risk Appears to Be CARB's Chief Concern.

CARB's chief concern with crop-based fuels, and canola specifically, seems to be deforestation and land-use change risk. A second concern that CARB has raised is the risk of creating excess demand that draws these feedstocks to California over other regions.

CARB has long stated that land-conversion risks are its main concern with regard to crop-based fuels. For instance, at the February 2023 LCFS workshop, CARB staff described reviewing "land use change science" in response to crop-based biofuel concerns, stating that "biofuel production must not come at the expense of deforestation or food production."⁴ At the same workshop, staff said they were weighing comments for and against limits on crop-based fuels in response to those concerns.⁵ At CARB's September 2023 Board meeting, Board members and staff also discussed sustainability guardrails and a cap on crop-based fuels as potential means to address land conversion and food production risk related to biofuels growth. Subsequently, the LCFS 45-day package released in December 2023 raised "the risk that rapid expansion of biofuel production and biofuel feedstock demand could result in deforestation or adverse land use change."⁶ To reduce this risk, CARB proposed sustainability guardrails, including third-party certifications, rather than a cap. The main rationale for the sustainability certification requirement was the same concern driving CARB throughout the LCFS amendment process: to "limit deforestation and land use change as a result of feedstock production as much as possible."⁷

The proposed geographic specification updates to canola and other LUC values in Table 6 also reflect CARB's overarching concern with land-conversion risk. In the Table 6 context, CARB

² *Id.* at 128-29, § 95488.3(d) Table 6.

³ *Id.*

⁴ CARB, Presentation: California LCFS Workshop at 37 (Feb. 22, 2023), https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/lcfs_meetings/LCFSpresentation_02222023.pdf.

⁵ *Id.* at 37, 41.

⁶ CARB, Initial Statement of Reasons on Proposed LCFS Amendments at 32 (Dec. 19, 2023) ("ISOR"), <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>

⁷ CARB, Proposed LCFS Amendments, Appendix E: Purpose and Rationale of Proposed Amendments at 79-80 (Jan. 2, 2024), https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/lcfs_appe.pdf.

proposed explicitly tying listed feedstocks to the geographies where the LUC values were modeled because the “LUC carbon intensity for feedstocks from regions other than the regions modeled may not be equivalent with the Table 6 values for those feedstocks shown.”⁸

CARB has only identified the second concern—that California’s demand for biofuels could draw virgin feedstocks away from use in other regions—in more recent analyses. In the 15-day package notice, CARB comments on the proposed cap stated that California “must ensure that other regions are able to also access increasing volumes of low-carbon alternative fuels.”⁹ The notice further stated that a cap would avoid “sending a long-term signal for virgin soy or canola oil to serve California demand.”¹⁰

B. The Proposed Cap and Table 6 Updates Address Risks Inapplicable to Lower-Risk Cover Crops Like Winter Canola.

CARB’s approach to winter canola should be distinct from its treatment of “canola” in the LCFS amendments. The two concerns that are animating CARB’s 15-day package modifications related to canola—CARB’s long-standing focus on minimizing land-conversion, and its more recent concern with ensuring other regions have access to low-carbon fuels—do not apply to winter canola.

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1. Winter Canola ILUC Risk Is Lower Than Spring Canola ILUC Risk, So the LCFS Should Not Treat the Two Feedstocks Identically.

The differences between spring canola and winter canola are particularly apparent when it comes to ILUC, and ILUC appears to be CARB’s main concern with spring canola. Spring canola is a cash crop, planted in the spring and harvested in the fall. Winter canola is a cover crop that is specifically bred for cultivation over the winter. It is planted in the fall and harvested in the spring. As such, winter canola is generally grown on land that would otherwise be fallow. Thus, winter canola, almost by definition, has less land-conversion risk than spring canola. It is grown on land *already* cultivated for another purpose (for instance, growing a food crop) during the summer. While farmland-expansion pressure may be associated with demand for spring canola, that pressure is minimized for a feedstock like winter canola that is planted exclusively as a cover crop. Moreover, winter canola brings significant environmental and sustainability benefits as a cover crop. Including winter canola in a crop rotation can help balance nutrient uptake, replenish soil fertility, reduce erosion, improve water retention, and reduce the need for fertilizers and pesticides.

⁸ CARB, 15-Day Notice: Proposed LCFS Amendments at 10 (Aug. 12, 2024), https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_notice.pdf.

⁹ *Id.* at 4.

¹⁰ *Id.*

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In recent years, researchers have emphasized that “double-cropping” with a cover crop such as winter canola can promote crop diversity, add environmental benefits, and make “a dedicated energy crop economically attractive.”¹¹ Planting winter canola or another cover crop can also alleviate concerns about biofuel crops replacing food crops, because both can be grown on the same land in one season.¹² Further, oilseed cover crops like winter canola can “eliminate the side effect of ILUCs for biofuel production because they come in rotation with the major crops with some savings in demand for new cropland.”¹³ Researchers are interested in crops such as winter canola for the same reason that winter canola should not be treated as identical to spring canola: Winter canola has markedly lower land-conversion risks, and thus lower ILUC values.

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A May 2024 analysis of winter canola provides data to support the lower-risk ILUC profile of winter canola compared to spring canola.¹⁴ Researchers examined the ILUC of the entire canola market and concluded that “using winter rapeseed oil [i.e., winter canola oil] as the feed stock has a significant effect and decreases the corresponding ILUC emissions to about half of spring rapeseed [i.e., canola] ILUC values.”¹⁵ Additional scenarios examined by the researchers suggest winter canola has a zero, or even negative, ILUC factor, when examined as a stand-alone crop from spring canola. The analysis used the GTAP-BIO model accepted by the Carbon Offsetting and Reduction Scheme in International Aviation (“CORSIA”) representing double cropping and unused land. This modeling reinforces that winter canola and spring canola should be distinguished under the LCFS. Applying a cap to winter canola would be illogical, because the cap is driven by land-conversion concerns that are less applicable to winter canola, as the analysis here demonstrates. Prescribing the Table 6 ILUC value to winter canola would be equally unreasonable. The purpose of the proposed Table 6 modifications is to ensure Table 6 values accurately reflect the modeling for each feedstock—but the modeling used to reach the canola Table 6 value reflects *spring* canola, not *winter* canola.

2. Clarifying that Winter Canola Is Not Capped Would Promote, Not Undermine, CARB’s Goal of Ensuring Other Regions Access to Cleaner Alternative Fuels.

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Beyond their ILUC differences, winter canola and spring canola are also markedly different in terms of market size. The two types of canola should thus also be treated separately insofar as CARB is concerned with ensuring other regions have ample access to increasing volumes of low-risk biofuels.

¹¹ See R.W. Gesch & W.D. Archer, *Double-Cropping with Winter Camelina in the Northern Corn Belt to Produce Fuel and Food*, 44 INDUSTRIAL CROPS & PRODUCTS 718, 719 (2013).

¹² *Id.* (internal citation omitted).

¹³ See, e.g., Farzad Taheripour et al., *Oilseed Cover Crops for Sustainable Aviation Fuels Production and Reduction in Greenhouse Gas Emissions Through Land Use Savings*, 9 FRONTIERS IN ENERGY RESEARCH 1 (Jan. 20, 2022).

¹⁴ See generally Farzad Taheripour & Ehsanreza Sajedinia, Purdue University, *Induced Land Use Change: Case of Winter Rapeseed Biodiesel* (May 2024).

¹⁵ *Id.* at 4.

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Winter canola is still an emerging crop in the United States, whereas spring canola is relatively established. Based on recent National Agricultural Statistics Service acreage reports, we estimate that the United States planted only 79,000 acres of winter canola in 2024 compared to approximately 2.5 million acres of spring canola.¹⁶ And this is far less than the approximately 90 million acres of soybeans planted in 2024.¹⁷ These numbers illustrate that there is little concern that California will siphon off winter canola supplies that other markets should have access to; compared to spring canola (and soybeans), United States winter canola acreage is small. Allowing uncapped crediting for winter canola would not undermine CARB's goal of ensuring that low-carbon fuels derived from abundant feedstocks like soy and canola can reach to other markets. There are currently no winter canola pathways in the LCFS at all. Including winter canola in the cap would thus stymie the development of a promising but fledgling low-risk feedstock. If CARB is committed to expanding other markets' access to low-risk alternative fuels, CARB should support winter canola pathways to foster a market for winter canola so that it can then serve other regions as well. Applying a cap to winter canola would not enhance, and could instead threaten, this market.

Moreover, it would not "send[] a long-term signal for virgin soy or canola oil to serve California" to allow uncapped winter canola LCFS crediting, either.¹⁸ As an initial matter, winter canola has more in common with other cover crops than it does with spring canola, particularly with respect to ILUC, sustainability, and other CARB focuses. Thus, to the extent these concerns prompted CARB's desire to avoid drawing virgin spring canola oil to California long-term, winter canola clearly should not be grouped with spring canola. Further, any signal sent by allowing uncapped winter canola volumes would be neither harmful nor long-term. Instead, it would be a signal encouraging investment in a low ILUC-risk feedstock that will benefit other regions once it matures.

Finally, clarifying that winter canola is separate from spring canola would not undermine efforts to completely displace carbon-intensive fossil diesel with cleaner drop-in fuels, to the extent that is a CARB objective. We note that the 15-day notice characterized the proposed cap on canola and soy oil as a change that "allows for California to displace up to 100% of the State's current fossil diesel demand with cleaner alternative diesel."¹⁹ However, it is not the cap that would "allow" California to displace fossil diesel with cleaner alternatives. More accurately, any full displacement of fossil diesel would come *in spite of* the proposed cap on the drop-in fuel

¹⁶ See USDA National Agricultural Statistics Service, Acreage (June 2024) 19, https://www.nass.usda.gov/Publications/Todays_Reports/reports/acrg0624.pdf (identifying approximately 2.5 million acres of spring canola).

¹⁷ *Id.* at 41.

¹⁸ 15-Day Notice at 4.

¹⁹ *Id.*

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feedstocks that are best positioned to replace diesel in the near term.²⁰ Excluding winter canola from the cap, and instead grouping it with other cover crops of similarly low ILUC risk, would help California replace fossil diesel without raising the land-conversion concerns associated with spring canola and soy.

In sum, CARB's cap on canola oil and its Table 6 changes are not logical in the context of winter canola due its role as a cover crop and its resulting lower ILUC risk. To resolve this issue, Bunge encourages CARB to clarify that winter canola is not included in the canola oil cap or subject to the canola LUC value listed in Table 6. Winter canola should be treated as any other similarly low-risk crop: It should not be subject to the cap, and its LUC value should be determined based on modeling reflecting its unique risk profile.

III. Sustainability Guardrail Recommendations

207.10

Bunge is committed to ending deforestation in agricultural supply chains. Our record shows a robust history of working with farmers and stakeholders to address deforestation. It is imperative that efforts to stop deforestation in agricultural supply chains take a risk-based approach so that resources and energy are directed at the parts of the world where the risk of deforestation is the highest. To have a one-size-fits-all approach to addressing certification of deforestation and conversion adds an unnecessary burden on agricultural supply-chains, and can result in diverting resources and focus from areas of the world where the risk of deforestation and conversion is the greatest. Bunge raised issues related to the sustainability certifications and urged a later implementation timeline in our comments on the December 2023 45-day package and the April 2024 workshop. We maintain those concerns and encourage CARB to re-examine its proposal on the sustainability certification and ensure the approach it is taking is commensurate with the risks specific to each region of the world.

207.11

Furthermore, Bunge is concerned about the timeline laid out for initial compliance for fuel producers. The 15-day package proposes that, starting in the 2026 data year, fuel producers using biomass must collect and submit supply chain data such as spatial data of farm boundaries and submit an attestation letter certifying that biomass was sourced on land that was cleared or cultivated before 2008.²¹ Bunge appreciates the value of attestations and data. However, we also know firsthand how difficult this data is to collect and the burden it places on supply-chain participants. We have been performing comparable data-gathering to comply with similar European Union deforestation rules, which go into effect at the end of 2024. From this experience, Bunge has learned that collecting and managing geographical shapefiles or coordinates of plot boundaries presents complex logistical challenges. It takes time to gather

²⁰ See, e.g., ISOR at 88-94 (explaining that Alternative 1 to the proposed LCFS amendments, which limited total credits from virgin oil feedstock diesel fuels, resulted in relatively more fossil diesel use and had fewer emissions reduction and public health co-benefits compared to the proposed amendments).

²¹ Proposed Regulation Order at 171-72, § 95488.9(g)(2).

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the necessary data, and it could be unrealistic for the LCFS to require such data and related attestations on such short notice. The agricultural feedstock supplied to biofuel producers in 2026 will primarily come from the 2025 crop season. The 2025 crop season essentially begins in the fall of 2024 as farmers begin purchasing seed and inputs, and make planting decisions. In order for farmers, agriculture companies, and biofuel producers to be properly prepared to meet the farm boundary and attestation requirements on January 1, 2026, the work would essentially have to begin today, and many in the supply-chain will not be ready to meet this standard by 2026. Bunge urges CARB to shift the initial compliance date for sustainability certification back to the original proposal of 2028. This adjustment would phase in the requirements on the timeline that was originally proposed for sustainability requirements in the 45-day package. Further, this modification would better ensure the proposed requirements can be satisfied by the deadline.

IV. Conclusion

Bunge appreciates CARB's commitment to improving the LCFS in the 2024 amendments. We hope our comments help enhance the program in its final version.

207.12

In particular, Bunge encourages CARB to clarify that winter canola will be considered separate from spring canola under the program. As explained in Part II above, winter canola and spring canola are distinct in key respects. Most notably, there are significant differences between their ILUC risk profiles and their respective roles in crop rotation. In light of these differences, the proposed canola cap and the Table 6 canola value should not apply to winter canola.

207.13

We also ask CARB to move back implementation of the proposed farm boundary data and attestation requirements so that these requirements apply for the 2028 data year or later. Bunge's firsthand experience with the challenges of collecting this data to comply with EU regulations confirms that 2028 is a more realistic target.

We appreciate the opportunity to share Bunge's perspective and to advance our common goal of a cleaner, sustainable fuel supply.

Sincerely,



Robert Coviello
Chief Sustainability Officer and Government Affairs

August 27, 2024

The Honorable Board Members
California Air Resources Board
1001 I Street
Sacramento, CA 95814
Submitted Electronically

Attn: Honorable Liane M. Randolph
Chair, California Air Resources Board

Dear Honorable Members:

Subject: Los Angeles Department of Water and Power's Comments on California
Air Resources Board's Proposed Modifications to the Proposed Amendments to
the Low Carbon Fuel Standard Regulation

The Los Angeles Department of Water and Power (LADWP) appreciates the opportunity to provide comments on the California Air Resources Board's (CARB) Proposed Modifications (15-Day Changes) to the proposed amendments to the Low Carbon Fuel Standard (LCFS) Regulation (45-Day Proposal) posted on August 12, 2024. LADWP reaffirms its strong support of the LCFS program and its role in achieving the substantial greenhouse gas (GHG) emissions reduction goals of Assembly Bill (AB) 32, Senate Bill 32, and AB 1279.

As an electrical distribution utility (EDU), LADWP is the largest municipal electric utility in the nation, serving approximately 1.4 million residential and business customers. As a large publicly owned utility, LADWP is in the most optimal position to promote transportation electrification by investing in programs that benefit everyone while reducing the financial impacts to its customers. LADWP offers the following comments on the proposed amendments for your consideration.

I. § 95484. Annual Carbon Intensity Benchmarks

The LCFS regulation is vital to decarbonizing the transportation fuel sector. LADWP supports CARB's proposed 30 percent reduction in fuel carbon intensity (CI) by 2030 and 90 percent reduction in fuel CI by 2045. To comply with long-term zero emission vehicle adoption targets of regulations such as Advanced Clean Cars II, Advanced



Clean Fleets, Advanced Clean Trucks, and others by the 2045 deadline, extending the LCFS program is essential in supporting the transition. LADWP supports CARB staff's proposal to modify the near-term increase in stringency to a nine percent CI reduction in 2025 from the five percent year-to-year increase included in the initial 45-Day Proposal.

II. § 95483(c)(1). Updates to Residential Electric Vehicle Charging

a. *Base Credits*

LADWP has been a long-time advocate of electrifying the transportation sector. From light-duty (LD) electric vehicle charger rebates first offered in 2013 to medium- and heavy-duty (MHD) vehicle charger rebates in 2018, and previously owned electric vehicle rebates expanded in 2023. LADWP continues to develop various programs that promote electric vehicles and increase benefits to disadvantaged communities and low-income customers. Since 2022, LADWP spent approximately \$14.5 million towards installing electric vehicle chargers in disadvantaged communities. LADWP relies on the LCFS program to continue funding these equity-focused efforts while reducing the financial impacts to its customers. LADWP supports the proposed reduction in the Publicly Owned Utilities' (POUs') minimum base credit contribution required to fund the Clean Fuel Reward Program and the corresponding increase in the holdback credit which will help fund LADWP's transportation electrification programs.

b. *Original Equipment Manufacturer (OEM) Base Credits*

The 15-Day Changes introduced a new provision that will allow the Executive Officer the option to direct up to 45 percent of base credits to OEM of electric vehicles. LADWP has several concerns with this provision if enacted:

- As written, the allocation of 45 percent of EDUs' base credits to OEMs is expected to result in a decrease in EDU holdback credits when compared to the 45-Day Proposal. This conclusion is based on the following interpretation and sample calculation:
 - Section 95483(c)(1)(A) states, "If the Executive Officer assigns a portion of base credits to OEMs pursuant to section 95483(c)(1)(B), the EDUs are assigned the remaining base credits."
 - Section 95483(c)(1)(B) states, "If the Executive Officer directs base credits to eligible OEMs, the requirements of section 95483(c)(1)(A)2. do not apply." 95483(c)(1)(A)2 contains the CFR percent contribution requirements, which will also not apply.

- Based on the above cited sections, LADWP understands that if the total base credit equals 100 million metric ton (MMT), OEMs will get 45 MMT and EDUs will get the remaining 55 MMT.
- Determination of individual EDU allocations is based on section 95486.1(c)(1)(A), ratio of non-metered residential electric vehicles assigned to an EDU over total number of non-metered residential electric vehicles.
- Large POUs make up approximately 10 percent of the base credit and would receive 5.5 MMT for holdback.
- In comparison, large POUs would contribute 25 percent to CFR and keep 75 percent or 7.5 MMT for holdback under the 45-Day Proposal.

Based on the Notice of Public Availability of Modified Text, CARB staff stated that, *"If the OEMs receive base credits, utilities will no longer be required to contribute to a Clean Fuel Reward program, and credits available for holdback equity projects are unaffected."* For clarification, the language in the regulation needs to be amended to capture CARB's intent.

- OEMs are currently not subject to the equity spending requirement. To be consistent with CARB's equity goals, LADWP recommends including equity spending provisions for OEMs. For example, OEMs can provide rebates for used electric vehicles with additional rebates based on the income of the customer or provide options that would make the cost of replacing critical components (i.e. batteries and motors) of used electric vehicles comparable to internal combustion vehicles, ensuring that purchasing and maintaining electric vehicles would remain reasonably priced for the customers.

c. Restrictions on Use of Holdback Credits

LADWP supports the 45-Day Proposal to keep the holdback equity requirement for POUs at 50 percent as stated in Appendix E (page 15) of the Proposed Amendment. However, this is not reflected in the language of the proposed regulation in section 95483(c)(1)(A)5. a. LADWP recommends that CARB staff amend the language of the proposed regulation to explicitly state the holdback equity requirements for POUs for clarification.

III. **§ 95486.2(b) and 95486.3(b). Generating and Calculating Credits for Zero Emission Vehicle (ZEV) Fueling Infrastructure Pathways**

LADWP supports the proposed amendments that expand the current ZEV infrastructure crediting provisions beyond LD infrastructure to MHD infrastructure and extending the LD crediting. LADWP believes that infrastructure crediting will help reduce the risk of under-utilized chargers and will drive the buildout of necessary infrastructure.

Additionally, LADWP supports the changes to the Fast-Charging Infrastructure crediting in the 15-Day Changes.

IV. **§ 95501. Requirements for Validation and Verification Services**

Staff's proposal to extend the third-party verification requirement to electric vehicle charging data except for non-metered residential transactions per Section 95491(d)(3)(A) means that metered residential transactions (for base credits or incremental credits) will be subject to verification, which would be challenging because of the required site visits.

Section 95501(b)(3) states that, "at least one lead LCFS verifier accredited by the Executive Officer on the verification team must, in addition to one visit to validate an application, annually visit each facility; and, if different from the fuel production facility, the central records location for which the records supporting an application or report subject to verification are submitted."

Annual site visits to *each* facility for verification of Quarterly Fuel Transactions Reports can be time-consuming and burdensome. Fueling-supply equipment in California is already subject to accuracy verification by the Department of Food and Agriculture's Division of Measurement Standards. Fuel transactions that can easily be verified using desktop review, such as those using Lookup Table CIs and invoices, should be considered low-risk and should not be subject to the site visit requirement. Complying with this requirement would be especially challenging for the verification of residential electric vehicle charging data since this implies having to perform site visits at private properties as part of the verification process. LADWP recommends that CARB staff amend or add language that allows for site visits at a central records location for verification of residential electric vehicle charging data or exempt these transactions from the site visit requirement. Additionally, for small credit generators, it may not be financially feasible (even with deferred verification) to hire third-party verifiers. LADWP urges CARB to consider adding language to allow verification exemptions (subject to the Executive Officer's approval) especially when the cost of verification exceeds the value of the LCFS credits generated.

The Honorable Board Members
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August 27, 2024

In closing, LADWP appreciates the opportunity to provide comments and feedback on these important topics. If you have any questions about LADWP's comments, please contact Ms. Andrea Villarin, at (213) 367-0409 or Mr. Bang Phung, at (213) 367-8689.

Sincerely,

Katherine Rubin
Director of Corporate Environmental Affairs

BP:mh

c: Ms. Rajinder Sahota, CARB
Mr. Matthew Botill, CARB
Mr. Jordan Ramalingam, CARB
Ms. Andrea Villarin
Mr. Bang Phung



The Honorable Liane Randolph
Chair, California Air Resources Board
1001 I St, Sacramento, CA 95814
Sacramento, California 95814

August 27, 2024

RE: 15-Day Package for the Low Carbon Fuel Standard Update

Dear Chair Randolph and Members of the Board:

Clean Energy would like to thank CARB staff for the opportunity to comment and emphasize our support for many of the proposed amendments to the Low Carbon Fuel Standard (LCFS) in the “15-day Package” released on August 12, 2024. We remain committed as a collaborative partner to the clean air and environmental goals of our state.

209.1

We believe the “15-day Package” is a measurable improvement upon previous drafts. The increased step-down percentage, commitment to book and claim, a true-up and numerous citations for the record recognizing the benefits of dairy biogas will be helpful to the market. However, please consider the following constructive amendments that we believe would increase further market certainty, confidence and performance:

- **True-Up:**

209.2

SUPPORT: we are pleased that a “True Up” has been proposed which allows the state and project to recognize the true environmental benefits of the project from the onset, and helps project owners recover otherwise lost credits during the temporary pathway certification period. Unfortunately, the language in the 15-day Package does not allow the True-Up to take effect until after “verification” of the operational CI data. This implies that you would not be able to realize the True-Up until after your first Annual Fuel Pathway Verification (AFPR).

Based on the existing LCFS pathway process, a dairy project that started in January 2025 would not likely receive its Provisional Pathway until 2026, with its AFPR Verification occurring late in 2027. This means the project would be without any True-up value for nearly two years. Moving dairy pathways from Tier 2 to Tier 1 should reduce the Provisional Pathway approval process, but there is still a significant gap from project start to when a True-up is realized.

PROPOSED AMENDMENT: The True-Up should be applied retroactively at the point when the Provisional Pathway is approved.

- **Step-Down:**

209.3

SUPPORT: we are pleased to see the proposed 9% step down (vs. a prior 5%) be implemented in Quarter 1, 2025. Without it, the credit bank will not reduce fast enough and we will be stuck in a depressed LCFS price environment.

209.4

PROPOSED AMENDMENT: while the proposed step-down amendment helps, it may not be nearly enough on its own. The oversupply of credits in the market hurts existing project returns, limits new project development, and sends the wrong signal to investors. Since the proposed 30% CI target by 2030 would send a modest market signal for private investment (today's market price remains at \$54 despite CARB's proposal), especially for a program that over-delivered and outpaced CARB staff's expectations to date, a 40% CI target for 2030 would be far better and/or a 30% CI target if an amended (please see below) Automatic Accelerator Mechanism can be triggered in 2025.

- **Automatic Adjustment Mechanism (AAM):**

209.5

PROPOSED AMENDMENT: while we appreciate that CARB is keeping the AAM as a tool to be enacted in 2027, we believe this tool may be needed much sooner. This is exemplified with the credit price recently hovering around the mid-\$50s in direct reaction to the release of the "15-day Package." This is worrisome to a leading company investing hundreds of millions to support California's emissions reductions goals that needs credit prices to be in the six-digit range.

We strongly believe the AAM should be triggered as early as 2025 if the credit bank is awash with credits (i.e., the credit build is 2.5 times larger than the credit draw in any given quarter). This mechanism would dynamically respond to a potential future event where there is a significant underestimation of CI reductions in a given year. If left unaddressed or ineffective, the program cannot raise credit prices to levels private capital needs to further invest in low carbon fuel projects.

- **Avoided Methane Credit (AMC):**

209.6

PROPOSED AMENDMENT: we are concerned with the reduction of the AMC eligibility for dairy projects built pre-2030 from 3 to 2 crediting periods. This will disincentivize early dairy project investments that California needs to meet SB 1383 goals.

The industry has already suffered for years with damaging LCFS credit prices due to an abnormally delayed LCFS update. Further, unmitigated dairy emissions are the largest source of methane emissions in the state. The modification to reduce AMC crediting periods is seemingly counter to our climate needs and goals on several levels. We urge CARB to retain the 3 crediting periods.

- **Four-To-One CI Penalty:**

209.7

PROPOSED AMENDMENT: we urge CARB **NOT** to adopt a penalty mechanism for CI changes at a project. Projects are biological in nature and can experience changes in CI due to many factors, including but not limited to, ambient temperature, energy input increases and/or decreases, cloud cover, etc. When these types of natural changes occur, the operator

of the low carbon project, like an anaerobic digester, will properly manage the fluctuating project CI and credits being generated. In the event the CI changes unfavorably resulting in an over-generation of credits, normal course of operations is to bank these credits for retirement through the Annual Fuel Pathway Reporting (AFPR) process.

209.7
cont.

Unfortunately, the proposed regulation would apply a four-to-one penalty to the CI if it moves unfavorably to the credit generating CI. Because of this, an operator will be forced to apply a very conservative margin of safety to the CI of their project, thus reducing its quarterly revenues. Those intending to comply with the true-up in good faith but fall short will be harmed, and thus a disincentive for investment. We don't believe this should be the tool for enforcement or a bad actor outcome.

As it stands today, the pathway approval process takes nearly two years to complete, resulting in lower revenues at the beginning of a project and now you will also see lower revenues during a project while it goes through the AFPR process, which can take up to two years. This proposed change will not provide any CI emissions benefit to the program and puts additional financial strain on low carbon investments.

We recognize the recent LCFS update proposal is vastly improved upon from what was proposed nearly two years ago. We appreciate CARB's commitment to ambitious state goals and targets, backed by science-based and fuel neutral policies. The LCFS needs to be stringent and continue rewarding projects based GHG outcomes. Remaining true to these core concepts will ensure California leads the world in rapid transportation sector decarbonization.

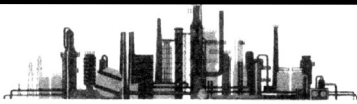
Sincerely,



Todd R. Campbell
Vice President, Public Policy & Regulatory Affairs
Clean Energy



Ryan Kenny
Policy Director – Western U.S.
Clean Energy



Executive Director: Craig A. Moyer, 2049 Century Park East, Los Angeles, California 90067
Phone: (310) 312-4353 Fax: (310) 312-4224 E-mail: cmoyer@manatt.com

August 27, 2024

VIA CARB ONLINE PORTAL

Clerks' Office
California Air Resources Board
1001 I Street
Sacramento, California 95814

RE: Comments on the 15-Day Proposed Modifications to Amendments to LCFS Regulations

Honorable Board Members:

The Western Independent Refiners Association ("WIRA") appreciates the opportunity to comment on the California Air Resources Board's ("Board") Proposed Amendments for the Low Carbon Fuel Standard released on August 12, 2024 ("Proposed Amendments"). WIRA is a long-standing trade association comprised of small and independent refiners on the West Coast of the United States, including various regions of California. WIRA has been an active participant in local, state, and federal rulemakings for many years, with its members serving a vital role as pro-competitive forces in the market for refined transportation fuel.

210.1

The Proposed Amendments, although couched as minor regulatory revisions, will have significant and meaningful impacts on the LCFS program and its regulated parties—including WIRA members. Consequently, a 15-day comment period during which to study and remark on these substantial changes is simply insufficient given the importance of this matter.

For example, the Board's publicly-noticed materials contain no discussion or consideration of the operational and economic impacts the Proposed Amendments will have on regulated entities. This dearth of analysis evidences a need to take a harder, closer look at these issues. On the contrary, the 15-day public notice for the Proposed Amendments seems to downplay their impacts, stating that "the modifications consist of provision clarifications, minor revisions removing certain proposals, such as removing jet fuel as a required fuel, and updated modeling, which does not alter the compliance responses such that the significance determinations change." But this is not the case—the Proposed Amendments as drafted will have significant impacts.

While environmental analysis is a separate issue, the Proposed Amendments will result in extensive market and cost impacts to businesses that will be required to comply with the Proposed

210.1
cont.

Amendments. The Board must consider the regulatory impacts these Proposed Amendments will have, including resulting economic harms to LCFS-regulated parties.

210.2

WIRA would appreciate insight into the Board's position with respect to the Proposed Amendments' economic impacts on California businesses, individuals, and the LCFS market in general (among other issues). For example, the proposal to limit LCFS credits for biofuels generated from soybean oil and canola oil would seem to potentially justify its own Standardized Regulatory Impact Assessment to avoid an arbitrary and capricious action given the potential economic impacts from that lone amendment. Simply stated, the Board must have a full understanding of the facts and impacts these Proposed Amendments will have prior to considering them for approval.

210.1
cont.

In conclusion, WIRA respectfully encourages the Board to identify additional opportunities to engage with the regulated community to better appreciate the Proposed Amendments and to explore potential reasonable alternatives. Thank you for your thoughtful consideration of this letter. If you have any questions, please do not hesitate to contact me at (310) 312-4353 or by email at cmoyer@manatt.com.

Respectfully submitted,

Western Independent Refiners Association

/s/ Craig A. Moyer

Craig A. Moyer
Executive Director and General Counsel

August 27, 2024

Submitted via ca.gov

Liane M. Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Comments on Modifications to Proposed Low Carbon Fuel Standard Amendments

Dear Chair Randolph:

Leadership Counsel for Justice & Accountability, Central Valley Defenders of Clean Water & Air, Animal Legal Defense Fund, and Food & Water Watch (collectively, “Commenters”) submit the following comments¹ on the Modifications to the Proposed Low Carbon Fuel Standard Amendments (“Modifications”).²

211.1 The Modifications double down on lavish incentives and special treatment for fuels derived from factory farm gas. They also continue to inappropriately treat factory farm gas production as an extremely powerful offset mechanism that facilitates business as usual for fossil fuel and dirty hydrogen producers. These factory farm gas policies are a dead end for the climate and a disaster for vulnerable communities, especially residents of the San Joaquin Valley. They are as impractical as they are unjust. The California Air Resources Board (“CARB”) has all the information it needs to reject this expensive, polluting, unjust, and ineffective climate strategy.

211.2 Commenters urge CARB to (1) immediately eliminate avoided methane crediting for all
211.3 pathway types; (2) not increase stringency unless and until CARB first eliminates avoided
211.4 methane crediting; (3) not accelerate deliverability requirements unless and until CARB first
211.5 eliminates avoided methane crediting, or, at minimum, clarify how avoided methane crediting
and deliverability requirements will interact; and (4) eliminate modifications that sanction
hydrogen methane laundering.

¹ These comments follow Commenters’ initial comments on the proposed amendments to the LCFS. Leadership Counsel for Justice and Accountability et al. Comments on Proposed Amendments to LCFS (Feb. 20, 2024) (hereinafter “Initial Comments”), https://www.arb.ca.gov/lispub/comm/iframe_bccomdisp.php?listname=lcfs2024&comment_num=7060&virt_num=377.

² CARB, Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information, Proposed Low Carbon Fuel Standard Amendments (released Aug. 12, 2024) (hereinafter “Modification”), https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_notice.pdf.

(1) Avoided Methane Crediting Periods

CARB staff proposes two changes to shorten the length of time that avoided methane crediting will be available for factory farm gas pathways' carbon intensity calculations. First, staff proposes to shorten the number of 10-year crediting periods using avoided methane crediting for projects that break ground before January 1, 2030, from three to two consecutive periods.³ Second, staff propose to include electricity alongside hydrogen as pathway types that are ineligible for avoided methane crediting after December 31, 2045 if the project does not break ground before January 1, 2030.⁴

211.6 On the first, Commenters appreciate that staff recognize the imperative to phase out biomethane avoided methane crediting. But moving from three to two crediting periods does not address the underlying problem of supercharging factory farm gas build outs in the next five years under the proposed "break ground" cutoff date in 2030. So while we support this change, it does not go far enough and we urge CARB to phase out avoided methane crediting immediately.⁵ Offering 20 years of irrational and counterproductive carbon intensity values via avoided methane crediting is better than 30 years, but for all the reasons Commenters explain in our Initial Comments, any continuation of this backward policy undermines the LCFS and perversely encourages harm to vulnerable Californians already dealing with air and water polluted by the dairy industry.

211.7 On the second, Commenters oppose avoided methane crediting for factory farm gas-to-electricity pathways and therefore support this change. However, as Commenters have explained, allowing projects to burn factory farm gas in combustion engines causes local air pollution while generating paltry quantities of electricity.⁶ No matter the end use, retaining avoided methane crediting for any pathways perpetuates harmful factory farm practices and perversely entrenches and incentivizes methane production at the largest dairies and livestock facilities. We therefore support this proposed change but urge staff to go further and eliminate avoided methane crediting for these electricity pathways immediately.

³ *Id.* at 12.

⁴ Modification Attachment A-1: Proposed 15-Day Changes to Proposed Regulation Order (Proposed Sections for Amendments) at 171, https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_atta-1.pdf.

⁵ Relatedly, we reiterate that CARB must initiate SB 1383 rulemaking to adopt direct regulation of manure methane emissions so that California has a chance of meeting SB 1383's 40% reduction mandate. *See* Initial Comments at 28; Cal. Health & Safety Code § 39730.7(b)(1).

⁶ *See* Initial Comments at 4, 11; Leadership Counsel for Justice and Accountability et al. Comments on the Draft Environmental Impact Analysis for the Proposed Amendments to LCFS at 11–12 (Feb. 20, 2024), https://www.arb.ca.gov/lispub/comm/iframe_bccomdisp.php?listname=lcfs2024&comment_num=6969&virt_num=299.

(2) Stringency

CARB now proposes to further accelerate the stringency of the LCFS's carbon intensity benchmark from a 5% increase to a 9% increase in 2025, with tapering increases through 2029.⁷ CARB states this modification is needed “in light of the continued growth in low-carbon fuels and in response to stakeholder feedback requesting an increase in stringency to bring deficits and credits into balance.”⁸ In other words, credit generators like factory farm gas producers along with investors in factory farm gas production have requested that CARB raise the price of credits to increase their return on investments.

211.8 CARB must not increase the stringency without first eliminating avoided methane crediting, which itself would likely have the effect of increasing credit prices by cutting out the glut of illusory, inflated credit generation by factory farm gas pathways.⁹ As we explained in our Initial Comments, the increased stringency paired with increased, short-term factory farm gas incentives, will supercharge factory farm gas development and associated harms.¹⁰ Increasing the stringency even more in the near-term, as CARB now proposes, will only further fan the flames and engender further perverse incentives. Instead of focusing on manufacturing demand, CARB first should rein in this bogus supply of credits.

211.9 In our Initial Comments we laid out that the proposed amendments would increase transportation costs for lower income people and people of color.¹¹ As explained in Jonathan S. Shefftz's Technical Memorandum, attached here as Exhibit 1, CARB's proposal to increase stringency to boost credit prices will cause real harm to California households, and staff's proposal to further increase that burden starting in 2025 makes the problem even worse. Taking a conservative approach in his analysis, Mr. Shefftz concludes that CARB's proposal will force households in the median and 20th percentile income ranges in San Joaquin Valley counties to bear significant financial burden. Mr. Shefftz's analysis shows that, for example, households in the 20th percentile of income in Kern county could end up spending nearly *four times* more of their annual income on gas in 2025 compared to 2024 (1.6% and 0.42%, respectively), and that is without even accounting for the change from 5% to 9% in 2025 that will exacerbate this spike.¹² By 2040 that number is projected to increase to over 3.3% of these household's annual income. Other counties see a similar impact on the most economically vulnerable households' annual income:

⁷ Modifications at 5.

⁸ *Id.*

⁹ See, e.g., Wara et al., Simulating an “EJ Scenario” for the Low Carbon Fuel Standard Rule Update Using the ARB CATS Model at slide 7 (May 31, 2023), <https://ww2.arb.ca.gov/sites/default/files/2023-05/Stanford%20Presentation.pdf>.

¹⁰ Initial Comments at 10.

¹¹ *Id.* at 7–8, 38.

¹² Exhibit 1, Shefftz Technical Memorandum at Tbl. 3.

211.9
cont.

- Fresno (1.38% of annual income for households in the 20th percentile of income in 2025, 2.88% by 2040)
- Kings (1.42% in 2025, 2.95% by 2040)
- Madera (1.54% in 2025, 3.21% by 2040)
- Merced (1.56% in 2025, 3.25% by 2040)
- San Joaquin (1.12% in 2025, 2.33% by 2040)
- Stanislaus (1.23% in 2025, 2.56% by 2040)
- Tulare (1.48% in 2025, 3.09% by 2040)

In sum, the cost of juicing the LCFS to increase credit generators' profit margins will be borne most heavily by lower income Californians, including lower income Californians in the San Joaquin Valley who are concurrently and disproportionately bearing the environmental, economic, and health costs of factory farming and factory farm gas production.

(3) Deliverability

CARB staff proposes to require that all bio-CNG, bio-LNG and bio-L-CNG pathways meet deliverability requirements after December 31, 2037, if the Executive Officer certifies a pipeline map by July 1, 2026.¹³

211.10 Commenters urge CARB not to adopt deliverability requirements, even conditional ones, unless and until it ends avoided methane crediting. If CARB implements deliverability requirements while retaining avoided methane crediting, CARB will concentrate lucrative credit generation for livestock methane in facilities in California and facilities that provide gas to a pipeline connected with California's gas pipeline. In doing so, CARB will accelerate the concentration of factory farming and factory farm gas production in the San Joaquin Valley. This would have the effect of concentrating more animals, more manure, and more pollution in a region that cannot bear those harms.

If CARB elects to retain both avoided methane crediting and these conditional deliverability requirements, it is not clear how the introduction of deliverability requirements would interact with the ending of avoided methane crediting and the 10-year crediting periods for biomethane.

(4) Hydrogen Methane Laundering

211.11 CARB's proposed changes to section 95482(h) would reinforce and even intensify CARB's encouragement of methane laundering in the production of dirty hydrogen. Beginning on January 1, 2031, CARB would allow fossil fuel hydrogen to generate credits *only if* it is

¹³ Modifications at 159.

211.11
cont.

paired with the environmental attributes of biomethane.¹⁴ This modification would have the effect of increasing demand for livestock methane by codifying a monopoly whereby the environmental attributes of biomethane are the only avenue for fossil gas hydrogen producers to generate LCFS credits. Similarly, it will send market signals to biomethane producers and investors that there will be increased demand for biomethane to support hydrogen production in 2031 and thereafter. This modification will only encourage more factory farm gas production along with the air, water, and odor pollution that accompanies the concentration of cows, manure, and gas infrastructure.

211.12

As an additional note, CARB lacks authority to adopt LCFS amendments post-2030 or promulgate regulations to encourage hydrogen production.¹⁵ The Legislature has not authorized such rulemaking authority or otherwise directed CARB to use the LCFS as the mechanism for developing hydrogen infrastructure.

Conclusion

211.13

For the foregoing reasons, and in the foregoing ways, CARB must update the proposed Modifications to comply with its legal obligations and reform the LCFS. To do otherwise would be arbitrary, capricious, and an environmental injustice.

Respectfully,

Jamie Katz

Phoebe Seaton

Leadership Counsel for Justice & Accountability
Central Valley Defenders of Clean Water & Air

Brent Newell

Law Office of Brent J. Newell

Tyler Lobdell

Food & Water Watch

Christine Ball-Blakely

Animal Legal Defense Fund

¹⁴ *Id.* at 37.

¹⁵ Initial Comments at 31–35.

**Exhibit 1, Jonathan S. Shefftz Technical
Memorandum**

Jonathan S. Shefftz
d/b/a JShefftz Consulting
jss@JShefftzConsulting.com

14 Moody Field Road
Amherst MA 01002
413-658-5549

TECHNICAL MEMORANDUM

To: Leadership Counsel for Justice & Accountability
From: Jonathan S. Shefftz, d/b/a JShefftz Consulting
Date: August 27, 2024
Re: CARB Proposed Updates to LCFS Program

At the request of the Leadership Counsel for Justice & Accountability and its partner organization, the Environmental Integrity Project, I have reviewed updates proposed by the California Air Resources Board (“CARB”) to the Low Carbon Fuel Standard (“LCFS”) Program.

Attached to this memorandum is my current CV. My background includes a wide range of economic analyses in the public policy context, including those performed under contract to U.S. EPA. In particular, I have previously provided support to EPA on two public comment processes. The first, for the EPA BEN economic benefit computer model and related issues, began with a Federal Register Notice published on September 24 of 1996 and culminated in a Federal Register Notice published on August 26 of 2005. The second, for drinking water affordability in small systems under the Safe Drinking Water Act, began with a Federal Register Notice published on March 2 of 2006. For both of these public comment processes, in addition to performing economic analyses, I supported EPA by reviewing public comments (both written and verbal) and drafting suggested written responses. I also helped to organize stakeholder in-person meetings.

My review in this matter focuses exclusively on the following issue, as formulated by CARB:

The LCFS program aims to benefit all vehicle owners by displacing fossil fuels and supporting deployment of ZEVs and the use of alternative fuels. However, as stated in Section III.D.1, the proposed amendments are likely to indirectly result in increases to the retail price of fossil fuels at the pump, due to cost pass-through by fossil fuel producers and importers. This potential price increase may impact low-income, disadvantaged, and rural communities more than other consumers of fossil fuels, because individuals living in these communities traditionally spend a larger share of their income on transportation fuels. In addition, it is possible that

individuals in these communities may lack the means to effectively make use of ZEV technology as quickly as wealthier individuals, and therefore would rely on more expensive fossil fuels for longer. Low-income and disadvantaged communities are also more likely to be communities of color that face on-going exposure to the highest concentrations of toxic air pollutants from vehicles using fossil fuels because these communities are often located near congested roadways, including near warehouses, ports, and distribution centers.

My focus in this technical memorandum is to quantify the community-specific household impacts of those fossil fuel price increases. My analysis starts with a set of year-specific state-wide inputs and intermediary calculations in Table 1:

- Column “a” lists the year for each row, starting with the current calendar year of 2024 and then extending out through 2046, so as to correspond with the years for which per-gallon price impact forecasts are available from CARB.
- Column “b” provides the per-gallon incremental price differential for each year as a result of the proposed updates, as calculated by CARB’s own economists (SRIA Table 22). The most recent modifications to those proposed updates, with higher stringencies over the next four years, will if anything result in higher price increases. Hence my projected impacts are potentially a significant underestimate for the years 2025 to 2029.
- Column “c” provides the future federal CAFE standards for new vehicle mileage efficiency. These standards most likely overstate future efficiency gains for the purposes of this analysis since the impacts are exclusively upon vehicles powered by gasoline, whereas CAFE standards can be met by battery electric vehicles (“BEV”) and other vehicles fueled by alternative sources.
- Column “d” calculates the actual effective efficiency for new vehicles, based upon the midpoint of the adjustment range as stated in the Federal Register Notice for the new CAFE standards.
- Column “e” calculates a projection for fleet-wide vehicle mileage efficiency. I start with a publicly available current estimate of 31.1 miles per gallon (“mpg”) for California. Then in each year, based upon a 12.6-year national average for vehicle age, I retain $11/12.6^{\text{th}}$ of the existing vehicles and blend in $1/12.6^{\text{th}}$ of new vehicles meeting the effective CAFE standards from Column “d” (i.e., the CAFE standard net of the mid-range of the adjustment factor as estimated in the Federal Register Notice).
- Column “f” provides an average of the year-specific forecast for the Consumer Price Index (“CPI”) from the federal Congressional Budget Office (“CBO”) and the Office of Management and Budget (“CBO”), which I include for the purpose of projecting current household income figures from the U.S. Census Bureau out into future years.
- Column “g” calculates the impact of the annual CPI increases on household income.

Next, Table 2 provides the county-specific inputs and my intermediary calculations. I start with eight counties in the San Joaquin valley, which correspond to eight different multi-jurisdictional entities for which CARB has estimated daily vehicle miles traveled (“VMT”) per person. Using U.S. Census data for household size, I convert the daily VMT per person into annual VMT per household. I then provide the county-specific household income figures from the U.S. Census, both at the median (i.e., 50th percentile) and 20th percentile. Finally, I adjust the 2022 income figures from the U.S. Census to 2024 using the ratios of the respective CPI values (annual for 2022 and July for 2024).

Finally, Table 3 combines all of the information from Table 1 and Table 2 to calculate year-specific impacts from higher gasoline prices expressed as a percentage of household income. Focusing on the 20th percentile (i.e., the second column for each county), in 2026, all counties are expected to experience impacts of over a percentage point of household income. Future years are expected to experience even higher impacts, but these are not until over a decade in the future, and hence the detailed projections are subject to more uncertainty.

These specific impacts are only for households whose vehicle miles traveled are via gasoline-powered vehicles. (Diesel-powered vehicles would experience comparable impacts, but passenger diesel-powered vehicles represent only about two percent of California registrations, and are likely to become even lower in the future as such models become even more rare.) But how widespread are such affected households?

In the longer-term horizon, California offers many incentives for BEV and PHEV purchases in addition to federal incentives. The proposed LCFS program updates would be accompanied by additional incentives, although such incentives could be implemented even without the other LCFC proposed updates. And California already has a fleet-wide requirement for BEV and PHEV sales leading up to a 100-percent requirement by 2035.

But California is starting now with a relatively trivial level of BEV and PHEV ownership. According to the U.S. Department of Energy, which publishes “2022 Light-Duty Vehicle Registration Counts by State and Fuel Type” for each state, only about 2.5 percent of California vehicle registrations were BEV. Adding in new car sales tracked by the California Energy Commission, and applying the same fleet turnover model that I employed for vehicle efficiency, I estimate that during the period of the first peak in my Table 3 for the household income impacts, about 90 percent of passenger vehicle models will still be powered by gasoline (with PHEV models counted as half a BEV for this purpose). Furthermore, based on current vehicle ownership, recent vehicle sales patterns, and consumer surveys of vehicle purchase plans,¹ continued reliance on gasoline-powered vehicles will be more prevalent among the types of lower-income rural households that are the focus of my Table 3.

¹ See, for example, “EV Ownership Ticks Up, but Fewer Nonowners Want to Buy One,” by Jeffrey M. Jones, April 8, 2024, <https://news.gallup.com/poll/643334/ownership-ticks-fewer-nonowners-buy-one.aspx>.

Table 1						
STATE-WIDE INPUTS: PRICE INCREASES, MPG, INCOME FORECAST						
(a)	(b)	(c)	(d)	(e)	(f)	(g)
<u>Year</u>	<u>\$/g</u>	<u>CAFE</u>	<u>25%</u>	<u>Fleet</u>	<u>CPI fx</u>	<u>Impact</u>
2024	\$0.12			31.1		1.00
2025	\$0.47			31.1	2.25%	1.02
2026	\$0.52			31.1	2.15%	1.04
2027	\$0.49	55.2	41.4	31.9	2.20%	1.07
2028	\$0.39	56.3	42.2	32.7	2.25%	1.09
2029	\$0.38	57.5	43.1	33.6	2.30%	1.12
2030	\$0.25	58.6	44.0	34.4	2.30%	1.14
2031	\$0.47	59.8	44.9	35.2	2.30%	1.17
2032	\$0.59	61.1	45.8	36.1	2.30%	1.20
2033	\$0.66	61.1	45.8	36.8	2.30%	1.22
2034	\$0.72	61.1	45.8	37.5	2.30%	1.25
2035	\$0.79	61.1	45.8	38.2	2.30%	1.28
2036	\$0.86	61.1	45.8	38.8	2.30%	1.31
2037	\$1.25	61.1	45.8	39.4	2.30%	1.34
2038	\$1.44	61.1	45.8	39.9	2.30%	1.37
2039	\$1.69	61.1	45.8	40.3	2.30%	1.40
2040	\$1.80	61.1	45.8	40.8	2.30%	1.43
2041	\$1.83	61.1	45.8	41.2	2.30%	1.47
2042	\$1.61	61.1	45.8	41.6	2.30%	1.50
2043	\$1.42	61.1	45.8	41.9	2.30%	1.54
2044	\$1.21	61.1	45.8	42.2	2.30%	1.57
2045	\$1.02	61.1	45.8	42.5	2.30%	1.61
2046	\$1.02	61.1	45.8	42.8	2.30%	1.64
Notes:						
(a)	Year for data or calculation.					
(b)	SRIA Table 22.					
(c)	Corporate Average Fuel Economy Standards for Passenger Cars and Light Trucks for Model Years 2027 and Beyond and Fuel Efficiency Standards for Heavy-Duty Pickup Trucks and Vans for Model Years 2030 and Beyond, 49 CFR Parts 523, 531, 533, 535, 536, and 537.					
(d)	Calculated as (c) x (1 -25%), so as to incorporate the 25% mid-point from the above FRN for estimated loss of actual mpg compared to CAFE min.					
(e)	Average mpg, set through 2026 at: https://www.iseecars.com/green-car-adoption-study					
	... then blending in the CAFE min for each year at 1/12.6 to approximately fleet turnover based upon 12.6-year average vehicle age.					
(f)	Average of CBO & OMB forecast for CPI.					
(g)	Impact on income projection.					

Table 2

COUNTY-SPECIFIC INPUTS: HOUSEHOLD SIZE, VEHICLE MILES TRAVELED, CURRENT INCOME

[illegible]

Table 3

COUNTY-LEVEL PRICE INCREASE INPUTS AS A PERCENT OF HOUSEHOLD INCOME, BOTH MEDIAN/50th PERCENTILE AND 20th PERCENTILE

	Fresno		Kern		Kings		Madera		Merced		San Joaquin		Stanislaus		Tulare	
Year	Median	20th	Median	20th	Median	20th	Median	20th	Median	20th	Median	20th	Median	20th	Median	20th
2024	0.14%	0.36%	0.17%	0.42%	0.20%	0.37%	0.16%	0.40%	0.16%	0.41%	0.12%	0.29%	0.13%	0.32%	0.17%	0.39%
2025	0.53%	1.38%	0.65%	1.60%	0.76%	1.42%	0.61%	1.54%	0.63%	1.56%	0.48%	1.12%	0.51%	1.23%	0.65%	1.48%
2026	0.58%	1.50%	0.70%	1.74%	0.82%	1.54%	0.66%	1.67%	0.68%	1.69%	0.52%	1.21%	0.55%	1.33%	0.70%	1.61%
2027	0.52%	1.35%	0.63%	1.56%	0.74%	1.38%	0.59%	1.50%	0.61%	1.52%	0.46%	1.09%	0.50%	1.20%	0.63%	1.44%
2028	0.39%	1.02%	0.48%	1.18%	0.56%	1.05%	0.45%	1.14%	0.47%	1.15%	0.35%	0.83%	0.38%	0.91%	0.48%	1.10%
2029	0.36%	0.95%	0.44%	1.10%	0.52%	0.97%	0.42%	1.06%	0.43%	1.07%	0.33%	0.77%	0.35%	0.84%	0.45%	1.02%
2030	0.23%	0.60%	0.28%	0.69%	0.33%	0.61%	0.26%	0.66%	0.27%	0.67%	0.21%	0.48%	0.22%	0.53%	0.28%	0.64%
2031	0.41%	1.07%	0.50%	1.24%	0.59%	1.10%	0.47%	1.19%	0.49%	1.21%	0.37%	0.86%	0.39%	0.95%	0.50%	1.15%
2032	0.49%	1.28%	0.60%	1.48%	0.70%	1.31%	0.56%	1.43%	0.58%	1.44%	0.44%	1.03%	0.47%	1.14%	0.60%	1.37%
2033	0.53%	1.37%	0.64%	1.59%	0.75%	1.41%	0.60%	1.53%	0.62%	1.55%	0.47%	1.11%	0.50%	1.22%	0.64%	1.47%
2034	0.55%	1.43%	0.67%	1.66%	0.79%	1.47%	0.63%	1.60%	0.65%	1.62%	0.49%	1.16%	0.53%	1.27%	0.67%	1.54%
2035	0.58%	1.51%	0.71%	1.75%	0.83%	1.55%	0.66%	1.68%	0.69%	1.70%	0.52%	1.22%	0.56%	1.34%	0.71%	1.62%
2036	0.61%	1.58%	0.74%	1.84%	0.87%	1.62%	0.70%	1.76%	0.72%	1.79%	0.55%	1.28%	0.58%	1.41%	0.74%	1.70%
2037	0.85%	2.22%	1.04%	2.57%	1.22%	2.28%	0.98%	2.47%	1.01%	2.50%	0.76%	1.79%	0.82%	1.97%	1.04%	2.38%
2038	0.95%	2.47%	1.15%	2.86%	1.35%	2.53%	1.08%	2.75%	1.12%	2.78%	0.85%	1.99%	0.91%	2.19%	1.16%	2.64%
2039	1.08%	2.80%	1.31%	3.24%	1.53%	2.87%	1.23%	3.12%	1.27%	3.15%	0.96%	2.26%	1.03%	2.48%	1.31%	3.00%
2040	1.11%	2.88%	1.35%	3.34%	1.58%	2.95%	1.27%	3.21%	1.31%	3.25%	0.99%	2.33%	1.06%	2.56%	1.35%	3.09%
2041	1.09%	2.84%	1.33%	3.29%	1.56%	2.91%	1.25%	3.16%	1.29%	3.20%	0.98%	2.29%	1.04%	2.52%	1.33%	3.04%
2042	0.93%	2.42%	1.13%	2.80%	1.33%	2.48%	1.06%	2.69%	1.10%	2.72%	0.83%	1.95%	0.89%	2.15%	1.13%	2.59%
2043	0.79%	2.07%	0.97%	2.39%	1.13%	2.12%	0.91%	2.30%	0.94%	2.33%	0.71%	1.67%	0.76%	1.84%	0.97%	2.22%
2044	0.66%	1.71%	0.80%	1.98%	0.94%	1.75%	0.75%	1.90%	0.78%	1.93%	0.59%	1.38%	0.63%	1.52%	0.80%	1.83%
2045	0.54%	1.40%	0.65%	1.62%	0.77%	1.43%	0.61%	1.56%	0.64%	1.58%	0.48%	1.13%	0.51%	1.24%	0.66%	1.50%
2046	0.52%	1.36%	0.64%	1.57%	0.75%	1.39%	0.60%	1.51%	0.62%	1.53%	0.47%	1.10%	0.50%	1.21%	0.64%	1.46%

Notes:

Each county-specific household percentage is calculated as the county-specific annual household VMT (Table 2, column e), divided by the year-specific mpg (Table 1, column e), multiplied by the year-specific SRIA \$/gallon fx (Table 1, column b), divided by the county-specific 2024 income value (Table 2, either column h for median or column i for 20th percentile), multiplied by the MHI year-specific increase factor (Table 1, column g).

Attachment A: Curriculum Vitae

JONATHAN S. SHEFFTZ

**d/b/a JShefftz Consulting
14 Moody Field Road
Amherst MA 01002**

Mr. Shefftz is an independent consultant who specializes in the application of financial economics to litigation disputes, regulatory enforcement, and public policy decisions. Previously he was a consultant with Industrial Economics, Incorporated (“IEc”) from 1992 until 2006 when he moved to western Massachusetts. Mr. Shefftz has extensive experience in settlement and litigation support, and has been qualified as an expert witness in U.S. District Court, a federal agency’s Administrative Court, and state courts.

Mr. Shefftz’s recent experience includes work in the following areas.

- Calculating the economic damages suffered by companies and individuals from alleged wrongful actions.
- Applying financial economics to civil penalty factors in regulatory enforcement actions.
- Analyzing financial economic issues related to public policy decisions.

Mr. Shefftz has performed this work in a variety of contexts, including expert witness testimony, computer model development, training course delivery, and regulatory review. He has supervised project teams comprising economists, accountants, paralegals, and software developers, as well as worked in parallel with engineers, scientists, lawyers, and lobbyists. His clients have included federal and state governmental agencies, private litigators, and other private-sector entities.

Mr. Shefftz holds a B.A. *magna cum laude* and *Phi Beta Kappa* in Economics and Political Economy from Amherst College, and an M.P.P. degree, with concentrations in Government & Business and Energy & Environmental Policy, from the John F. Kennedy School of Government at Harvard University.

Mr. Shefftz’s positions have included Eastern Vice President for the National Association of Forensic Economics, Chair for the Town of Amherst Planning Board, referee for the *Journal of Forensic Economics*, Course Liaison for the “Engineering Economic Decision Making” course at the University of Massachusetts Amherst, and Treasurer for the Jewish Community of Amherst, American Avalanche Association, Moody Field Homeowner Association, and U.S. Ski Mountaineering Association. He is also a member of the Government Finance Officers Association, American Academy of Economic and Financial Experts, and Amherst Area Chamber of Commerce.

JONATHAN S. SHEFFTZ

Economic Damages and Unjust Enrichment

Mr. Shefftz has experience with the following work on economic damages and unjust enrichment, including expert witness testimony both in deposition and at trial. He has also applied his expertise in unjust enrichment calculation, financial statement analysis, municipal financial assessment, and corporate control / ownership issues in the context of environmental regulatory enforcement cases, as described in a separate section on a successive page.

Business Damages and Unjust Enrichment

Mr. Shefftz has modeled companies' cash flows under hypothetical "but-for" states of the world versus actual states of the world to calculate business damages in numerous cases. Sample contexts include allegations by: an engineering firm that lost business to a spin-off competitor, timber companies whose contracts were breached via implementation of Congressional legislation, a furniture company whose joint venture was interfered with by a key customer, a fixed base operator prohibited from selling jet fuel by a municipal airport commission, a brownfields remediation firm whose key principal became incapacitated, a state-chartered joint underwriting association whose servicing carrier incorrectly determined premiums, a transportation company that received contaminated fuel, a social networking website imperiled by a developer's nondelivery, an entrepreneur whose computer code was discarded by a demolition crew, an industrial facility whose environmental control facility was undersized by an engineering consultant, a data center operator whose contracting officer received kickbacks, a whistleblower who reported environmental violations under the New York False Claims Act, a whistleblower who reported prescribing practices by a specialty pharmacy, a sports organization whose apparel licensee breached a contract, a food processor whose operations were interrupted by an industrial boiler's natural gas explosion, a solar power panel installation company whose supplier provided defective equipment, a commercial real estate owner subjected to default interest, and an IT company that suffered tortious interference upon losing an exclusive distributorship.

Personal Damages / Losses

Mr. Shefftz has assessed lost earnings and household services along with incurred and anticipated medical costs in numerous cases involving wrongful death, personal injury, wrongful termination, estate disputes, credit card interest overcharges, divorce, child neglect, and inhumane treatment. Sample contexts include allegations of employment discrimination, medical malpractice, workplace injuries, vehicular accidents, physical assault, retail store accidents, outdoor recreation, below-market earnings, lead poisoning, professional license revocation, violations of the Servicemembers Civil Relief Act, an arrest instigated by a former spouse, inadequate child welfare supervision, judicial incarceration, and delayed payments covered by Massachusetts Chapter 93A.

JONATHAN S. SHEFFTZ

Economic Damages and Unjust Enrichment (continued)

FIFRA Pesticide Data Compensation

Mr. Shefftz assessed the data compensation amounts owed by a follow-on registrant to the original product registrant under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

Class Actions

Mr. Shefftz's work here has included: analyzing whether the minimum damages threshold had been established to certify the class, creating a streamlined model to calculate pecuniary damages across class members, and assessing the economic factors for the presence of a reverse auction.

Present Value of Life Care Plans

Mr. Shefftz has calculated the present value of life care plan projections in numerous cases, both on their own and in connection with personal damages and losses. He has extensive experience in efficiently adjusting the varying periodicities of life care plans into a standardized format.

Water Contamination

For a real estate development, Mr. Shefftz analyzed the diminution in value by projecting the groundwater contamination-induced delayed schedule versus the original schedule. On a claim to have developed groundwater assets but for contamination, he testified on the municipality's impaired financial condition at the time. On a class action lawsuit by property owners, he evaluated the defense economist's statistical analysis of property values. On other water contamination lawsuits, he has calculated the damages from the need to switch to alternative sources of water, including a desalination plant, whole-house drinking water systems, and a neighboring utility.

Intellectual Property

For defense counsel in a copyright infringement lawsuit, Mr. Shefftz assessed declarations from the plaintiff's expert economist who asserted that a "companion" book would damage the author of the original series of novels. He also assisted counsel with preparation for trial cross examination.

Computer Model Development

For the U.S. Department of Justice Commercial Litigation Branch, Mr. Shefftz developed a standalone computer model for statutorily determined interest under the Contract Disputes Act.

JONATHAN S. SHEFFTZ

Financial Factors in Environmental Regulatory Enforcement

Mr. Shefftz is experienced with the following work on environmental regulatory enforcement actions brought under the Asbestos Hazard Emergency Response Act (AHERA), Clean Air Act (CAA), Clean Water Act (CWA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Emergency Planning and Community Right-to-Know Act (EPCRA), False Claims Act (FSA), Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), Oil Pollution Act (OPA), Resource Conservation and Recovery Act (RCRA), Safe Drinking Water Act (SDWA), Spill Prevention, Control and Countermeasure (SPCC) rule, Toxic Substances Control Act (TSCA), Underground Storage Tank (UST) program, as well as various state statutes. Mr. Shefftz has been qualified as an expert witness on numerous occasions in federal, administrative, and state courts. His clients for this work have included the U.S. Environmental Protection Agency (EPA), U.S. Department of Justice (DOJ), private litigators, state Attorneys General, and defense counsel.

Financial Statement Analysis / Ability-to-Pay / Economic Impact / Corporate Control & Ownership

Mr. Shefftz has examined the tax returns, financial statements, and other financial documentation for individuals, businesses, not-for-profits, municipalities, and all four unincorporated organized U.S. territories, to assess the ability to pay for – and/or economic impact of – sought environmental expenditures, e.g., compliance costs, penalty demands, and cleanup/remediation costs. He has reviewed discovery documents and conducted research in many cases to assess the extent to which subsidiaries can rely on their corporate parents for financial support and the extent to which corporate control of subsidiaries goes beyond that exercised by mere ownership.

Financial Gain / Economic Benefit / Unjust Enrichment

Mr. Shefftz has modeled companies' and municipalities' cash flows under hypothetical full and timely compliance states of the world versus actual delayed compliance states of the world to calculate the economic benefit (i.e., financial gain or unjust enrichment) on numerous enforcement actions. Such modeling has focused both on incremental compliance costs that were delayed and/or avoided as well as compliance scenarios that would have entailed impacts on a company's revenues (i.e., so-called illegal profits, competitive advantage, or Beyond BEN Benefit). As part of this work, he has estimated the weighted-average cost of capital for a wide variety of companies and industries.

JONATHAN S. SHEFFTZ

Financial Factors in Environmental Regulatory Enforcement (continued)

Other Financial Factors in Environmental Regulatory Enforcement Actions

Mr. Shefftz has performed work on other financial factors in regulatory enforcement actions: the “size of violator” penalty element; the potential impact on the penalty calculation from alternative inputs for other “gravity” factors; the relative weight of different financial indicators for establishing deterrence; and, the adequacy of financing plans to ensure environmental compliance.

Computer Model Development, Training, and Support

Mr. Shefftz has managed the development of the Windows operating system versions of the BEN, PROJECT, ABEL, INDIPAY, and MUNIPAY computer models that U.S. EPA’s Office of Enforcement and Compliance Assurance applies to financial economics issues in enforcement actions. He has prepared the models’ help systems and training materials, as well as presented training courses and provided related support for federal and state enforcement staff. Mr. Shefftz has also assisted in several U.S. EPA academic peer reviews and public comment processes for the BEN computer model and related economic benefit recapture issues. And he has created versions of the models for other nations: Canada (BEN), Chile (BEN and ABEL), and El Salvador (BEN).

JONATHAN S. SHEFFTZ

Public Policy

Cost of Capital Estimation

For the U.S. EPA Office of Ground Water and Drinking Water, Mr. Shefftz assessed peer reviewer comments and then revised a draft report on cost of capital estimation for water systems. His work included applying the capital asset pricing model to the commercial drinking water industry and correcting for the earlier draft's assumptions regarding capital structure and industry-level business risk.

Financial Assurance

For a state agency, Mr. Shefftz proposed appropriate inflation forecasts and discount rates, drafted a guidance document, and then developed a stand-alone computer model to calculate the net present value of future remediation costs. For EPA's Office of Solid Waste, he provided recommendations on discounting future cleanup costs; for the Office of Site Remediation and Enforcement, he created a computer model to assess the combined affordability of financial assurance and cleanup costs; for another EPA office, he created a spreadsheet model to calculate the insurance and/or trust fund amounts necessary to provide for post-closure care. For the U.S. Department of the Interior's Office of Surface Mining Reclamation and Enforcement, he reviewed other agencies' approaches and developed a spreadsheet model to calculate initial trust fund amounts and then recalculate subsequent years' annual rebalancings to reflect actual returns and additional future costs. For a not-for-profit, he reviewed draft reports on the potential role of financial assurance in the regulation of hydraulic fracturing (i.e., "fracking").

Proposed Legislation and Regulations

For an industry association, Mr. Shefftz designed and implemented a survey and analyzed its results to predict the impacts of a proposed national lead tax upon lead consumption and dependent industrial sectors. For a national waste management firm, he analyzed the financial impacts of a proposed state tax on hazardous waste land disposal. For a citizen group, Mr. Shefftz assessed the economic efficiency of proposed state regulations for municipal water treatment intended to mitigate degradation of coastal waters. For another citizen group, Mr. Shefftz assessed EPA's proposed new regulations for restricting water pollution from meat processing facilities.

JONATHAN S. SHEFFTZ

Public Policy (continued)

Joint Cost Allocation

For a study of Bureau of Reclamation rate setting for California's Central Valley Project, Mr. Shefftz researched economically efficient methods for allocating water project costs to user classes.

Superfund Impacts

Mr. Shefftz examined the Department of Energy SURE model's predictions of economic impacts from Superfund liability and cost allocation reform. At a Superfund site, he critiqued a small city's claims that a proposed contaminated soil cleanup would lead to widespread economic disruptions.

Legislative and Regulatory Review

For the 1990 Clean Air Act amendments, Mr. Shefftz investigated the potential of fuel oxygenation requirements to cause petroleum refinery closures. For the Safe Drinking Water Act, he reviewed EPA's national-level drinking water affordability criteria, assessed their implications for small water systems' finances, proposed alternative criteria, created databases to predict how many systems would be judged unable to afford drinking water rules, evaluated public comments, drafted text of a report in response to a Congressional charge, and provided additional support to U.S. EPA Office of Ground Water and Drinking Water staff t stakeholder meetings. For a coalition of citizen groups, Mr. Shefftz assessed the incentive structures and market impacts from California Low Carbon Fuel Standard.

Permit Applications

For a citizen group, Mr. Shefftz assessed the economic analysis report accompanying a permit application for a crude oil export terminal with regard to the criteria specified in the state constitution. For another citizen group, he assessed an engineering report and its companion economic and fiscal impact report accompanying a permit application for a wastewater treatment plant with regard to the social and economic factors specified in the state antidegradation regulations.

JONATHAN S. SHEFFTZ

Representative Clients

Mr. Shefftz has been retained by the following clients, whether directly as an independent consultant, during his prior employment at Industrial Economics, Incorporated (“IEc”), and/or as an independent consultant via subcontract with IEc.

State and Local Agencies:

California	Connecticut
Illinois	Indiana
Massachusetts	Michigan
New Hampshire	New Mexico
Ohio	Pennsylvania
Texas	Virginia
Washington	Wisconsin
Allegheny County Health Department (PA)	

Federal / National Agencies:

U.S. Department of Justice (Civil Division – Commercial Litigation Branch; Environment and Natural Resources Division – Environmental Enforcement Section, Environmental Defense Section)

U.S. Environmental Protection Agency (various Headquarters Offices and Regional Counsels)

U.S. Fish and Wildlife Service (within U.S. Department of Interior)

National Oceanic and Atmospheric Administration (within U.S. Department of Commerce)

Office of Surface Mining Reclamation and Enforcement (within U.S. Department of Interior)

Superintendencia del Medio Ambiente (Chile)

Ministerio de Medio Ambiente y Recursos Naturales (El Salvador)

JONATHAN S. SHEFFTZ

Representative Clients (continued)

Industry:

Bouncing Cranberries LLC	Circle Environmental, Inc.
Country Villa Bay Vista Healthcare Center	CWM Chemical Services, Incorporated
ERL Medical Corporation	
Fortune 500 automobile parts distributor [identity kept confidential as per counsel request]	
Fortune 500 manufacturing company [identity kept confidential as per counsel request]	
Fortune Global 500 chemicals company [identity kept confidential as per counsel request]	
Frasco Fuel Oil	French Heritage, Inc.
Infinity Fluids Corporation	Kinder Morgan
Kroger Specialty Pharmacy	Manassas NCP FF, LLC
National Coating Corporation	Lead Industries Association
MedMal Joint Underwriting Ass'n of RI	Musco Family Olive
NSIPI Administrative Manager	
Privately held automobile parts manufacturer [identity kept confidential as per counsel request]	
Privately held diesel parts wholesale distributor [identity kept confidential as per counsel request]	
Pro AV Systems	Professional Contract Sterilization, Inc.
Prolerized New England Co., Inc.	Rectrix Aerodome Centers, Inc.
Schnitzer Steel Industries, Inc. dba Radius Recycling	
Stebbins-Duffy, Inc.	Sterling NCP FF, LLC
Taotao USA, Inc.	Valley Solar
WDC Holdings LLC d/b/a Northstar Commercial Partners	

In addition to the industry clients listed above, Mr. Shefftz has also performed work on behalf of numerous other industry clients and their insurers on economic damages cases, but without any direct interaction with such parties and their insurers or any analytical focus on them.

JONATHAN S. SHEFFTZ

Representative Clients (continued)

Citizen Groups:

Advance Etowah	Advocates for the West
Alabama Environmental Council	Animal Legal Defense Fund
Appalachian Mountain Advocates	Appalachian Voices
Biodiversity Conservation Alliance	Black Warrior Riverkeeper
Blue Water Baltimore, Inc.	California Coastkeeper Alliance
Center for Biological Diversity	Center for Comm. Action & Environ. Justice
Center for Justice	Chesapeake Legal Alliance
Citizens Against Ruining the Environment	Clean Air Council
Communities for a Healthy Bay	Conservation Law Foundation
Coosa Riverkeeper	Earthjustice
Earthrise Law Center	Ecological Rights Foundation
Environment America Research & Policy	Environment California
Environment Ohio	Environmental Advocates of New York
Environmental Defense Center	Environmental Integrity Project
Environmental Law and Policy Center	Environment Texas Citizen Lobby, Inc.
Food & Water Watch	Friends of Hurricane Creek
Friends of Lick Creek	Friends of the Lower Keys
Frontier Group	Grand Canyon Trust
Gulf Restoration Network	High Country Conservation Advocates
Hoosier Environmental Council	Hurricane Creekkeeper
Idaho Conservation League	Inland Empire Waterkeeper
Inst. Governance & Sustainable Development	Lake Erie Waterkeeper
Leadership Counsel Justice & Accountability	Louisiana Bucket Brigade
Louisiana Environmental Action Network	Lower Susquehanna Riverkeeper Association
National Environmental Law Center	National Parks Conservation Association
Natural Resources Defense Council	Newark Education Workers Caucus
Northwest Environmental Defense Center	Ohio Valley Environmental Coalition
Okanogan Highlands Alliance	Olympic Forest Coalition
Orange County Coastkeeper	Oregon Public Interest Research Group
Our Children's Earth Foundation	Pacific Environmental Advocacy Center

JONATHAN S. SHEFFTZ

Representative Clients (continued)

Citizen Groups (continued):

PennEnvironment
Prairie Rivers Network
Puget Soundkeeper Alliance
RE Sources for Sustainable Communities
St. Bernard Citizens for Environ. Quality
San Francisco Baykeeper
Sierra Club
Southern Environmental Law Center
Suncoast Waterkeeper
Texas Rio Grande Legal Aid, Inc.
Tulane Environmental Law Clinic
Univ. of Denver Environmental Law Clinic
West Virginia Highlands Conservancy
WildEarth Guardians

Potomac Riverkeeper
Public Justice
Raritan (NY/NJ) Baykeeper
Respiratory Health Association
San Antonio Bay Estuarine Waterkeeper
Save the Sound
South River Watershed Alliance, Inc.
Spokane Riverkeeper
Tampa Bay Waterkeeper
Toxics Action Center, Inc.
United States Public Interest Research Group
Waste Action Project
Wild Fish Conservancy
Willamette Riverkeeper

JONATHAN S. SHEFFTZ

Representative Clients (continued)

Law Firms:

Adler, Cohen, Harvey, Wakeman & Guekguezian	Law Office of Jacqueline L. Allen
Allyn & Ball, P.C.	Aqua Terra Aeris Law Group
Arnold & Porter LLP	Baker, Braverman & Barbadoro P.C.
Barton Gilman LLP	Bayh, Connaughton and Malone
Beveridge & Diamond PC	Bricklin & Newman, LLP
Brown Legal PLLC	Brownstein Hyatt Farber Schreck, LLP
Butler Snow LLP	Cain, Sherry, Geller & Vachereau
Calderón & Williams	ChasenBoscolo
Chihak & Martel	The Law Offices of William Chu
Clinton & Muzyka, P.C.	The Collins Law Firm, P.C.
Cooper & Lewand-Martin, Inc.	D'Ambrosio Law Offices
DarrowEverett LLP	Davison Law, LLC
DeCotiis, FitzPatrick & Cole, LLP	Law Offices of John K. Dema, P.C.
DLA Piper	Doherty, Wallace, Pillsbury & Murphy
Donovan Hatem LLP	Downey Brand LLP
Dreyer Boyajian LLP	Frederick, Perales, Allmon & Rockwell, PC
Law Office of Austin J. Freeley	Gallagher & Cavanaugh LLP
Gallant & Ervin, LLC	The Garcia Law Firm
Garnett Powell Maximon Barlow	German Rubenstein LLP
Gordon Rees Scully Mansukhani, LLP	David S. Hammer, Esq.
Hanson Curran LLP	George E. Hays, Esq.
Henrichsen Siegel Moore, PLLC	Hoffner PLLC
Hogan Lovells US LLP	Hunsucker Goodstein PC
Kampmeier & Knutsen PLLC	Kaplan, Massamillo & Andrews, LLC
Kasowitz, Benson, Torres & Friedman LLP	Keches Law Group
Law Office of David E. Keller	Keller Rohrback L.L.P.
Kirby McInerney LLP	James E. Kolenich, Esq.
Law Office of Amy Kropke	Meryl A. Kukura, Esq.
Kenneth Lieberman, Esq.	Lawson & Weitzen, LLP
Lexington Law Group	Lozeau Drury LLP
Lucentini & Lucentini LLP	Mackie Shea O'Brien, PC

JONATHAN S. SHEFFTZ

Representative Clients (continued)

Law Firms (continued):

Manson Bolves Donaldson Varn
Marr Law Offices
Meyers Nave
MFI Law Group PLLC
Morrison & Foerster LLP
Motley Rice LLC
Nelson Mullins Riley & Scarborough LLP
Law Office of Michael D. Parker
Pierce Atwood LLP
Pillsbury Winthrop Shaw Pittman LLP
Powell Environmental Law
Raymond Law Group LLC
Reed Smith LLP
Law Offices of Russo & Minchoff
Ryan, Ryan, Johnson & Deluca, LLP
Sartini Law, PC
Saul Ewing LLP
Jon L. Schwartz, Attorney at Law, P.C.
Sheff & Cook, LLC
Simonds, Winslow, Willis & Abbott
Steve Harvey Law LLC
Sycamore Law
Van Ness Feldman LLP
Law Offices of Charles G. Walker
Wilson Elser Moskowitz Edelman & Dicker
Zaytoun Ballew & Taylor, PLLC

Mark, Migdal & Hayden LLC
McCarter & English, LLP
Meyner and Landis LLP
Law Offices of Keith A. Minoff, P.C.
Morrison Mahoney LLP
Law Office of Jennifer F. Novak
Oliver Law Group
Patton Boggs LLC
Edward M. Pikula, Esq.
Plaza Law Group
Ransmeier & Spellman P.C.
Reardon Law Office LLC
Rubin and Rudman LLP
Ryan & Kuehler PLLC
Ryan Whaley Coldiron Shandy PLLC
Sasson, Turnbull, Ryan & Hoose
The Schreiber Law Firm
Richard Schwartz & Associates, P.A.
Silverstein, Silverstein & Silverstein P.A.
Smith & Lowney, PLLC
Stoel Rives LLP
Todd & Weld LLP
Vorys, Sater, Seymour and Pease LLP
Waltzer Wiygul & Garside LLC
Reed Zars, Esq.

JONATHAN S. SHEFFTZ

Publications and Presentations

Structural Changes in Interest Rates, paper discussant at Western Economic Association International Conference (on-line), 7/1/22.

Cause and Effect: The Asymmetry in Deducing Effect and Inferring Cause, paper discussant at National Association of Forensic Economics Eastern Meeting (on-line), 2/25/22.

How Good Is My Degree? Economic Damages from False Claims by Colleges, paper discussant at Western Economic Association International Annual Conference (on-line), 6/27/21.

Social Security Losses in Personal Injury, paper discussant at Western Economic Association International Annual Conference (Portland OR), 7/1/16.

The “Loss of Chance” Rule in the Various States, paper discussant at Allied Social Sciences Association Annual Conference (Philadelphia PA), 1/4/14.

Foreign Net Discount Rates: The Case of Undocumented Mexican Workers, paper discussant at Western Economic Association International Annual Conference (Seattle WA), 6/30/13.

Evolving Transition Probabilities and Worklives, paper discussant at Allied Social Sciences Association Annual Conference (San Diego CA), 1/5/13.

Commercial Damages Calculations, panelist at Eastern Economic Association Annual Conference (Boston MA), 3/10/12.

Medical Net Discount Rates: 1980 - 2011, paper discussant at Eastern Economic Association Annual Conference (Boston MA), 3/10/12.

The Value of Future Earnings in Perfect Foresight Equilibrium, paper discussant at Allied Social Sciences Association Annual Conference (Denver CO), 1/8/11.

The Role of the Economic Expert in Litigation Directed at Piercing the Corporate Veil, presentation at Fall Forensic Economics Workshop (Durango CO), 10/8/10.

Alternative Perspectives for Breach-Nonbreach Scenario Specifications in Commercial Litigation, paper presentation at Western Economic Association International Annual Conference (Portland OR), 7/1/10.

Sampling Issues in Commercial Damages Cases, paper discussant at Western Economic Association International Annual Conference (Vancouver BC), 7/1/09.

Net Discount Rates: Does Duration Matter?, paper discussant at Eastern Economic Association Annual Conference (Boston MA), 3/7/08.

JONATHAN S. SHEFFTZ

Publications and Presentations (continued)

Enforcement Economics: Deterrence, Economic Benefit, & Ability to Pay, presentation at California Environmental Protection Agency State Water Resources Control Board “Enforcenomics” Workshop (Berkeley CA), 1/11/08.

Alternative Focuses for “But-For” Scenario Specification in Commercial Litigation, paper presentation at Western Economic Association International Annual Conference (Seattle WA), 6/30/07.

Expert Witness Role Play, presentation at U.S. EPA 9th Financial Analyst Workshop (Atlanta GA), 5/3/07.

Working with Experts in Environmental Cases: An Expert Economist’s Perspective on Expert Testimony, presentation at Public Interest Environmental Law Conference (Eugene OR), 3/2/07.

Alternative Measures and Focuses for Economic Damages Calculations, paper presentation at Eastern Economic Association Annual Conference (New York NY), 2/23/07.

Lost Profit as a Measure of Lost Earning Capacity, panelist at Western Economic Association International Annual Conference (San Francisco CA), 7/7/05

“EPA’s Economic Benefit Analysis Policy and Practice,” *Natural Resources and Environment*, Fall 2004.

“Taxation Considerations in Economic Damages Calculations,” *Litigation Economics Review*, Summer 2004.

Economic Benefit and Wrongful Profits in the Calculation of Penalties for Environmental Violations, presentation to Boston Bar Association Environmental Litigation Committee, 9/23/04.

Business Valuation/Commercial Damages, panelist at Western Economic Association International Annual Conference (Vancouver BC), 7/1/04.

“Wrongful Profits: Setting the Record, and the Concept, Straight,” *Environment Reporter*, 1/2/04.

Present Value Sensitivity to Ex Ante vs. Ex Post Perspective, paper presentation at Western Economic Association International Annual Conference (Denver CO), 7/12/03.

Taxation Considerations in Economic Damages Calculations, paper presentation at Eastern Economic Association Annual Conference (New York NY), 2/22/03.

JONATHAN S. SHEFFTZ

Publications and Presentations (continued)

Economic Benefit from Illegal Competitive Advantage and Complex Economic Benefit Scenarios, presentation at U.S. EPA 5th Financial Analyst Workshop (Boston MA), 7/26/00.

Economic Benefit in Wetlands Cases: Financial Analysis Issues, presentation at U.S. EPA Wetlands Enforcement Conference (Alexandria VA), 3/22/00.

Economic Benefit, presentation at U.S. EPA 4th Analyst Workshop (Denver CO), 3/10/99.

In addition to the publications and presentations listed above, Mr. Shefftz has published and presented extensively on topics unrelated to his economics consulting practice, mainly in the area of avalanche safety. He also holds various memberships and certifications in that field.

JONATHAN S. SHEFFTZ

Testimony History

Lower Susquehanna Riverkeeper Association v. Republic Services of Pennsylvania LLC (USDC MD Penn.), deposition 8/12/24.

California Coastkeeper Alliance v. Cosumnes Corporation dba Murieta Equestrian Center (USDC ED Calif.), deposition 3/26/24.

Paula Appleton a/k/a Paula Sweet v. National Union Fire Insurance Company of Pittsburgh, PA, and AIG Claims, Inc. (USDC Mass), deposition 10/30/23.

Sierra Club et al. v. Midwest Generation, LLC (Illinois Pollution Control Board), deposition 10/28/21 and hearing testimony 5/16&17/23.

The State of New York, et al. v. Covanta Hempstead Company and Covanta Holding Corporation (NY Supreme Court), affidavit 5/04/23.

James F. Riley, Jr. and Pamela B. Bankert v. Timothy S. Martinez, D.M.D. et al. (Mass. Superior Court), courtroom testimony 03/20/23.

Amazon.com, Inc. and Amazon Data Services, Inc. v. WDC Holdings LLC dba Northstar Commercial Partners et al. (USDC ED Va), deposition 12/21/22.

Sierra Club, Inc. and Conservation Law Foundation, Inc. v. Granite Shore Power LLC et al. (USDC ED NH), deposition 11/11/20 and courtroom testimony 10/20/22.

San Francisco Baykeeper v. City of Mountain View and San Francisco Baykeeper v. City of Sunnyvale (USDC ND Calif.), deposition 8/18/21.

Sierra Club v. Woodville Pellets, LLC (USDC ED Texas), deposition 7/29/21.

Environmental Law & Policy Center and Hoosier Environmental Council v. Cleveland-Cliffs Burns Harbor, LLC and Cleveland-Cliffs Steel (USDC ND Indiana), deposition 7/14/21.

PennEnvironment, Inc., and Clean Air Council v. United States Steel Corporation (USDC WD Penn), deposition 2/10/21.

Ohio Valley Environmental Coalition and The Sierra Club v. Eagle Natrium LLC (USDC ND West Virginia), deposition 8/19/20.

Gary and Anne Childress, et al. v. JP Morgan Chase & Co., et al. (USDC ED North Carolina), deposition 1/24/19 and affidavit 3/17/20.

Seneca Economics and Environment, LLC v. Manson Bolves Donaldson Varn, P.A. (Florida Circuit Court), affidavit 2/26/20.

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Testimony History (continued)

Permit application for Plaquemines Liquids Terminal, LLC (Louisiana DEQ), affidavit 1/27/20.

Newark Education Workers Caucus and Natural Resources Defense Council, Inc. v. City of Newark et al. (USDC NJ), courtroom testimony 8/15/19.

Wild Fish Conservancy v. Cooke Aquaculture Pacific, LLC (USDC WD Wash), deposition 8/02/19.

Waste Action Project v. Port of Olympia (USDC WD Wash), deposition 7/17/19.

Toxics Action Center, Inc. and Conservation Law Foundation v. Casella Waste Systems, Inc. and North Country Environmental Services, Inc. (USDC NH), deposition 5/15/19.

Suncoast Waterkeeper, Our Children's Earth Foundation, and Ecological Rights Foundation v. City of Gulfport (USDC MD Fla), deposition 5/7/19.

San Antonio Bay Estuarine Waterkeeper and S. Diane Wilson v. Formosa Plastics Corp., Texas, et al. (USDC SD Tex), deposition 1/16/19.

Infinity Fluids Corporation v. Eemax, testimony at binding arbitration hearing, 12/6/18.

Puget Soundkeeper Alliance v. Seattle Iron & Metals, Corp. (USDC WD Wash), deposition 10/4/18.

Natural Resources Defense Council, Respiratory Health Association, and Sierra Club, Inc. v. Illinois Power Resources, LLC and Illinois Power Resources Generating, LLC (USDC CD Illinois), deposition 6/12/18.

Louisiana Environmental Action Network and Stephanie Anthony v. Exxon Mobil Corp. d/b/a/ ExxonMobil Chemical Co. (USDC MD Louisiana), deposition 10/26/17.

Jeffrey Palmer v. Inn Serve Corporation d/b/a Hampton Inn & Suites, Inn of Daphne, Inc. d/b/a Hampton Inn et al. (Court of Lauderdale County, Mississippi), affidavits 6/2/17 & 10/23/17.

In the Matter of Taotao USA, Inc., Taotao Group Co., Ltd., and Jinyun County Xiangyuan Industry Co., Ltd. (U.S. EPA Administrative Court), deposition 9/26/17, courtroom testimony 10/19/17.

Puget Soundkeeper Alliance v. Louis Dreyfus Commodities LLC et al. (USDC WD Wash), deposition 3/2/16.

Gulf Restoration Network, Louisiana Environmental Action Network, and Sierra Club v. United Bulk Terminals Davant, L.L.C. (USDC ED Louisiana), deposition 5/5/15.

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Testimony History (continued)

Village of Stillwater, Town of Stillwater, Town of Waterford, Water Commissioners of the Town of Waterford, Village of Waterford, Town of Halfmoon, and County of Saratoga v. General Electric Company et al.; and Saratoga County Water Authority v. General Electric Company (USDC ND New York), deposition 4/2/14.

Environment Texas Citizen Lobby, Inc. and Sierra Club v. ExxonMobil Corporation, et al. (USDC SD Tex), deposition 6/1/12, courtroom testimony 2/14/14.

Waste Action Project v. Draper Valley Holdings LLC dba Draper Valley Farms (USDC WD Wash), deposition 1/21/14.

RE Sources for Sustainable Communities v. Pacific International Terminals, Inc. (USDC WD Wash), deposition 4/11/13.

WildEarth Guardians v. Lamar Utilities Board doing business as Lamar Light and Power, and Arkansas Power Authority (USDC Colo), deposition 3/22/13.

Tina A. Rhodes, Individually and as Administratrix of David C. Rhodes, et al. v. Tyrone Gadsen and GP&T Transport, Inc. (Mass. Superior Court), deposition 12/11/12, courtroom testimony 1/23/13.

Waste Action Project v. Sierra Pacific Industries dba Sierra Junction City Sawmills (USDC WD Wash), deposition 12/28/12.

People of the State of California and The City of San Diego v. Kinder Morgan Energy Partners, L.P., et al. (USDC SD Cal), deposition 4/26/12.

Marvin Evans v. Certain Underwriters at Lloyd's London, KMS Associates, Inc., Greenwich Insurance Company, W. Brown & Associates, Inc. and Hub International Gulf South Limited f/k/a/ Hibernia Rosenthal Insurance Agency, LLC d/b/a Hibernia Rosenthal (Florida Circuit Court), depositions 9/15/11 and 11/15/10.

Bouncing Cranberries LLC v. CommonPlaces eSolutions, LLC, testimony at binding arbitration hearing 8/18/11.

Puget Soundkeeper Alliance v. BNSF Railway Company (USDC WD Wash), deposition 7/7/11.

State of Texas v. BP Products North America Inc. (Texas District Court), deposition 6/7/11.

Chevron Corporation v. Jonathan S. Shefftz (USDC Mass) and *Maria Aguinda et al. v. Chevron Corporation* (Court of Justice of Nueva Loja, Ecuador), deposition 12/16/10.

JONATHAN S. SHEFFTZ

Testimony History (continued)

Elizabeth Russell and Katherine Gates v. Joseph Reilly and James Georges, Executors of the Estate of K. Mildred Dooling, a/k/a Mildred K. Dooling, and Patrick Curtin, Individually and as Trustee of the M.D. Realty Trust (Mass. Superior Court), courtroom testimony 7/21/10.

Hildagarde Bartling, et al. v. Country Villa Bay Vista Healthcare Center, et al. (California State Court), deposition 1/29/10.

Joseph J. Zajac III v. Pamela J. Trueblood, et al. (USDC MD Fla), affidavit 9/16/09.

In the matter of 99 Cents Only Stores (U.S. EPA Administrative Court), courtroom testimony 6/24/09.

U.S. v. Government of Guam (USDC Guam), courtroom testimony 12/9/08 and 4/13/09.

U.S. v. James and Nancy Oliver d/b/a Safety Waste Incineration (USDC Alaska), courtroom testimony 3/25/09 and 3/27/09.

In the matter of Valimet, Inc. (U.S. EPA Administrative Court), courtroom testimony 12/10/08.

Rectrix Aerodome Centers, Inc. v. Barnstable Municipal Airport Commission, et al. (USDC Mass), deposition 12/2/08.

State of Ohio v. The Shelly Holding Company et al. (Franklin County Municipal Court), depositions 7/30/08 and 9/19/08, courtroom testimony 10/16/08 and 10/17/08.

In the matter of Lowell Vos Feedlot (U.S. EPA Administrative Court), courtroom testimony 9/17/08.

French Heritage, Inc. v. Ethan Allen, Inc. (Connecticut State Court), deposition 6/28/06 and 6/29/06.

Oregon Public Interest Research Group, Diane Heintz, and Rena Taylor v. Pacific Coast Seafoods Company, Pacific Surimi Joint Venture, LLC, Pacific Surimi Co., Inc., and Dulcich Inc. d/b/a Pacific Seafood Group (USDC Oregon), deposition 4/18/06.

In the matter of Rizing Sun LLC (U.S. EPA Administrative Court), courtroom testimony 2/7/06.

State of Ohio v. Container Recyclers, Inc. (Franklin County Municipal Court), deposition 4/1/05.

In the matter of Vico Construction Corporation and Smith Farm Enterprises (U.S. EPA Administrative Court), courtroom testimony 6/20/02 and 10/8/03.

U.S. v. The New Portland Meadows, Inc. (USDC Oregon), courtroom testimony 5/20/03.

In the matter of Vico Construction Corporation and Amelia Venture Properties (U.S. EPA Administrative Court), courtroom testimony 1/14/03.

JONATHAN S. SHEFFTZ

Testimony History (continued)

United States Public Interest Research Group, Stephen E. Crawford, and Charles Fitzgerald v. Heritage Salmon, Inc.; U.S. PIRG et al. v. Stolt Sea Farm, Inc.; U.S. PIRG et al. v. Atlantic Salmon of Maine LLC (USDC Maine), deposition 6/5/01, courtroom testimony 10/15/02.

U.S. v. Murphy Oil USA, Inc. (USDC WD Wis), deposition 4/24/01.

U.S. v. Royal Oak Enterprises, Inc. (USDC ED Va), depositions 3/22/00 and 5/19/00.

In the matter of Titan Wheel Corp. of Iowa (U.S. EPA Administrative Court), affidavit 11/24/99.

U.S. v. Gulf States Steel, Inc. (USDC ND Ala), affidavit 12/30/98, deposition 10/22/99.

U.S. v. Koch Industries, Inc. (USDC ND Okla and SD Tex), depositions 5/24/99 and 6/1/99.

State of Wisconsin v. I-K-I Manufacturing Company, Inc., deposition 4/13/99.

U.S. v. Borden Chemicals & Plastics (USDC MD La), deposition 2/5/98.

State of New Hampshire v. Johnson Products, Incorporated, deposition 2/3/98.

In the matter of EK Associates, L.P., d/b/a EKCO/GLACO, and EK Management Corporation (U.S. EPA Administrative Court), courtroom testimony 8/14/97.

U.S. v. Smithfield Foods, Inc., et al. (USDC ED Va), deposition 7/9/97.

U.S. v. Nucor Corporation (USDC ND Ala), deposition 6/12/97.

U.S. v. U.S. Metallics, Inc., and Town of Onalaska, Wis. (USDC WD Wis), affidavit 10/21/96.



August 27, 2024

Rajinder Sahota
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: AMP AMERICAS COMMENTS ON THE PROPOSED 15-DAY CHANGES TO THE PROPOSED AMENDMENTS TO THE LOW CARBON FUEL STANDARD REGULATION

Dear Ms. Sahota:

Thank you for the opportunity to comment on the Proposed 15-Day Changes to the Proposed Amendments to the Low Carbon Fuel Standard ("LCFS"). Amp Americas ("Amp") appreciates the California Air Resource Board's ("CARB's") leadership on addressing climate change, and especially appreciates CARB staff's thorough and ongoing stakeholder engagement throughout the LCFS amendment process. We strongly support the LCFS program, which has been critical in advancing a wide array of climate and environmental priorities in California, as CARB has documented in various workshops throughout the amendment process and most recently with the August 22, 2024, Dairy Sector Workshop.

Amp strongly supports amending the LCFS quickly and in a manner that will ensure its ongoing success as a driver of investment in a broad array of low carbon fuels for California, including dairy methane capture projects. We appreciate many of the proposed amendments to the LCFS, but encourage additional, minor amendments through another 15-Day change package to ensure the program can continue to support investment in clean fuels and methane reductions, including at dairies. Specifically, we offer the following comments on the 15-Day Changes, which are elaborated upon below:

- We appreciate and strongly support a step down of at least 9% in 2025.
- We strongly support inclusion of an auto acceleration mechanism ("AAM") in the program, however we continue to believe minor changes are important to maximize its role in stabilizing the market, specifically:
 - Allow the first test to occur in 2026 to evaluate 2025 performance.
 - Set the credit bank trigger at 1x quarterly deficits, rather than 3x.
 - Allow the AAM to apply in consecutive years, should market conditions warrant.
- We appreciate and strongly support the proposed the true up provisions, including the proposed 15-Day Changes to expand the true-up to include periods using temporary pathways.
- We strongly oppose any arbitrary sunset provisions for avoided methane crediting, including limiting projects to two credit periods instead of three, and especially any that would apply retroactively to existing projects.
- We strongly oppose an arbitrary sunset for book and claim provisions and the proposed deliverability requirements, which introduce significant uncertainty into the market that will disrupt current and future investments in clean fuels.



- 212.8
- We encourage CARB to enable book-and-claim accounting for biogas-to-electricity pathways, to support the transition to ZEVs and provide equal treatment between hydrogen and electricity pathways.

ABOUT AMP

Founded in 2011, Amp develops, owns, and operates renewable natural gas (“RNG”) facilities that convert dairy waste into carbon-negative renewable energy. Over our history, Amp’s projects have prevented 2 million metric tons of carbon equivalent emissions, and we plan to rapidly expand our impact over the next several years.

As a pioneer in the dairy RNG industry, Amp registered the first 5 dairy RNG-to-CNG pathways in California’s LCFS program, and we were the RNG supplier for the first 11 dairy RNG-to-hydrogen pathways. Our experience developing, operating, and reporting on these and other assets gives us a unique perspective on the impact CARB policy has on investment and project development activity related to low carbon fuels. Our projects and resulting methane and carbon dioxide reductions have been made possible by CARB’s leadership in decarbonizing transportation, and we encourage CARB to continue to support the policy decisions that have made it so successful.

A NEAR-TERM STEP-DOWN OF AT LEAST 9% IS NEEDED TO STRENGTHEN THE MARKET AND MAINTAIN THE PROGRAM AS A DRIVER OF INVESTMENT IN CLEAN FUELS PROJECTS

To meet California’s Short-Lived Climate Pollutant (“SLCP”) reduction and carbon neutrality goals, it is imperative to maintain a robust LCFS that is technology-neutral and performance-based. Investments supported by the LCFS are vital for developing dairy digesters and other projects that mitigate methane emissions. As highlighted at the Dairy Sector Workshop and in other CARB processes, California’s strategy of leveraging the LCFS to support methane mitigation projects, including at dairies, has proved tremendously successful, with hundreds of digesters now online and under development throughout the state and nationally.

The ongoing development and operation of low carbon fuel projects, including dairy RNG projects, requires programs like the LCFS to provide and maintain a strong and clear market signal sufficient to attract capital for new projects and to maintain operations at existing RNG facilities. In previous comments,¹ we have described how the bank of excess credits could reach about 38 million by the end of 2024, almost 6 times quarterly deficit generation. According to our analysis, a step-down to 25% in 2025, coupled with a stronger target of at least 35% in 2030, is necessary to correct for this projected level of surplus credits. Note that this would translate to a ~11% step down in 2025 and aligns with similar analysis and findings from ICF.²

Still, the increase in the step-down to 9%, as proposed in the 15-Day Changes, represents significant progress towards addressing the excess credit bank. We appreciate CARB proposing to increase the

¹ <https://www.arb.ca.gov/lists/com-attach/7007-lcfs2024-UjNdNIEgUI4CdAFz.pdf>

² Based on its analysis, “ICF recommends a step down of 10.5% to 11.5% in 2025 to achieve a target credit bank equivalent of 2-3 quarters worth of deficits.” See pg. 1 of ICF comments at: <https://www.arb.ca.gov/lists/com-attach/7078-lcfs2024-VDVcNFlyVGsLdFQu.pdf>



212.10
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step-down and have it take effect in Q1 2025, provided the regulation is finalized before April 2025. We strongly support this proposal and encourage CARB to work to finalize the regulation before April 1, 2025 – so that the step down may take effect in Q1 and to avoid an ongoing buildup of the credit bank.

THE AUTO ACCELERATION MECHANISM IS A CRITICAL NEW COMPONENT OF THE PROGRAM, BUT CAN BE MADE MORE EFFECTIVE

Amp appreciates CARB's proposed amendment to incorporate an AAM into the program. We strongly support this element of the proposed amendments and encourage CARB to maintain the AAM as an element of the regulatory package the Board considers in November.

212.11

This mechanism will help to strengthen the program and avoid cyclical “boom-bust” investment cycles common to commodity markets. An AAM provides a clear, ongoing signal that there will be a market for low carbon fuels, providing greater certainty to investors and incentivizing continuous investments in clean fuels and ongoing greater emissions reductions. It will help avoid future market weakness driven by as-yet unforeseen trends in low carbon fuels supplies, which could include accelerated transportation electrification, widespread use of E15 or deployment of carbon capture, removal, utilization, and storage (“CCRUS”), or any number of other factors.

While the market is currently overachieving its targets, ironically, overachieving targets in the near term may lead to sustained price weakness, which would inevitably lead subsequently to low levels of investment and sustained periods of underachievement and high prices. If the market swings from undersupply to oversupply, prices will be volatile, undermining public confidence in the program and jeopardizing long term goals. An AAM can help provide a clear, ongoing signal that there will be a market for low carbon fuels, providing greater certainty to investors and incentivizing continuous investments in clean fuels and ongoing greater emissions reductions, provided that it is designed appropriately.

Still, we believe the AAM can be made more effective with minor adjustments, which specifically would:

- Allow the AAM to take effect as soon as the regulation does, with the first test occurring in 2026 to evaluate 2025 performance.
- Set the AAM trigger at 1x quarterly deficits, rather than 3x, in recognition that 1) the LCFS is now a liquid and mature market, and 2) that liquid and mature markets are in surplus conditions when inventory is greater than 0.6x quarterly demand.
- Remove the limit on applying the AAM in consecutive years. The market should dictate when the AAM applies.

WE STRONGLY SUPPORT THE TRUE-UP PROVISIONS AND EXPANSION TO INCLUDE PERIODS USING TEMPORARY PATHWAY CARBON INTENSITIES

212.12

Amp strongly supports the proposed amendments regarding “credit true up after annual verification” and the proposed 15-Day Changes to expand the credit true up to include periods using temporary pathway CIs after annual verification. For RNG pathways specifically, which encompass living, biological



212.12
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systems, several parameters beyond the control of a pathway holder³ can impact a number of variables that affect the CI of a pathway. Due to these unpredictable and uncontrollable factors, verified pathways may deviate from provisional pathways through no fault of the project developer. The true up provisions will protect the environmental integrity of the program and maintain rigorous accounting and verification, while allowing flexibility to accommodate reasonable uncertainties.

Expanding the true up provisions to include periods using temporary CIs is especially important, and we appreciate CARB proposing this change in the 15-Day Change package. Essentially all dairy RNG pathways utilize a Tier 2 process today, which currently takes about 18-24 months for approval. During this process, dairy RNG projects use a temporary CI score (-150 gCO₂e/MJ), which is often much higher than the actual verified CI (often -300 gCO₂e/MJ or below). Under this framework, projects fail to receive credit for a large portion of their emissions reductions for about two years, which also reduces credit availability in the program overall. By allowing a true up between temporary CI and certified CI values, the proposed amendments will help alleviate concerns related to pathway process delays, assist in avoiding complicated storage agreements, provide reliable deliveries to fleets by avoiding buildup of stored gas inventory, allow more direct sales of RNG to smaller local fleets, and motivate additional project development.

Due to aforementioned dynamic factors that impact biological systems, CARB should implement the following changes as they impact the true-up and associated deficit obligations provisions:

212.13

- CARB should allow adjustments to the margin of safety (“MOS”) a pathway may apply as needed throughout the year, as operational data becomes available, and at a minimum quarterly. This will allow a pathway to adjust the CI of the pathway to ensure a pathway holder can correct CI exceedance proactively.
- A MOS should be allowed to be added to a temporary CI. As Section 95488.10(a)(7) includes the verified CI to be compared to a temporary pathway CI, a margin of safety should be allowed to be added at the time of requesting a temporary CI and at a minimum quarterly. As a pathway is waiting in the Tier 1/Tier 2 process, a developer’s forecasted CI will change as operational data comes in and have no recourse to correct a CI exceedance once validation is completed.

CARB SHOULD AVOID ARBITRARY SUNSETS TO AVOIDED METHANE CREDITING, INCLUDING RETROACTIVE REDUCTIONS TO AVOIDED METHANE CREDITING PERIODS

212.14

Avoided methane crediting is critical for both financing digester project development and long-term operating viability. Dairy digester projects cost tens to hundreds of millions of dollars and take 2-3 years to develop and construct. Avoided methane crediting provides the source of revenue for these projects that pays for their beneficial impact and allow developers to invest. (If in the future, farm methane emissions are regulated directly, milk buyers will foot the bill for reducing emissions through milk prices or government will directly subsidize digesters. But until then, avoided methane crediting is the only

³ Parameters beyond the control of a pathway holder include temperature, herd count, changes to the manure volatile solid content, unplanned equipment downtime, evolving energy efficiency due to equipment age, force majeure events, and changes in dairy operations beyond the operator’s control.



proven way to support the development, ongoing operations, and associated emissions reductions that digesters provide.⁴)

212.14
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As noted above and in CARB documents and presentations, the LCFS has proven a successful model – likely the most successful in the world – in achieving methane reductions from the agricultural sector. This success stems directly from avoided methane crediting as part of lifecycle greenhouse gas (“GHG”) emissions accounting for biomethane pathways. Methane crediting is both scientifically accurate and proven effective in supporting project development and driving significant methane reductions. Given this demonstrated success and scientific accuracy, a number of new programs are taking a similar approach to California’s, including the Inflation Reduction Act and other programs based on the Argonne National Laboratory (“ANL”) Greenhouse gases, Regulated Emissions, and Energy use in Technologies (“GREET”) model.

Still, project infrastructure and equipment have a finite life. If avoided methane crediting goes away, not only will new projects not be built, but existing projects will shut down because they cannot pay operating costs and costs to maintain and extend the life of equipment. In both cases, we will backslide to pre-LCFS methane emissions at dairies. Backsliding has happened before. Many of Amp’s projects were originally biogas-to-electricity projects that were shut down by prior owners due to failed economics. CARB should not assume that once a digester project is developed, methane emissions are permanently abated, and it should not change accounting for avoided methane emissions until clear mechanisms are in place to ensure avoided methane emissions remain avoided.

212.15

We are concerned with the proposal to limit avoided methane crediting to two crediting periods, rather than three, and especially concerned with the impact it will have on existing projects. Existing projects were financed and developed based on the expectation of receiving three crediting periods, and if they are limited to two, we anticipate many early projects will shut down in the early 2030s, and those dairies will revert to emitting methane. The December 2023 proposed amendments to the LCFS already reduce avoided methane crediting for new projects starting in 2030. This new provision in the 15-Day Changes goes further by penalizing existing projects, projects currently under development and construction, and projects that would be developed between 2025 and 2030. In multiple forums, including the 2022 Scoping Plan and the August 2024 Dairy Sector Workshop, CARB has stated that additional mitigation measures are still needed in the dairy and livestock sector. Avoided methane crediting under the LCFS is currently the most successful strategy for achieving dairy sector reductions, and CARB should avoid arbitrary changes to avoided methane crediting that would serve to disrupt existing and planned investments in the sector.

We hope CARB is not proposing to retroactively regulate existing projects, but if that’s the case, we believe additional clarification is warranted in subsection 95488.9(f)(3)(A), to clarify that the change in avoided methane crediting periods only applies to *new* projects, for which developers have not already invested capital. An RNG project takes two to three years to develop. Consequently, we propose that pathways that are completed prior to three years after the finalization of this regulation be entitled to three crediting periods as follows:

⁴ <https://onlinelibrary.wiley.com/doi/10.1111/gcbb.13101>



212.15
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Crediting Periods. Avoided methane crediting for existing dairy and swine manure pathways that register for a pathway on or before December 31, 2027 as described in (f)(1) above, and for existing landfill-diversion pathways that register for a pathway on or before December 31, 2027 as described in (f)(2) above, is limited to three consecutive 10 years crediting periods, counting from the quarter following Executive Officer approval of the application. Avoided methane crediting for new dairy and swine manure pathways that register for a pathway on or after January 1, 2028 and on or before December 31, 2029 as described in (f)(1) above, and for existing landfill-diversion pathways that register for a pathway on or after January 1, 2028 and on or before December 31, 2029 as described in (f)(2) above, is limited to two consecutive 10 years crediting periods, counting from the quarter following Executive Officer approval of the application. The pathway holder must formally request each subsequent crediting period for the project through the AFP. For pathways for bio-CNG, bio-LNG, and bio-L-CNG used in CNG vehicles associated with projects that break ground after December 31, 2029, the Executive Officer may only approve avoided methane crediting through December 31, 2040. For pathways for biomethane used to produce hydrogen or electricity that break ground after December 31, 2029, the Executive Officer may only approve avoided methane crediting through December 31, 2045.

212.16

As other states and jurisdictions consider developing their own LCFS, CARB's leadership and continuing to maintain a technology-neutral, performance- and science-based approach is critical. If California moves to restrict avoided methane crediting, or to limit access to its fuel market for out-of-state renewable supplies, it not only threatens to limit options and increase costs associated with meeting the state's goals, but it also sets a bad precedent that may lead others to do the same, with the impact being less investment in methane abatement and low carbon fuels projects.

CARB SHOULD AVOID ARBITRARY SUNSETS FOR BOOK-AND-CLAIM ACCOUNTING AND AVOID IMPOSING ADDITIONAL DELIVERABILITY REQUIREMENTS

212.17

We strongly urge CARB to maintain book-and-claim eligibility for all RNG pathways, including RNG used for hydrogen production or electricity generation. The North American natural gas system does not mirror the fractured and isolated electricity markets in the western U.S. Instead, the gas system is deeply interconnected, and long ago moved away from point-to-point service, instead creating trading hubs and flexible receipt and delivery points to give customers a variety of options in the market. California imports nearly all of its natural gas,⁵ and any biomethane injected into the pipeline system under the LCFS serves to displace fossil natural gas that otherwise would be imported into the State.

For its part, fossil natural gas operates on a system very similar to book-and-claim, in which buyers of fossil gas do not buy the molecules injected by their supplier, but rather instantaneously take receipt of a pre-agreed amount of gas, based on a mass-balance corresponding to the amount their supplier

⁵ According to the California Energy Commission, "California continues to depend upon out-of-state imports for nearly 90 percent of its natural gas supply..." <https://www.energy.ca.gov/data-reports/energy-almanac/californias-natural-gas-market/supply-and-demand-natural-gas-california>



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injected elsewhere in the system. These systems already work well for natural gas supplies across the continent and in the LCFS, and they should continue to be leveraged to cost effectively and efficiently support decarbonizing California gas end uses. RNG under the LCFS should be treated no less preferentially than compared to fossil natural gas, and book-and-claim eligibility should be maintained for all RNG pathways.

212.18

We are especially concerned by the proposal in the 15-Day Changes to add additional deliverability requirements for RNG pathways in the future – both in the LCFS and other programs, which will create roadblocks for RNG to transition to hard to electrify sectors. Amp and other investors are eager to continue investing and developing projects to reduce methane and provide low carbon fuels for California, however this provision would add a tremendous amount of uncertainty that may prohibit those investments in the future. It is unclear whether CARB can develop a gas system map identifying interstate pipelines and their majority directional flow and there is no way to understand what that would look like ahead of time. In addition, the natural gas market is fluid, and proposed directional flow data from 2020 to 2023 is arbitrary and does not represent how the natural gas system may operate in the future. At best, this provision may serve to delay investment decisions until July 1, 2026, and at worst, it could stifle investment in out-of-state projects altogether. We strongly urge CARB to remove this proposal in subsequent 15-Day Changes.

CARB SHOULD ENABLE BOOK-AND-CLAIM ACCOUNTING FOR BIOGAS-TO-ELECTRICITY PATHWAYS

212.19

Amp supports California's overall decarbonization goals and its efforts to develop RNG supplies to decarbonize stationary sources in all sectors of the economy. Provisions in the proposed amendments help support transitioning RNG to ZEV fuels and stationary sources, but we encourage additional steps to further assist the transition. Specifically, we encourage CARB to allow RNG book-and-claim eligibility for RNG used to produce offsite electricity to charge electric vehicles.

Enabling book-and-claim delivery for RNG sourced from projects in North America to be eligible for both hydrogen production *and* electricity generation would align with state goals around ZEVs and maintain equal treatment among ZEV options – including both hydrogen and electricity. Also, as a significant portion of the LCFS value generated from RNG flows to the stations that distribute fuel, and this same dynamic would apply to RNG-to-electricity-to-EV pathways, enabling RNG book-and-claim eligibility will inject additional LCFS value into the EV ecosystem, supporting further infrastructure investment in support of CARB's goals.

ADDITIONAL PROVISIONS TO SUPPORT AN ONGOING, SUCCESSFUL LCFS

In addition to these recommendations on the proposed amendments, we appreciate the opportunity to reiterate our comments on the following issues⁶:

212.20

- CARB should apply Less Intensive Verification for all QFTR reports identified in Section 95500(c)(1) which is consistent with the CARB Regulation for the Mandatory Reporting of Greenhouse Gas Emissions, Title 17 of the California Code of Regulations ("CCR") Section

⁶ <https://www.arb.ca.gov/lists/com-attach/7007-lcfs2024-UjNdNIEgUI4CdAFz.pdf>



212.20
cont.

95130(a)(1), and allows for less intensive verification services for the following two years if the less intensive verification criteria are met, instead of for electricity QFTR only.

212.21

- Data substitution the Missing Data Provisions, Section 959491.2(b)(2)(B), are based on a calendar year; however data substitution is required to be completed monthly to determine fuel allocations for Pathways with multiple fuel pathway codes. If the quantity of data substitution changes over a year, the data substitution methodology will change, which will change fuel allocation and require all entities, not just the fuel pathway holder, to re-open and re-report every all four QFTR annually. Amp requests that the use of “reasonable temporary methods” continue to be allowed to address missing data, which allows for operational realities and engineering best practices to be used. As the majority of data being substituted is continuous data (e.g., 15-minute data), data substitution using data directly prior and after is likely to be more accurate than a 30-day average or highest/lowest value over a one- to two-year time period.

212.22

- CCRUS protocols should be utilized as they are developed, pursuant to SB 905 or if the CCS Protocol is updated otherwise.
- The proposed CA-GREET 4.0 and revised Tier 1 calculators should be updated with minor revisions to improve accounting for current practice:⁷

212.23

- All biomethane pathway calculators should include the option to model biogas-to-electricity carbon intensity scores.
- Applicants should be allowed to account for actual fugitive methane performance.
- The avoided emissions boundary should include biogas flared during normal operations.
- The volatile solids table should be updated to include new technologies (e.g., Dissolved Air Flotation, Hydrocyclones).

CLOSING

212.24

Thank you again for your collaboration with stakeholders through this public process, the opportunity to comment on the proposed 15-Day Changes. In addition, Amp supports the Coalition for Renewable Natural Gas’s comment letter. We appreciate your consideration of these comments and your work to amend and strengthen this critical program. We very much appreciate the diligent effort CARB staff, leadership, and the Board are putting into this rule-making process.

Sincerely,

Cassandra Farrant

Cassandra Farrant
Head of Environmental Credit Compliance
Amp Americas

⁷ <https://www.arb.ca.gov/lists/com-attach/360-lcfscalculators23-ws-UTBVPgZ3U19QIgNg.pdf>



Alternative Fuels & Chemicals Coalition

*Advocating for Public Policies to Promote the Development & Production of
Alternative Fuels, Renewable Chemicals, Biobased Products, and Sustainable
Aviation Fuels*

August 27, 2024

VIA ELECTRONIC FILING

California Air Resources Board
Rajinder Sahota
Deputy Executive Officer
Climate Change and Research, CA Air
1001 1 St #2828
Sacramento, CA, 95814

Re: Comments to the 15-Day Information for LCA Standard Amendments

Dear Rajinder Sahota:

AFCC and its member companies are providing comments to the 15-day Information for the Proposed Low Carbon Fuel Standard Amendments.

AFCC is a collaborative government affairs effort organized by the Kilpatrick Townsend & Stockton law firm and American Diversified Energy. AFCC was created to address policy and advocacy gaps at the federal and state levels with respect to renewable chemicals, bioplastics/biomaterials, cell-cultured food ingredients, alternative proteins, single cell protein for food and feed, enzymes, alternative fuels, biobased products and sustainable aviation fuels sectors. AFCC member companies work on food and fiber supply chain security and sustainability, renewable chemicals, industrial biotechnology, bioplastics and biomaterials, and biofuels.

Executive Summary

213.1 AFCC and its member companies object to language in the 15-Day amendments that specifically states that the biomass must come from "non-industrial forestland." Therefore this prohibits the use of biomass from "industrial forestland" which would include plantation forest, which is the primary source of feedstock for AFCC producers and/or developer's projects.

The recommendation from AFCC and its member companies is to exclude the new language biomass must come from "non-industrial forestland" rfrom the LCFS rulemaking package and that a separate focused rulemaking that involves producers/developers, foresters, and other stakeholders in California are included.

Definition of Forest Biomass & Reduction of Biomass Availability

213.2 An objectionable issue would be the proposed definition of Forest Biomass Waste in 95488.8(g)(1)(A)3. While regions, and practices within those regions, differ across the US, excluding Industrial Forestland in California (or if produced outside

213.2
cont.

California and delivered into the State) would significantly reduce the amount of biomass available. In addition, Industrial Forestland owners have the capacity financially to offer long term contracts that enable funding by meeting requirements of the investors funding the biorefinery. And with the proposed phased approach for certification requirements, Industrial Landowners are more likely to have the necessary documentation in the early stages while small/private landowners work towards that requirement. With a primary goal of reducing forest fire risk, excluding Industrial Forestland and the harvesting of their waste exposes a significant amount of acreage to this risk.

The definition in that section is also too restrictive or at least not inclusive enough to be consistent with the RFS. There needs to be alignment with existing federal law, and CARB should not create new provisions which impede the growth of the emerging industry, and it serves to cause market confusion and derails the growth of our sector. The definition should include if the biomass is cut for "forest stand improvement" and compliant with all laws. In working with some other committees and getting their feedback, language similar to this for the definition would be preferred for the referenced section: "Forest biomass waste from forestlands removed for the purpose of wildfire fuel reduction or forest stand improvement, to reduce the risk to public safety or infrastructure, to create defensible space, or for forest restoration; and was performed in compliance with all local, State, and federal rules and permits."

Remove Restrictive Language: Impedes Development and Production of Sustainable Aviation Fuels(SAF)

213.3

One of the biggest challenges SAF producers are facing today is the cost of production compared to incumbent technologies. Restricting the use of forest residuals would simply be left to rot in the field if not used for feedstock in the production of SAF. The CO2 and methane that such rotting contributes to the atmosphere will continue unabated. The jets flying overhead will have less access to sustainable aviation fuel and will have to continue to rely heavily upon fossil fuel sources. The exclusion of feedstocks from industrial forestlands will thus have severe negative social and economic consequences for all producers of SAF, advanced biofuels, cellulosic biofuels and impoverished people of the rural communities where impede our efforts to reduce the levels of CO2 and methane in the atmosphere.

Importance of the RFS and Forest Residuals: LCFS Compliance

213.4

It is significant that the CARB should not create barriers to investments made and should be aligned with federal policies and not be restrictive and impeding innovation in the United States by restricting sourcing of feedstocks, especially since these are waste or in areas setup for hazardous fuels. We urge CARB to not cause confusion in the market and encourage the growth of the nascent biofuels sector.

213.4
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AFCC and its member companies propose that the Renewable Fuel Standard (40 CFR §80.2) already places significant constraints on which materials from industrial forestlands can be utilized for qualified credits and represent an excellent model for adoption by California. The RFS restrictions ensure that the materials utilized are from managed, sustainable forestlands and that there is a traceable chain of custody that ensures compliance. The acceptable materials are pre-commercial thinnings and slash. Under the RFS Slash is defined as the residue, including treetops, branches, and bark, left on the ground after logging or accumulating as a result of a storm, fire, delimbing, or other similar disturbance. Pre-commercial thinnings are defined as trees, including unhealthy or diseased trees, removed to reduce stocking to concentrate growth on more desirable, healthy trees, or other vegetative material that is removed to promote tree growth.

Under the RFS industrial forestlands, or tree plantations, that the pre-commercial thinnings are allowed to originate from are further defined as a stand of no less than 1 acre composed primarily of trees established by hand- or machine-planting of a seed or sapling, or by coppice growth from the stump or root of a tree that was hand- or machine-planted. Tree plantations must have been cleared prior to December 19, 2007 and must have been actively managed on December 19, 2007, as evidenced by records which must be traceable to the land in question, which must include one of the following:

1. Sales records for planted trees or tree residue together with other written documentation connecting the land in question to these purchases;
2. Purchasing records for seeds, seedlings, or other nursery stock together with other written documentation connecting the land in question to these purchases;
3. A written management plan for silvicultural purposes;
4. Documentation of participation in a silvicultural program sponsored by a Federal, state or local government agency;
5. Documentation of land management in accordance with an agricultural or silvicultural product certification program;
6. An agreement for land management consultation with a professional forester that identifies the land in question; or
7. Evidence of the existence and ongoing maintenance of a road system or other physical infrastructure designed and maintained for logging use, together with one of the above-mentioned documents (SAF).

Production of Renewable Fuel from Municipal Solid Waste (MSW)

213.5

California Air Resource Body (CARB) to refer following precedence available under Renewable Fuel Standard Program (RFS) to produce renewable fuel from Separated MSW. As per US-EPA's decision on petition filed by Fiberight Blairstown Operating, LLC, MSW that has undergone separation and recycling of "recyclable paper, cardboard, plastics, rubber, textiles, metals, and glass ...to the extent reasonably practicable, and according to a plan submitted to and approved by U.S. EPA under the registration procedures specified in § 80.1450(b)(1)(viii)" is categorized as Separated MSW and has been approved as feedstock for production of renewable fuel under RFS program.

213.5
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Thus, we urge CARB to approve feedstock 'Separated MSW' which has been derived from MSW and processed with the most advanced technology available for separation of recyclables and to the extent reasonably practicable, as per the procedures approved by EPA in § 80.1450(b)(1)(viii) to produce renewable fuels under LCFS.

Sustainability Requirements

213.6

Feedstock is not a "specified source" and must meet a set of sustainability standards defined in section 95488.9(g), that those standards are not well defined. As it stands, section 95488.9(g) appears to have been written with crop-based fuels in mind, and applying it to forest biomass waste and agricultural waste is inappropriate. Neither processors of agricultural waste nor forest management operators can be asked to be held to the same standards as purpose-grown crops without severely restricting the amount of agricultural and forest biomass waste that can be utilized in the LCFS program.

Hydrogen Production

213.7

The ruling on H2 produced from fossil resources even with CCS could be an issue, this applies to hydrogen used for transportation. Thus, H2 used in chemical process that comes from non-biomass energy sources is still allowed as the H2 itself is not a fuel but a chemical component of a process. This distinction is important for those fuel producers that hydroprocess feedstocks into biomass fuels and don't have access to biomass derived H2.

Limitation to Use of Virgin Seed Oils

213.8

The limitation to the use of virgin seed oils to 20% is a hindrance to the RD/HEFA/BD producers but is not impactful to products using non-food-based feedstocks.

Modifications to Maintaining Fuel Pathways

213.9

For the Modifications to Section 95488.10—Maintaining Fuel Pathways, clarification on how great of a CI difference is considered critical to trigger this issue. If 1 or less, it means that the verified CI must be higher than any variability in process operations that impact CI.

Conclusion

213.10

We believe that the goals of ensuring that industrial forestlands are sustainable can be achieved by instituting guidelines that largely align with those in the Federal Renewable Fuel Standard. We urge CARB to allow qualified biomass from industrial forestlands.

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In the near term we request that the new language regarding biomass be deleted from the LCFS rulemaking package and that a separate focused rulemaking that involves stakeholders and California agencies with forestry expertise in the process be initiated.

A handwritten signature in blue ink, appearing to read 'Rina Singh', with a large, stylized loop at the end.

Rina Singh, PhD.
Executive Vice President, Policy
Alternative Fuels & Chemicals Coalition

VIA ELECTRONIC POSTING

<https://ww2.arb.ca.gov/lispub/comm/bclist.php>
Comment List: lcfs2024

August 27, 2024

Clerk of the Board
California Air Resources Board
1001 I Street
Sacramento CA, 95814

Dear Chairman Randolph and Board Members:

Kern Energy (Kern) is providing comments on the California Air Resources Board's (CARB) proposed amendments to the Low Carbon Fuel Standard (LCFS) regulation released on

214.1 August 12, 2024. Kern is specifically providing comments on the following: (1) Near-term
214.2 Increase in Program Stringency is Excessively Aggressive; (2) Restricting Feedstocks and
214.3 New Pathways for Biomass-Based Diesel is Contrary to LCFS Program Goals; (3) Support
214.4 for Maintaining Fossil Jet Fuel Exemption; (4) Sunsetting Credit Generation for Hydrogen
214.5 Restricts Space for Innovation; (5) Operational Carbon Intensity (CI) Fluctuations Should
214.6 Not Result in Immediate Penalization; (6) Temporary Pathway Credit True-up Provides Fair
214.7 Treatment for New Fuel Production; and (7) Sustainability Requirements are Overly Broad
and Will Result in the Unintentional Exclusion of Forest and Agricultural Residues.

Kern Energy is an independent, family-owned and operated transportation fuel company in the Southern San Joaquin Valley that has proudly fueled California for 90 years. At a capacity of 26,000 barrels per day, Kern is the only refiner producing both gasoline and diesel between the major refining complexes in the Bay Area and Los Angeles. While California is one of the most challenging operating environments in the world for a small refiner, Kern has thrived while many others have failed. As a renewable fuel pioneer, Kern understands what is needed to address California climate and environmental concerns. Kern embraced the challenge presented by California's LCFS and the federal Renewable Fuel Standard, becoming just the second refinery in the U.S. to produce renewable diesel by co-processing bio-feed and the first small refiner in California to blend biodiesel.

Kern has been an active participant in the development and evolution of the LCFS since program inception, both actively engaging in the policy-making process and reliably serving the California market as a provider of liquid transportation fuels meeting California's strict standards. Kern appreciates CARB Staff's tremendous work throughout the rulemaking

214.8

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process, particularly for demonstrating the significant contributions that lower CI liquid fuels have delivered toward achieving the state's climate goals and the continued need for these fuels for many years to come. It is critical that any changes to the LCFS support logical and attainable CI reduction targets while continuing to incentivize fuel producers like Kern to ensure the reliable delivery of ever cleaner and lower carbon transportation fuels to our communities.

1. Near-term Increase in Program Stringency is Excessively Aggressive

214.9

Staff proposes to modify Section 95484 (d) through (f) with an immediate increase in stringency to a 9% CI reduction in 2025, nearly double the 5% year-to-year increase presented in the initially proposed December 2023 amendments. This increase is additive to adjusting the overall CI reduction goal to 30% by 2030 and proposing the addition of an auto-acceleration mechanism that would accelerate the annual CI target by a year when specified market conditions are triggered. Staff note this change as intended to smooth the curve between the 2025 compliance target and the originally proposed 30% reduction in 2030, yet the effect is to create an immediate, near impossible burden to comply.

This additional increase has the effect of front-loading 2025 with an unreasonable compliance burden to refiners with little to no time to prepare, rather than spreading the burden across the full five years to 2030. The CI benchmark for gasoline in 2024 is 87.01 grams CO₂ per megajoule (g/MJ). Under the 5% increased stringency scenario initially proposed in the 45-day package, this benchmark would drop to 80.55 g/MJ – a 6.46 g/MJ difference. Under the 9% stringency scenario currently proposed, this benchmark would drop to 76.6 g/MJ – an astounding difference of more than 10 g/MJ. CARB cannot expect refiners to adjust to this dramatic change in less than four months. To place additional context around the magnitude of this CI reduction, even under the current proposal, the next time a benchmark CI decline of 10 g/MJ would be realized is in six years.

CARB is creating an impossible feat for regulated parties to comply even as the agency acknowledges the need for liquid fuels to meet state demand for many years to come. The LCFS proposed amendments already create a layering effect with the incorporation of the auto-acceleration mechanism, limitations to biomass feedstocks, and disincentives toward biomass-based diesel fuels. The longer runway associated with the 5% stringency allows fuel producers the time needed to continue advancing new technologies and innovations in ultra-low CI fuels and implementing projects that are already underway but take five or more years to engineer, construct, and commission. Kern understands that Staff may envision smoothing the curve as beneficial, but the reality is an opposite and detrimental effect. Kern supports requiring reductions in a ratable manner.

214.9
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Kern is one of the smallest refineries in California and is one of only two remaining small refineries in the state producing finished transportation fuels. California Energy Commission data indicates that roughly 30 years ago a dozen small refineries operated in the state. The demise of over 80% of California small refiners over the last 30 years is due in large part to exponentially expanding regulatory burdens and accompanying compliance costs, which disproportionately harms small businesses. Using today's near-record low credit prices in the carbon market, Kern's estimated cost to comply with the newly proposed 10 g/MJ decline (9% stringency proposal) is greater than \$13 million for 2025 alone – more than double Kern's estimate under the previous 5% stringency proposal. These single-year cost-to-comply estimates using current carbon credit prices should be seen as conservative, if not the minimum cost for Kern to comply. The agency's desired result from the layered stringencies in this regulatory action is to drive up the price of carbon, which leaves these compliance estimates nowhere to go but up. Kern expects to see these costs double again if/when the market responds to CARB's signal.

Kern urges CARB to continue consider giving consideration to small refineries for the disproportionate regulatory impact on these facilities and ways to alleviate that burden. As a smaller company operating a single facility, Kern is less able to absorb regulatory costs. Notably, reduced costs create opportunities to utilize funds for reinvestment in the facility and expanding a low-CI fuel portfolio – investments that are critical for Kern's long-term operation and success and critical to meeting the state's climate goals.

2. Restricting Feedstocks and New Pathways for Biomass-Based Diesel is Contrary to LCFS Program Goals

214.10

Staff proposes to add new subsection 95482(i) to “provide credits for biomass-based diesel produced from virgin soybean oil and canola oil for up to 20 percent of annual biomass-based diesel” and impose the carbon intensity of the applicable diesel pool benchmark to volumes of fuel produced from these feedstocks in excess of the limit. The presentation of this new subsection within the 15-day package as an opportunity to generate credits is disingenuous at best when what Staff is proposing is a cap on these feedstocks and the disincentive to produce lower CI renewable fuel. This proposal will handicap renewable fuel producers' abilities to diversify their feedstock portfolio, creating additional strain on already tight waste feedstock markets and prices and imposing unnecessary uncertainties of feedstock supply.

Kern has made significant and successive investments in its facility over the years to produce increasing amounts of renewable diesel. Waste feedstocks have become increasingly competitive to source, particularly those higher-quality feedstocks that can be processed without additional pre-treatment. These conditions are only expected to

214.10
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become more severe as additional renewable diesel production capacity comes online. Placing a limit on the amount of any given renewable feedstock could jeopardize Kern's ability to maintain production volumes of lower CI renewable diesel as tallow and waste fats/oil supply become impossible to source. Kern was encouraged during the April 2024 public workshop when Staff acknowledged that renewable and conventional liquid fuels will continue to play a key role in the state's transportation fuel mix for many more years, particularly in the medium and heavy-duty sectors and even as California expands to additional and newer energy sources. Kern acknowledges CARB's preference to prioritize waste feedstocks over food-based crop-derived feedstocks, but this proposal is another attempt at picking winners and losers rather than letting the market set the signal.

Kern has further concerns about specific dates incorporated in effectuating this restriction. Staff's inclusion of a grandfathering clause to allow producers a longer runway for processing the higher amounts of these two feedstocks could be helpful if it were not based on calendar year 2023, an operational period that has already passed, and one in which operators had no knowledge that such a standard would be based. Operators had no ability to control their destiny without knowledge this would be an important determining factor in their future operation. Additionally, the proposed January 1, 2028, implementation date for grandfathered facilities gives only a narrow window to adjust their feedstock portfolio and secure sufficient additional volumes to replace these restricted sources. This will create yet another period of intense competition for limited supply of waste oils/fats available again creating immense strain and competition in the market.

214.11

The 15-day package notes this proposed addition will allow California to displace up to 100% of current fossil diesel demand with cleaner alternative diesel. However, Staff is also proposing amendments to Subsection 95488(d) that would restrict the approval of new fuel pathways beyond 2031. These two provisions appear to be in direct conflict because no new pathways would ensure no lower CI fuels are added to the program to replace these existing soy and canola-based fuels. Even if the number of zero-emission vehicles (ZEVs) exceeds a given threshold, it is perverse and counterintuitive to omit consideration for new pathways with lower CIs that would otherwise replace existing pathways and fuel supplies for the remaining diesel engines continuing to travel California's highways and power the state's economy.

214.12

Again, this proposal to limit liquid renewable fuels is contrary to the agency's stated goals. CARB should let the market dictate demand for biomass-based fuels, which would naturally follow the actual progress of ZEV adoption rather than setting arbitrary dates around hopeful ambition. Kern believes the proposed addition of Subsection 95482(i) and amendments to Subsection 95488(d) should be eliminated from the final regulatory amendments. At a minimum, the 2023 performance year and 2028 grandfathered

214.12
cont. implementation dates should be pushed out three years to afford producers sufficient time to plan and react to such a significant change.

3. Support for Maintaining Fossil Jet Fuel Exemption

214.13 In Section 95482(a), Staff proposes to remove “Fossil Jet Fuel” from the list of transportation fuels applicable under the LCFS. Significant strides are being made in the production of sustainable aviation fuel (SAF), but the reality persists that supply is insufficient to meet demand, and fossil jet fuel still plays a significant role in providing for safe, affordable and reliable operation within the aviation sector. Kern supports and appreciates Staff’s decision to maintain jet fuel in the list of those fuels found within Section 95482(a) and specifically list fossil jet fuel as exempt in Section 95482(c). Kern is encouraged by Staff’s commitment to finding alternative ways to reduce emissions from the aviation sector.

4. Sunsetting Credit Generation for Hydrogen Restricts Space for Innovation

214.14 Staff proposes to add new subsection 95482(h) to remove LCFS credit generation eligibility for hydrogen produced using fossil gas as a feedstock, effective January 1, 2031. Kern opposes this addition and encourages CARB to take a comprehensive, inclusive approach to meeting the hydrogen needs of a clean energy future. CARB has consistently acknowledged the need and support for advanced technologies, and a broad portfolio of fuels to meet the state’s climate goals. While the projected operational timeline for projects funded under the hydrogen hubs grants may appear to support expanded hydrogen production in California, the elimination of a viable, immediately available option before these projects have been realized is short-sighted and again demonstrates a willingness to pick winners and losers.

The production of fossil hydrogen with carbon capture and/or other advanced technologies should be seen as a positive contribution to expanding the supply of low-carbon hydrogen in California, able to supplement production via steam electrolysis, biomass gasification, and steam methane reforming of biomethane. Kern does not utilize steam methane reformers to make hydrogen from fossil gas. Instead, Kern’s refining operation produces hydrogen as a byproduct from our gasoline production facilities. Currently combusted on-site as fuel gas in industrial heaters, Kern is actively working with innovative partners on an advanced technology that would capture this hydrogen for use in on-site fuel cells to produce electricity – that is, replacing electricity from cogeneration and the state’s grid with zero CI electricity produced on-site by effectively using this existing energy source. Further, use of this captured hydrogen would allow for the replacement of diesel-powered engines in fixed generators and mobile equipment with clean hydrogen-fueled internal combustion

214.14
cont.

engines or hydrogen-powered fuel cells, supporting the move to zero-emission applications in the heavy duty and industrial sectors.

CARB must remain open to a broad array of technologies and avoid adopting policies that stifle innovation. Imposing barriers and prohibitions to the mobilization of existing industry and infrastructure only serves to hamper the development of key solutions and discourage contributors focused on improving our shared climate improvement goals. Kern urges CARB to eliminate this new subsection before final approval of LCFS amendments.

5. Operational CI Fluctuations Should Not Result in Immediate Penalization

214.15

Staff proposes modifications to Subsection 95488.10(a)(7) that expand the scope and impose immediate penalties on a renewable fuel producer when the verified operational CI is found to be greater than the certified CI of a fuel pathway. Staff's initial proposal first introduced this concept to Tier 1/Tier 2 pathway holders, and now Staff proposes to expand this to producers who have been operating under a temporary pathway. Kern acknowledges that any incremental credits should be invalidated if an operational CI exceeds the certified CI. However, the additional imposition of deficits without regard or due process for determining the reason is premature and assumes noncompliance warranting penalty without merit or substantiation. Furthermore, the assignment of deficits equal to four times the number of incremental credits is arbitrary, excessive and again omits consideration for the reason behind any such increase. Valid operational fluctuations that occur within the fuel production process, such as catalyst degradation over time, variations in feedstock quality, unforeseen unit upsets, or similar occurrences, should not warrant additional deficits as they do not represent noncompliance.

Pathway holders are already encouraged to incorporate a margin of safety into the certified CIs by accepting a higher CI than demonstrated through CARB-accepted life cycle calculations. This proposed application of deficits will drive pathway holders to further increase this arbitrary margin to their CI to avoid these penalties, rendering them unable to recognize the full amount of climate benefit of a fuel – essentially leaving credits “on the table.” Kern encourages CARB to reject this addition and support the existing process of incremental credit invalidation, a root cause analysis to explain the difference, and enforcement only if warranted.

6. Temporary Pathway Credit True-up Provides Fair Treatment for New Fuel Production

214.16

Staff proposes to expand the credit true-up provisions in subsection 95488.10(b) to include periods using temporary pathway CIs after annual verification. Kern appreciates Staff's

214.16
cont.

consideration of stakeholder comments highlighting the benefits of the credit true-up of temporary fuel pathways by providing a mechanism to recover credits based on verified operational data. Temporary pathway CIs take a conservative approach by assigning a sufficiently high CI that operational CIs are expected to prove lower or even have a large variation. Kern applauds these efforts to streamline the application review process, alleviate business impacts associated with a delay in pathway certification and allow for recognition of the full amount of climate benefit of a fuel.

7. Sustainability Requirements are Overly Broad and Will Result in the Unintentional Exclusion of Forest and Agricultural Residues

214.17

Staff proposes to add details to the original proposal on biomass sustainability requirements, incorporating a phase-in approach to reduce deforestation and other land conversion risks. Kern respectfully requests CARB consider further amendments to avoid unnecessary and unintentional exclusion of forest waste that is collected from wildfire mitigation, forest restoration and public safety projects. The sustainability criteria for both forest and agricultural waste were developed to address concerns about purpose-grown crops would also eliminate many beneficial projects that use forest waste biomass and agricultural residues. Section 95488.9(g) was originally written to ensure the sustainability of crop-based fuels but has now been expanded to cover all waste biomass. The proposed requirements are not appropriate for agricultural or forest residues where the feedstock is a waste product, and the fuel producer has no control over the crop growing practices. For example, a fuel producer that uses almond shells or orchard prunings to produce fuel or electricity has no control over the pesticides or erosion control methods used by the farmer who is growing the crop or orchard. Applying the same standards to agricultural or forest residues as to purpose-grown crops will effectively close the door to fuels that could be produced from agricultural and forest residues. Kern encourages CARB to reconsider this proposal with a keener eye on these unintended consequences.

In conclusion, Kern appreciates CARB's consideration of Kern's comments. As always, Kern is committed to working with Staff throughout this regulatory process. Please do not hesitate to reach out to me at (661) 845-0761 with any questions.

Sincerely,



Melinda Palmer
VP – Regulatory & Public Affairs
Kern Energy

Comment Log Display

Here is the comment you selected to display.

Comment 215 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name

Last Name

SAF stakeholder grou

Email Address

emily.carlton@lanzajet.com

Affiliation

Subject

Aviation and the CA LCFS

Comment

Please find attached comments from a coalition of SAF producers and stakeholders including Advanced Biofuels Canada, Biotechnology Innovation Organization, Blue Arrow, California Ethanol and Power, Clean Fuels Alliance Comstock Fuels, Darling Ingredients, Green Plains, LanzaJet, LanzaTech, Montana Renewables, Raizen, the Renewable Fuels Association, SkyNRG, Sugar Valley Energy, and XCF Global Capital.

We appreciate the opportunity to comment. Please do not hesitate to reach out with any questions.

Attachment

www.arb.ca.gov/lists/com-attach/app-zip/7550-lcfs2024-WyhCAil9VWP1wm0d.zip

Original File Name

SAF Group Comments_ CARB 15 Day LCFS Proposal_2024.08.27_final.zip

Date and Time Comment Was Submitted

2024-08-27 18:28:34

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

27 August 2024

California Air Resources Board
1001 I Street
Sacramento, CA 95814

Submitted Electronically via <https://ww2.arb.ca.gov/lispub/comm/bclist.php>

Re: Proposed Low Carbon Fuel Standard Amendments

Dear Board Members,

Decarbonizing aviation remains one of the most important tasks to address the growing impact of fossil fuels and to support California's aspirations to be a leader in climate policies.

215.1

We, as a broad coalition of sustainable aviation fuel (SAF) producers and stakeholders committed to building a robust alternative jet fuel industry and to decarbonizing aviation, express our disappointment that the current proposed amendments fail to fulfil CARB's commitment to advance support for SAF. According to the broad aviation sector, one of the largest expected opportunities for the aviation industry to reduce emissions is by using SAF.¹ Governor Newsom has indicated a desire to support SAF,² including via the LCFS program³. We share those goals, and we desire to keep the dialogue open to find ways – either in this rulemaking or future opportunities – for California to develop supportive SAF policies.

CARB originally proposed to “eliminate the LCFS exemption for fossil jet fuel as to intrastate fossil jet fuel consumption” which would have partially supported the 2045 carbon-neutrality scenario of the 2022 Climate Scoping Plan.⁴ However, the current proposed modifications remove fossil jet fuel as an LCFS obligated fuel. This seemingly leaves California's transportation decarbonization programs fully focused on gasoline and diesel. The failure of California to address some of the structural challenges associated with production and supply of SAF into California makes this Scoping Plan scenario aspirational only and significantly less likely to be achievable.

As outlined in previous comments,⁵ achieving California's ambitious goals for the aviation sector will require addressing the structural disincentives for SAF embedded in the status quo. While SAF is eligible to receive credits under the LCFS,⁶ the lack of deficits on the fossil jet fuel side decreases the value of SAF as a replacement relative to renewable diesel, which replaces an obligated and therefore more costly fossil fuel. This structural disparity, illustrated by multiple third-party analyses, strongly and systematically incentivizes clean fuel producers to make renewable diesel rather than SAF.⁷ The result: in 2023, 2 billion gallons of renewable diesel were registered by the program but only 23 million gallons of SAF.⁸ It remains **unclear** what differences exist between aviation and on-road fuels that justify continuation of uneven supportive policies.

The proposed obligation on intrastate jet fuel is a moderate—but critically important—first step toward equalizing the regulatory regimes for aviation relative to other transport sectors. It is also an opportunity

¹ Waypoint 2050: Aviation: Benefits Beyond Borders (aviationbenefits.org)

² Governor Newsom Calls for Bold Actions to Move Faster Toward Climate Goals | Governor of California calling for 20% SAF target.

³ See <https://www.gov.ca.gov/wp-content/uploads/2022/09/AB-1322-VETO.pdf?emrc=7598b6>

⁴ See 2022 Scoping Plan Update (ca.gov) assuming SAF would represent 80% of aviation fuel in 2045.

⁵ See <https://www.arb.ca.gov/lists/com-attach/7031-lcfs2024-Wyh01A3Ag5RMAV3.zip>

⁶ We applaud CARB's harmonization of the annual CI standards for diesel and jet fuel following the 2018 Rulemaking. This preserves credit generation opportunities for SAF and reduces some of the structural differences that would otherwise disincentivize SAF production compared to diesel, though significant disincentives remain.

⁷ See Bay Area Air Quality Management District (BAAQMD), Sustainable Aviation Fuel: Greenhouse Gas Reductions from Bay Area Commercial Aircraft. October 2020. Page 56 available at <https://www.baaqmd.gov/news-and-events/page-resources/2020-news/121120-saf-report>. See also <https://stillwaterassociates.com/saf-in-the-ira-era-how-do-the-incentives-stack-up/>.

⁸ CARB Data Dashboard available at <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>

for California to demonstrate its continued leadership in addressing the carbon emissions from transportation fuel. **We are disappointed that California seems ready to cede that leadership opportunity as to aviation.**

215.1
cont.

Staff received comments questioning the financial impact that an obligation on fossil jet fuel would have on airlines and airline customers. At least one commenter—researchers from UC Berkeley—directly analyzed the **magnitude** of those impacts on both fuel cost and demand for aviation. They found the compliance costs to be a mere \$0.68 per intrastate gallon in 2035—just \$0.06 per gallon if the costs are spread across the entire jet fuel pool, as we expect they would be.⁹ They also found that domestic aviation demand would shift only -0.2% as a result. We submit additional information for the record prepared by ICF confirming the Berkeley findings: they show the compliance costs to range from \$0.54-\$0.79 per gallon if concentrated on intrastate gallons, or just \$0.05-0.08 per gallon if spread across the jet fuel pool.¹⁰ These impacts are minimal, and, importantly, when spread across all jet fuel would have identical impacts on all carriers in California. These compliance costs are also both modest and predictable compared to historic volatility of jet fuel prices, which have ranged from below \$1 to over \$5 per gallon in California since 2000. Ultimately, this burden is far lighter than the compliance costs associated with the existing (and proposed to be increasingly stringent) obligations on gasoline and diesel, as they would apply to only a small fraction of the jet fuel pool.

Declining to address emissions from fossil jet fuel in this Rulemaking would also fail to address concerns of California’s environmental justice communities, who have explicitly asked CARB to support displacement of fossil jet fuel with SAF. Not finalizing obligations on fossil jet fuel prevents disadvantaged Californians from realizing the substantial air quality benefits (i.e., reductions of NO_x, PM 2.5, and SO_x) provided by SAF.

If CARB does not finalize an obligation on fossil jet fuel, it should modify the CI benchmark for jet fuel to avoid any unnecessary and unintended negative signals on SAF as an opt-in credit generating fuel. In the proposal, CARB accurately recognizes the continued growth in low-carbon fuels for on-road transportation and, in response to the same, has proposed increases in the near-term carbon intensity benchmarks. Such growth of alternative fuels – in both supply and demand – is largely attributable to the success of the LCFS program in addressing the carbon intensity of gasoline and diesel fuel: while an increasing CI reduction target reduces credit generation for low carbon fuels, it simultaneously increases deficits for obligated fuels. However, without a fossil jet fuel obligation, the increased stringency merely reduces credit generation opportunities for SAF, steadily decreasing its competitiveness with fossil jet fuel.

To illustrate, consider a hypothetical SAF with a carbon intensity of 43 gCO₂e/MJ. In 2035, under existing carbon intensity benchmarks that SAF would receive 0.0047 credits per gallon (~\$0.47/gal assuming credit price of \$100/tonne). But under the proposed benchmarks—even without Automatic Acceleration Mechanism (AAM) triggers—the same SAF would receive only 0.0009 credits (~\$0.09/gal) in the same year. Absent corresponding deficits, fossil jet fuel would remain cheap and abundant, and SAF adoption would decrease. A declining benchmark without corresponding obligations clearly and increasingly disadvantages adoption of opt-in alternatives over time.

For most low-carbon alternative fuels, production remains more expensive than the incumbent fossil alternative. Fundamentally, not obligating traditional fossil fuels ensures that they remain inexpensive relative to low carbon alternatives. Rational fuel users will choose the less expensive option, and even fuel users who want to advance low carbon options will be undercut. This puts a strong chilling effect on the rate of adoption of opt-in fuels.

215.2

To ensure that CARB’s current proposal does not exacerbate structural disincentives to SAF under the LCFS program, we suggest a modest step that would remove the applicability of the AAM to the table of annual

⁹ As fuel suppliers cannot identify ex ante which gallons of jet fuel sold will be used for intrastate flights, we anticipate that they would simply apply a small additional premium to all gallons to recover the compliance costs associated to the estimated intrastate fraction.

¹⁰ See ICF Report, Sustainable Aviation Fuel in California’s Low Carbon Fuel Standard, August 2024 (attached)

215.2
cont.

jet fuel benchmarks. The AAM applied to the gasoline and diesel benchmarks can act to control the credit supply by both reducing credit generation for alternative fuels and increasing deficits for fossil fuels. However, without any obligations on fossil jet fuel, the AAM would only undercut support for SAF without creating any corresponding demand.

215.3

In conjunction, we propose that CARB set the jet fuel benchmarks at a level and on a schedule that recognizes that SAF is an emerging, less mature market that has not benefited from higher fossil benchmarks and years of credit generation since program inception in 2010. In the early years of the LCFS program, CARB set small CI reduction targets for gasoline and diesel and modest annual increases to allow the industry (both fossil and alternative) time to complete their investments and ramp up production. CARB can evaluate the jet fuel benchmarks and set them in such a way that supports SAF as an emerging fuel and addresses airline industry concerns about the transition towards increasing low-carbon fuel use. This could include freezing the jet fuel benchmarks, resetting the 2030 jet fuel benchmark targets to their pre-amendment level of 20%, or decoupling the annual increases of the jet fuel benchmarks from those of gasoline or diesel. Notably, British Columbia has adopted a similar approach under their recent LCFS amendments, providing both a higher benchmark and a less aggressive compliance curve for aviation fuels, preserving credit generation opportunities for the emerging SAF industry.

215.4

We are committed to the success of SAF. To achieve that ultimate success, we rely on the cooperation and policy support from California. We provide these comments in hopes to further encourage the Board to do more than offer an unspecified commitment “to finding effective ways to reduce emissions from the aviation sector through the production and use of cleaner aviation fuels and other low-carbon alternatives to fossil jet fuel.” We look forward to the opportunity to continue to engage and inform the current modifications – or to support future efforts – to support decarbonization of jet fuel in California.

Sincerely,



Clean Fuels
ALLIANCE AMERICA

comstock
FUELS



August 2024

ICF Report



Sustainable Aviation Fuel in California's Low Carbon Fuel Standard

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Executive Summary

The pressure for airlines to reduce GHG emissions from passengers, investors, governments, and society has increased in recent years. In December 2023, the California Air Resources Board (CARB) published its Staff Report related to regulatory amendments to California's Low Carbon Fuel Standard (CA LCFS) program, which included a proposal to regulate *intrastate* jet fuel for the first time. During regulatory amendments in 2018, CARB proposed and ultimately approved the opportunity for renewable jet fuel or sustainable aviation fuel (SAF) to generate credits in the LCFS program; however, there was no action at that time to regulate its conventional counterparts.

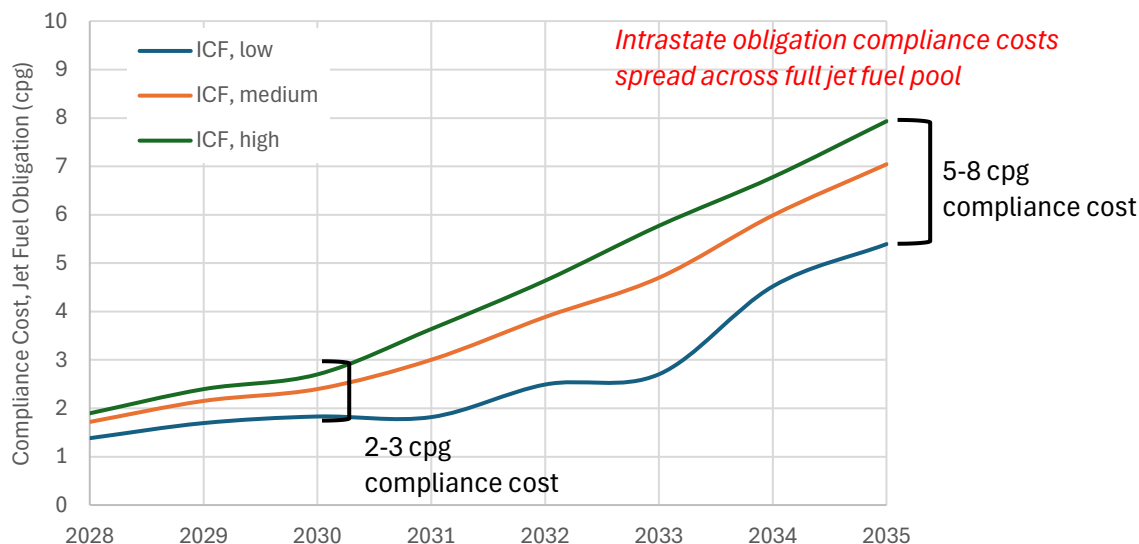
ICF evaluated the potential the compliance costs (in cents per gallon, cpg) associated with regulating intrastate jet fuel and the opportunity for SAF in the California LCFS market in the context of other SAF production incentives and its competitive positioning with respect to another drop-in fuel, renewable diesel.

Jet Fuel Compliance Costs

ICF Conclusion 1: ICF estimates that the potential jet fuel compliance costs associated with an intrastate jet fuel obligation will increase from around 1-2 cpg in 2028 and increase to 5-8 cpg over the period of the analysis to 2035.

ICF's analysis is summarized in the figure below.

ICF Analysis of Jet Fuel Compliance Costs in the CA LCFS w/ Intrastate Jet Fuel Obligation



For the sake of reference, intrastate flights burn jet fuel at a rate of about 1.8 gallons per mile traveled. Considering the flight distance between Sacramento (SMF) and Los Angeles (LAX) is about 375 miles, the implied compliance cost in 2035 is \$36 to \$54 per flight. ICF assumes that airlines would distribute these costs across both passengers and cargo according to their pricing algorithms, which presumably include customer willingness and ability to pay.

SAF vs RD: Value Stack Differential

ICF Conclusion 2: The value stack differential between SAF and renewable diesel will persist and constrain the opportunity for SAF deployment unless the incentive structure is rebalanced e.g., by including jet fuel in broader decarbonizing policies and via additional state tax incentives.

ICF Conclusion 3: An intrastate jet fuel obligation under the LCFS could help narrow the incentive gap between SAF and renewable diesel and may help shift low carbon fuel producers toward SAF production.

Hydroprocessed esters and fatty acids (HEFA), whereby waste oils and fats, such as used cooking oil and inedible animal fats, are converted into jet fuel, remains the most common pathway for SAF production today, with several emerging competitive SAF production pathways e.g., via alcohol-to-jet (AtJ) processing and Fischer-Tropsch (FT) pathways. SAF production via HEFA and AtJ pathways will compete directly with renewable diesel for investment and for incentive dollars—because these same technologies and facilities produce both renewable diesel and SAF, the incentive gap between the fuels will have a material impact on strategic decision making by producers. Minor production cost differences between SAF production pathways notwithstanding, the incentive value stack is the key factor driving disproportionate supply of renewable diesel and SAF.

The table below shows the incentives available for each fuel when delivered to the California market. ICF made several assumptions to develop these values as outlined in more detail in Section 5 of the report. ICF conducted the analysis for 2025, when the Blender's Tax Credit expires and the market transitions to the Clean Fuel Production Credit (Section 45Z of the Inflation Reduction Act).

Value Stack for SAF vs Renewable diesel in 2025 *without intrastate obligation on jet fuel*

Value Stack Component	Value to SAF \$/gal	Value to RD \$/gal	Assumptions
Commodity	\$2.42	\$2.49	June 2024 average
<i>Federal Incentives</i>			
IRA (45Z)	\$0.64	\$0.37	Assuming 30 g/MJ
RFS	\$0.80	\$0.85	\$0.50 D4 RIN
<i>State</i>			
Low carbon fuel standards	\$0.33	\$0.34	\$50/t, 9% CI stepdown
<i>Carbon compliance costs</i>			
Cap-at-Rack	--	\$0.41	\$40 CCA
LCFS compliance cost	--	\$0.16	\$50/t, 9% CI stepdown
TOTAL	\$4.19	\$4.62	

The key difference between the value stacks is linked to the carbon compliance costs shown in the table above. These are the compliance costs that refiners face because of the carbon constraining programs in California—including the LCFS program and the cap-and-trade program.

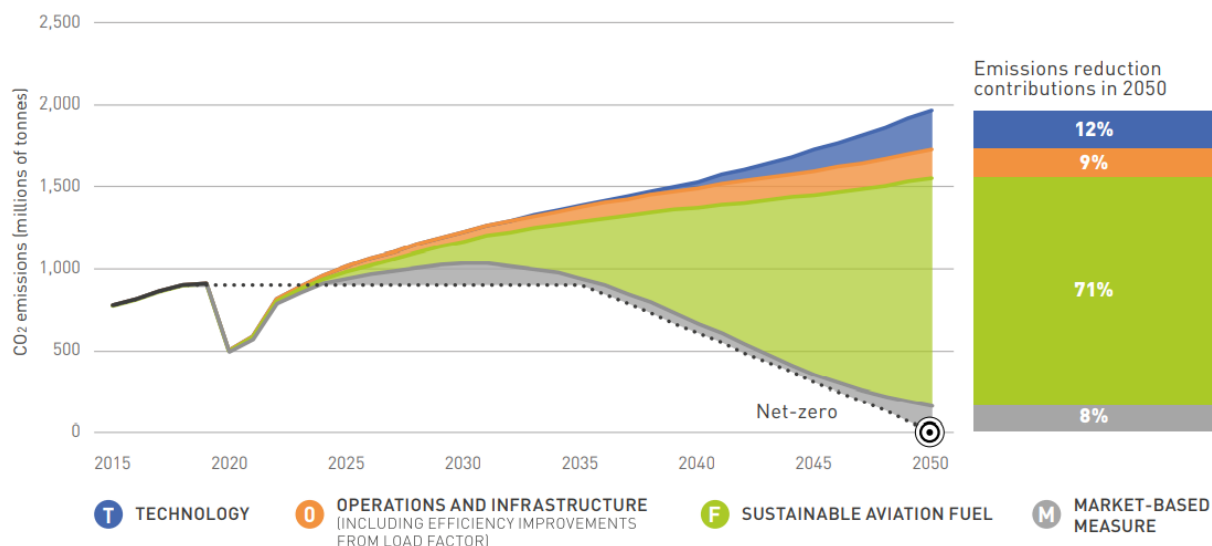
1 Introduction

In December 2023, the California Air Resources Board (CARB) published its Staff Report related to regulatory amendments to California's Low Carbon Fuel Standard (CA LCFS) program. The CA LCFS program is one of the main drivers for transportation decarbonization in California, and complements other regulations focused on GHG emission reductions economy-wide (e.g., cap-and-trade) and on the vehicle side of transportation (e.g., Advanced Clean Cars). There was a significant non-road aspect of the Staff Report: CARB has proposed to regulate *intrastate* jet fuel for the first time. During regulatory amendments in 2018, CARB proposed and ultimately approved the opportunity for renewable jet fuel or sustainable aviation fuel (SAF) to generate credits in the LCFS program; however, there was no action at that time to regulate its conventional counterparts.

In the following sections, ICF evaluates the potential compliance costs associated with regulating intrastate jet fuel. ICF also evaluated the opportunity for SAF in the California LCFS market in the context of other SAF production incentives and its competitive positioning with respect to another drop-in fuel, renewable diesel. First, we provide a brief overview of the role of SAF in the context of decarbonizing the aviation sector, and summarize the various incentives available to SAF producers, especially via the Inflation Reduction Act.

2 Decarbonizing the Aviation Sector

The pressure for airlines to reduce GHG emissions from passengers, investors, governments, and society has increased in recent years. It is widely recognized that a basket of four key measures is required for achieving aviation decarbonization by 2050: New technology aircraft, operational improvements, offsets, and sustainable aviation fuels. Considering the energy intensity of medium to long haul flights, and the need for liquid hydrocarbons to meet the energy requirements, SAF is considered as the most important technology to support aviation decarbonization.

Figure 1. Expected Emissions Reductions in Aviation Industry by Reduction Source¹

The aviation industry has considerable ambitions for SAF as a crucial method to decarbonize the sector, in parallel with aircraft and engine technology development and operational efficiencies. The Air Transport Action Group (ATAG) Waypoint report² suggests that up to 390 million tons per year of SAF will be required globally to meet the industry's target of a 50% carbon emissions reduction from 2005 levels by 2050, and over 450 million tons per year to achieve net zero carbon emissions in the same period.

SAF production

Existing SAF production is generally produced via hydroprocessed esters and fatty acids (HEFA), whereby waste oils and fats, such as used cooking oil and inedible animal fats, are converted into jet fuel. This conversion process is cheap, well proven, and is also extensively used to produce renewable diesel. These facilities tend to be large, with typical capacities of 50–500 million gallons per year (MGPY). There are other emerging pathways e.g., via alcohol-to-jet (AtJ) processing and Fischer-Tropsch (FT) pathways. These pathways can convert municipal waste, woody biomass, agricultural residues, industry waste gases, etc. into jet fuel and renewable diesel. Several facilities are under construction. These facilities are more complex and costly, but their feedstock can be cheaper. Compared to existing HEFA facilities, they are less sensitive to feedstock prices, have fewer constraints on feedstock availability, but use less proven technology. The initial facilities are expensive, but the cost is expected to rapidly decrease as the technology is improved.

¹ ATAG Waypoint 2050 Report, scenario 2

² *Ibid.*

3 Incentivizing SAF

There is an interesting dynamic emerging with respect to incentivizing SAF, in large part because it is more expensive than its conventional counterpart and because it is significantly disincentivized as compared to diesel substitutes like renewable diesel, in part as a result of the existing exemption for jet fuel under existing regulations like Cap-and-Trade and the LCFS program. To overcome these obstacles and expand SAF consumption, additional policy support will be necessary e.g., via additional incentives or regulatory intervention that helps to level the obligation across refined products, including gasoline, diesel, and jet fuel.

The current incentive-only domestic regulatory structure includes several components (see Table 1), including via the Inflation Reduction Act (IRA) from 2022, the federal Renewable Fuel Standard (RFS), state-level programs like the California LCFS, Oregon Clean Fuels Program (OR CFP), and Washington's Clean Fuel Standard (WA CFS), and state-level tax incentives.

Table 1. SAF Incentives and Renewable Diesel

Incentive	Description	
Federal	Sustainable Aviation Fuel (SAF)	Renewable Diesel (RD)
Biodiesel Mixture Excise Credit Blenders Tax Credit (BTC)	<ul style="list-style-type: none"> SAF is not eligible for the Biodiesel BTC. 	<ul style="list-style-type: none"> RD is eligible for a tax incentive up to \$1.00 per gallon blended with petroleum diesel.
Inflation Reduction Act 2022	<ul style="list-style-type: none"> For 2023–2024, the SAF Blender's Tax Credit (Section 40b) offers \$1.25 per gallon for producers achieving a GHG emission reduction of at least 50% compared to petroleum-based jet fuel. Producers will receive an additional \$0.01 per percentage reduction over the 50% requirement, with a maximum benefit of \$1.75 per gallon. For 2025–2027, the Clean Fuels Production Credit (CFPC, Section 45z) will go into effect and provides a per gallon incentive for SAF with lifecycle GHG emissions reductions less than 50 kgCO_{2e}/mmBtu. If wage and apprenticeship requirements are met, the base value is \$1.75 per gallon of SAF multiplied by the percent reduction below the 50 kgCO_{2e}/mmBtu threshold. 	<ul style="list-style-type: none"> For 2025–2027, the Clean Fuels Production Credit (CFPC, Section 45z) will go into effect and provides a per gallon incentive for RD with lifecycle GHG emissions reductions less than 50 kgCO_{2e}/mmBtu. If wage and apprenticeship requirements are met, the base value is \$1.00 per gallon multiplied by the percent reduction below the 50 kgCO_{2e}/mmBtu threshold.

Incentive	Description	
Renewable Fuel Standard <ul style="list-style-type: none"> The federal RFS requires volumetric blending of renewable fuels and SAF is eligible to contribute towards compliance by generating Renewable Identification Numbers (RINs) i.e., the currency through which compliance is achieved. RINs are reported as ethanol gallon equivalents 	<ul style="list-style-type: none"> SAF is eligible to generate D3, D4, D5, D6, and D7 RINs depending on the feedstock, conversion technology, and product SAF has a 1.6 multiplier for RINs after adjusting for the energy density of the fuel compared to ethanol. 	<ul style="list-style-type: none"> RD is eligible to generate D3, D4, D5, D6, and D7 RINs depending on the feedstock, conversion technology, and product RD has a 1.7 multiplier for RINs after adjusting for the energy density of the fuel compared to ethanol.
State		
Low carbon fuel standards <ul style="list-style-type: none"> Low carbon fuel standards in California, Oregon, and Washington establish carbon intensity benchmarks against which the transportation fuel market must achieve aggregate GHG emissions reductions each year. 	<ul style="list-style-type: none"> SAF is an opt-in fuel for these programs and generates credits depending on the CI of the fuel and the benchmark in any given year. However, petroleum jet fuel is not regulated in any of these programs today. California has proposed to regulate intrastate jet fuel. 	<ul style="list-style-type: none"> RD is an opt-in fuel for these programs and generates credits depending on the CI of the fuel and the benchmark in any given year. Petroleum diesel is regulated in these programs uniformly; because of this, the value generated by RD in the program includes what are often referred to as "avoided deficits" i.e., by displacing petroleum diesel with RD, credits are generated, and deficits are also avoided by displacing petroleum diesel.

4 Compliance Costs

With a focus on accelerating decarbonization of aviation fuels in line with deep greenhouse gas (GHG) emission reductions called for in AB 1279 and the 2022 Scoping Plan Update, and to incentivize SAF production further, CARB staff proposed to eliminate the exemption to *intrastate* jet fuel starting in 2028. The exemption would be lifted for "flights that take off and land within the State of California." As one might expect with any regulatory amendment, questions have been raised regarding the associated compliance costs.

With this context, we express our serious concern with a new proposal by the California Air Resources Board (CARB) to regulate jet fuel as an obligated fuel under the LCFS Program. CARB's proposed changes to the LCFS program include a proposal to eliminate the existing exemption for conventional jet fuel use for flights within the state of California. This proposed change is unlikely to

result in increased SAF production, availability, or use in California, but would lead to higher jet fuel prices.³

ICF notes two things with respect to this commentary: 1) higher jet fuel prices will inherently lead to improved SAF production economics by narrowing the subsidy needed and 2) these comments are silent on the magnitude of the impact on jet fuel prices. With regard to the former, ICF takes up the issue of the incentive gap for SAF relative to renewable diesel in the next section. With regard to the latter, ICF has quantified the likely impact on jet fuel prices by making a simple assumption: Regulated parties (i.e., refiners) will pass through the compliance costs entirely to end users (e.g., airlines), and that those end users would ultimately pass along any compliance costs to consumers (i.e., airline passengers). In other words, ICF is simplifying the consideration of consumer costs by assuming that they are equal to compliance costs, though there is nothing in the LCFS program or other regulation that requires compliance costs to be passed through as consumer costs.

ICF also assumes that the compliance cost associated with regulated intrastate jet fuel would get spread over the entirety of the jet fuel pool in California, rather than exclusively on intrastate jet fuel. To our understanding, there is no clear method by which jet fuel suppliers or jet fuel users would be able to distinguish at the point of sale between regulated and exempted gallons—therefore it is likely that the transaction will likely include a line item for LCFS compliance cost as is customary for gasoline and diesel transactions.

ICF's assumption is backed in large part by the existing treatment of compliance costs and consumer costs in the diesel market in California. Although the "diesel pool" includes conventional ultra-low sulfur diesel (ULSD), renewable diesel, and biodiesel, the LCFS compliance cost is spread over each blended gallon sold statewide as a consumer cost; there is not a separate cost allocated to specific gallons based on their regulatory status. A similar convention has evolved in the gasoline pool, in which ethanol (a low carbon fuel) is blended with gasoline.⁴ The compliance costs on the gasoline portion of the blend are spread over the entire gallon of fuel and passed on as consumer costs. These examples demonstrate the impracticality of distinguishing between aspects of the fuel pool with respect to characterizing compliance costs (and how they become consumer costs). ICF expects a similar convention will emerge for intrastate jet fuel when it is regulated in 2028.

ICF developed estimated compliance costs for obligated jet fuel in several different cases. More specifically:

- ICF assumed that the jet fuel obligation begins in 2028, as proposed.
- ICF used our own internal LCFS credit price forecasting to characterize the potential compliance cost impacts on jet fuel associated with CARB's proposed elimination of the exemption for intrastate jet fuel. ICF used three different credit price cases in the analysis, with

³ See comments submitted by Airlines for America, Alaska Airlines, American Airlines, the San Francisco Chamber of Commerce, and Southwest Airlines.

⁴ More specifically, as California Reformulated Blendstock for Oxygenate Blending (CARBOB).

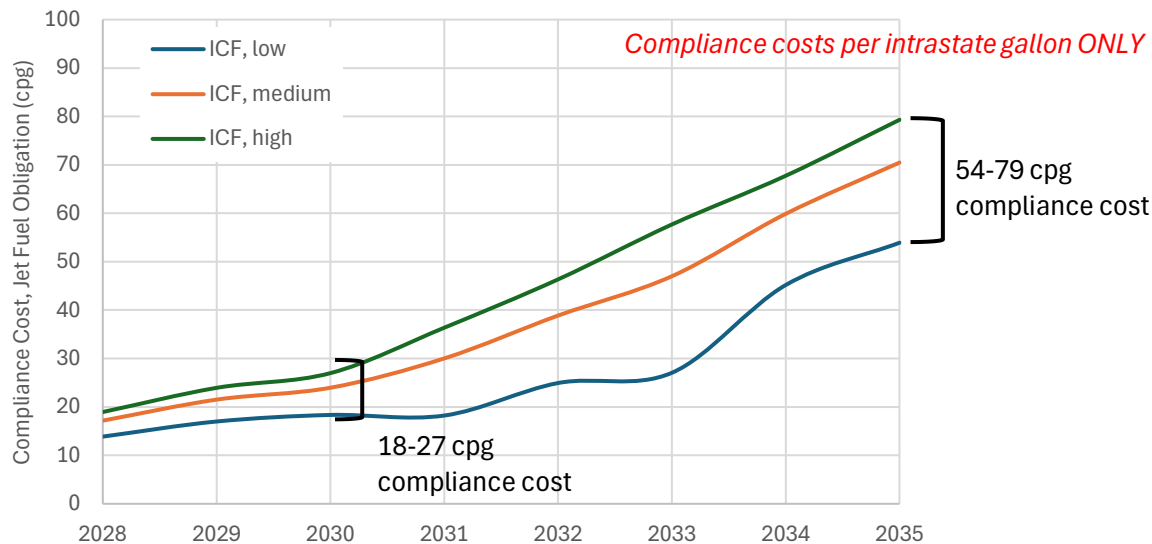
changes to assumptions regarding a) the carbon intensity (CI) step down in 2025 and b) the Automatic Acceleration Mechanism (AAM), with a focus on when it can be triggered, and how it is triggered (see table below).

Credit price case	Description
Low	<ul style="list-style-type: none"> Aligned with Staff Report from December 2023. 5% CI step down in 2030 AAM available for trigger earliest Jan 1, 2028
Medium	<ul style="list-style-type: none"> Modified case with 9% CI step down in 2030 AAM available for trigger earliest Jan 1, 2028
High	<ul style="list-style-type: none"> Modified case using ICF analysis with a 10.5% CI step down in 2025 More sensitive AAM and trigger sooner (2026, if needed)

- As noted above, the compliance cost is most likely to be spread across the entire jet fuel pool as the obligation on intrastate jet fuel comes into effect. However, for the sake of comparison, ICF has included an analysis of the compliance costs if they were concentrated on just intrastate jet fuel, which is estimated to be about 10% of the jet fuel pool.
- Accordingly, for the sake of simplicity, ICF has assumed that intrastate jet fuel that will be regulated is a constant 10% of the total jet fuel in California.

Figure 2 below shows ICF estimates for the compliance costs based on *per gallon of intrastate jet fuel* and shown in units of cents per gallon (cpg) on the y-axis. As a reminder, this implies the unlikely situation in which there will be a convoluted accounting scheme whereby sellers are able to apply the compliance costs exclusively to the obligated intrastate jet fuel gallons. ICF notes that the prices are shown in nominal terms.

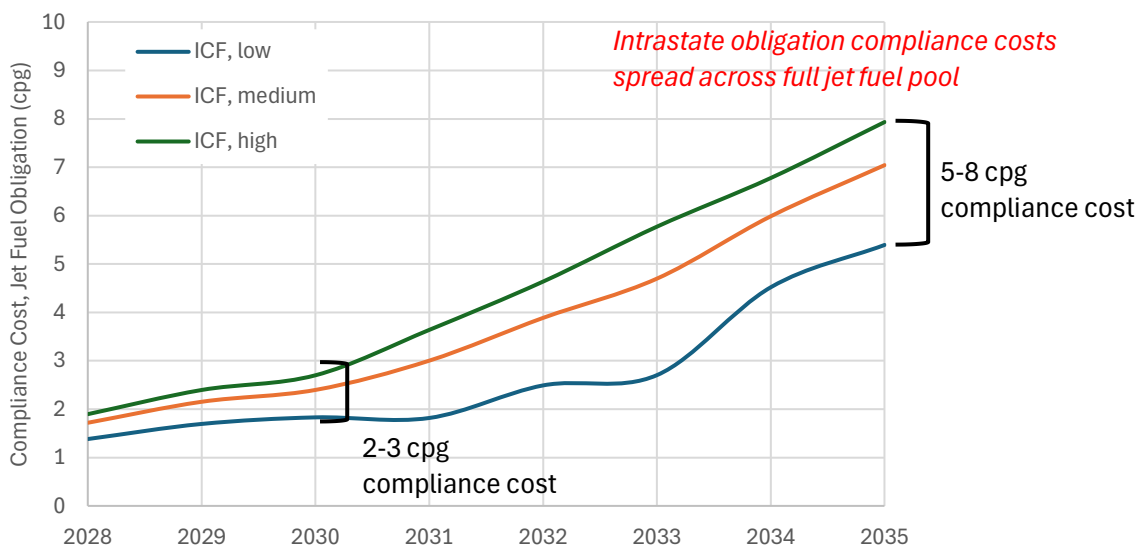
Figure 2. ICF Analysis of Jet Fuel Compliance Costs for Intrastate Gallons ONLY in the CA LCFS



This unlikely scenario yields compliance costs of 18–27 cpg in 2030 for intrastate gallons and 54–79 cpg for intrastate gallons using ICF's LCFS credit pricing forecasts. Furthermore, in this unlikely scenario, there would be no compliance cost on jet fuel for non-intrastate gallons. ICF notes that the compliance costs shown in Figure 2 are consistent with the expected compliance costs for diesel fuel moving forward.

Figure 3 below shows ICF estimates for the compliance costs associated with regulating intrastate jet fuel from 2028 to 2035 (noting that all prices are shown in nominal terms).

Figure 3. ICF Analysis of Jet Fuel Compliance Costs in the CA LCFS w/ Intrastate Jet Fuel Obligation



ICF estimates that the potential jet fuel compliance costs will increase from around 1–2 cpg in 2028 and increase to 5–8 cpg over the period of the analysis to 2035. For the sake of reference, intrastate flights burn jet fuel at a rate of about 1.8 gallons per mile traveled. Considering the flight distance between Sacramento (SMF) and Los Angeles (LAX) is about 375 miles, the implied compliance cost in 2035 is \$36 to \$54 per flight. ICF assumes that airlines would distribute these costs across both passengers and cargo according to their pricing algorithms, which presumably include customer willingness and ability to pay.

5 Value Stack: Renewable Diesel vs SAF

As noted previously, HEFA remains the most common pathway for SAF production today, with several emerging competitive SAF production pathways e.g., via AtJ or FT processing in the market. SAF production via HEFA pathways will compete directly with renewable diesel for investment and for incentive dollars—because these same technologies and facilities produce both renewable diesel and SAF, the incentive gap between the fuels will have a material impact on strategic decision making by producers. There are differing views on the production costs associated with renewable diesel and SAF production; and any production cost difference across technologies is minor. Minor production cost differences notwithstanding, the incentive value stack is the key

factor driving disproportionate supply of renewable diesel and SAF. We focus here on the California LCFS market.

The table below shows the incentives available to each fuel, drawing from the information presented in Table 1 above. ICF made several assumptions to develop these values. ICF conducted the analysis for 2025, when the Blender's Tax Credit expires and the market transitions to the CFPC for SAF and renewable diesel. ICF assumed a CI value of 30 g/MJ for both the CFPC calculation and the LCFS value calculation—we note, however, that it is highly unlikely that a fuel will have the same CI value across these two programs given the differences between the 40B SAF GREET model and the CA-GREET model. The table below includes other assumptions made in ICF's analysis.

Table 2. Value Stack for SAF vs Renewable diesel in 2025 without intrastate obligation on jet fuel

Value Stack Component	Value to SAF \$/gal	Value to RD \$/gal	Assumptions
Commodity	\$2.42	\$2.49	June 2024 average ⁵
<i>Federal Incentives</i>			
IRA (45Z)	\$0.64	\$0.37	Assuming 30 g/MJ
RFS	\$0.80	\$0.85	\$0.50 D4 RIN
<i>State</i>			
Low carbon fuel standards	\$0.33	\$0.34	\$50/t, 9% CI stepdown
<i>Carbon compliance costs</i>			
Cap-at-Rack	--	\$0.41	\$40 CCA
LCFS compliance cost	--	\$0.16	\$50/t, 9% CI stepdown
TOTAL	\$4.19	\$4.62	

The key difference between the value stacks is linked to the carbon compliance costs shown in the table above. These are the compliance costs that refiners face because of the carbon constraining programs in California—including the LCFS program and the cap-and-trade program. Renewable diesel producers, providing a drop-in substitute for diesel, have been able to capture these “avoided compliance costs” as part of their revenue streams.⁶ Other blended biofuels, like biodiesel and ethanol, lack the same substitutability as renewable diesel and with physical blending limits have been unable to command this premium in the market. It is unclear the extent to which SAF will be able to capture the avoided carbon costs in the LCFS program—but because jet fuel is not regulated via California's cap-and-trade, it most certainly will not capture any cap at the rack benefit shown for renewable diesel. An intrastate jet fuel obligation under the LCFS could

⁵ The commodity price listed for SAF is ICF's analysis of daily Argus LA Spot for jet fuel. The commodity price listed for renewable diesel is the Ultra-Low Sulfur No. 2 Diesel Fuel price reported by the EIA for Los Angeles posted [here](#).

⁶ There is emerging evidence that renewable diesel providers are and will continue to have to discount their pricing via this carbon compliance costs to maintain competitiveness.

help narrow the incentive gap between SAF and RD; however, it cannot do so fully. Regardless, any narrowing of the incentive gap may help shift low carbon fuel producers toward SAF production.

Spot prices and environmental commodity pricing will vary in California, the CI values will vary by feedstock, and the IRA incentives for SAF will be finalized soon. However, this view of the SAF–RD differential highlights a nearly 43 cent per gallon premium for renewable diesel, which will increase over time as compliance costs on diesel increase but remain at zero for jet fuel. ***This value stack differential will likely continue to constrain the opportunity for SAF deployment unless the incentive structure is rebalanced e.g., by including jet fuel in broader decarbonizing policies and via additional state tax incentives.***




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About ICF

ICF (NASDAQ:ICFI) is a global consulting services company with approximately 9,000 full-time and part-time employees, but we are not your typical consultants. At ICF, business analysts and policy specialists work together with digital strategists, data scientists and creatives. We combine unmatched industry expertise with cutting-edge engagement capabilities to help organizations solve their most complex challenges. Since 1969, public and private sector clients have worked with ICF to navigate change and shape the future.

August 27, 2024

Chair Liane Randolph and Board Members
California Air Resources Board
1001 I Street
P.O. Box 2815
Sacramento, CA 95812

Re: Proposed 15-day Change Amendments to the Low Carbon Fuel Standard Regulation

Submitted to <https://ww2.arb.ca.gov/applications/public-comments>

Dear Chair Randolph and Honorable Board Members:

Thank you for the opportunity to comment on ARB's Proposed 15-Day Changes to the proposed amendments. ChargePoint appreciates the ongoing work of the California Air Resources Board (ARB) Staff to manage and amend the LCFS to help advance investment in low carbon fuels and infrastructure in California. While we do have specific concerns with how the Proposed 15-Day Changes treats verification of on-road EV charging, we otherwise support the package and appreciate ARB's ongoing work on this important policy. The LCFS has been and remains an important tool for decarbonization, and we applaud the ARB for continuing to hone this important policy.

About ChargePoint

Since 2007, ChargePoint has been committed to making it easy for businesses and drivers to go electric with one of the largest electric vehicle (EV) charging networks and a comprehensive portfolio of charging solutions. ChargePoint's cloud subscription platform and software defined charging hardware is designed internally and includes options for every charging scenario from home and multifamily to workplace, parking, hospitality, retail, corridor, and fleets of all kinds.

Summary

- Provide an alternative path for verification of Quarterly Fuel Transaction Reports (QFTRs) for on-road EV charging that: 1) relies on third-party certifications to ensure accurate metering and 2) uses a desktop review to verify reporting without requiring site visits
- Recommend re-classifying all multi-family chargers as non-residential, regardless of parking space designation.
- Recommend strengthening Automatic Acceleration Mechanism (AAM) and allowing earlier implementation.
- Strongly support ARB's proposed changes to the heavy-duty FCI pathway
- Strongly support CARB's decision to increase the near-term step-down to 9% starting in 2025 and the discretion given to the Executive Officer to make future changes to supply eligibility, but share concerns of others that these amendments alone may not address the more fundamental problem of oversupply

Verification of on-road EV charging

The 15-day changes continue to impose a verification process designed for liquid/gaseous fuels to EV charging. ChargePoint has had several meetings with ARB staff over the summer during which we have discussed the shortcomings of relying on the current approach without considering how different a use case EV charging is and implored staff to allow for an alternative process that recognizes several key differences between EV chargers and other kinds of fuels. Most notably, we have discussed with staff that a verification process for EV charging does not benefit from site visits or re-calibration requirements, and how removing these from the proposal and allowing an alternative, desktop-based approach, would prevent significant and unnecessary costs being borne onto the industry. We cannot stress this enough.

Fuel supplied in the form of electricity takes a fundamentally different path from production to use than conventional liquid fuels. Liquid fuels originate from a set of relatively few, large sources, which produce and deliver large quantities of fuel in California that can be tracked with metering at the production sources. By contrast, electricity is produced from a distributed set of grid-connected resources and only becomes a transportation fuel when dispensed via a charging station. The relevant metering that records electricity used for transportation is therefore not restricted to a set of large facilities but is instead spread across hundreds of thousands of individual charging stations spanning the state.

To reflect the fundamental differences in fuel supply dynamics and efficiently provide reasonable certainty about volumes reported in quarterly fuel transaction reports (QFTRs), ARB should provide an alternative set of verification requirements for EV charging reporting that considers the differing risks and realities of EV charging, while at the same time leverages existing industry standards. This alternative does not need to completely replace the existing verification structure for EV charging QFTRs but can serve as another verification option for reporting entities. For the alternative verification path, we recommend that ARB:

- 1) *Leverage existing industry certifications to establish charging meter accuracy, which also removes any calibration requirements.*

The fundamental purpose of verification is to confirm that claims of electricity reported matches the amount of fuel that has actually been dispensed. For liquid fuels, tampering with a flow meter may lead to misreports of actual fuel dispensed. By contrast, the embedded meters within EV chargers are regulated by state and national specification programs that provide assurances that the meter accuracy data generated directly by chargers.

The California Type Evaluation Program (CTEP) and the National Type Evaluation Program (NTEP) both provide accuracy certifications for metering in EV charging products. The certification thresholds for accuracy are derived from the California Code of Regulations¹ and the National Institute of Standards and Technology (NIST) Handbook 44, which

¹ CCR Title 4 Division 9 Chapter 1, Sections 4000, 4001, and 4002.11. See: https://www.cdfa.ca.gov/dms/pdfs/CA_EVSE_Regulation_Reference_Document.pdf

publishes accuracy requirements for EV charging equipment.² Chargers certified by CTEP are certified to have:

- Level 2 – 1% in factory, 2% in the field
- Level 3 – 2.5% in factory, 5% in the field³

Both CTEP and NTEP have accuracy thresholds that are equivalent to or are stricter than the +/-5% accuracy threshold that CARB is proposing. Furthermore, the California Department of Food and Agriculture's (CDFA) Division of Measurement Standards (DMS) already uses C/NTEP as a certification standard for ensuring accuracy in commercial EV chargers. County Weights and Measures offices are tasked with enforcing compliance with these standards via registration and field testing. Given that there is an existing regulatory framework for enforcing accuracy standards in EV charging, reviewing meter accuracy via site visits within LCFS would be duplicative.

For charging use-cases that fall outside of DMS jurisdiction, such as private fleet charging, many of these devices' make/model will still very likely be C/NTEP certified, and reporting entities will be able to demonstrate this via certifications. For example, a ChargePoint CP6000 series charger – which is NTEP certified - used for private fleet charging in L.A. is the same from a meter accuracy standpoint as another CP6000 unit used for commercial charging in San Diego.⁴ For the minority of charging station make/models that have not obtained C/NTEP certification, these stations should be allowed to demonstrate accuracy via independent testing. Given that the specification the device is built to is the same regardless of use case (fleet, commercial, or private), for purposes of determining charging data accuracy within LCFS, it does not make sense to differentiate verification of meter accuracy by use case.

Perhaps most importantly, embedded electricity meters within EV chargers are fundamentally different devices than flow meters and are not subject to the same wear, corrosion, and accumulation of residue that can cause inaccuracy or drift in liquid or gaseous meters. Many EV charging stations, including ChargePoint's devices, are calibrated in the factory, sealed, and unalterable in a manner that makes recalibration impossible specifically to preserve the meter's accuracy and guard against tampering. Taken together, this means that applying requirements to recalibrate could necessitate a complete device replacement and add immense cost of compliance for program participants without reducing the risk of misreporting. Some charging operators/providers may drop out of the LCFS altogether rather than replacing devices.

² NIST Handbook 44 establishes the standards for Electric Vehicle Fueling Systems in Section 3.40. Handbook 44 (2024) is available at: <https://www.nist.gov/publications/specifications-tolerances-and-other-technical-requirements-weighing-and-measuring-15>

³ The specifications for DC devices receiving NTEP certification are slightly different and will become more stringent in 2025. Recent changes to NIST Handbook 44 will allow for tolerance of 5% in the factory and in the field for DC devices installed before January 1, 2025, with enforcement starting January 1, 2028. DC devices installed after January 1, 2025, will be expected to meet tolerances of 1% in factory and 2% in the field starting that date.

⁴ DMS oversees accuracy for devices used for a commercial purpose, i.e., an exchange that involves the sale of goods. See California Business and Professions Code § 12500

There is an existing and robust regulatory framework to ensure charging devices are accurate, which renders in-person visits to confirm meter accuracy duplicative and unnecessary. To the extent that ARB intends to verify the meter accuracy of chargers within LCFS verification, ARB should leverage existing metering certification standards and allow chargers holding CTEP, NTEP, or verified accuracy equivalency to be deemed accurate for all devices of a certified make/model– rather than expecting meter accuracy to be verified via in-person site visits via recalibration requirements for each individual device. Charging devices installed before the effective date of DMS regulation should be eligible to provide data to demonstrate their accuracy applicable to all devices of the same model.

- 2) *Use a desktop review to ensure reporting integrity and remove the requirement for site visits for verification of Quarterly Fuel Transactions Reports (QFTRs) for entities reporting on-road EV charging.*

With the accuracy of electricity metering for chargers established, verification for EV charging reporting should be focused on a review of data produced by charging meters rather than the meters themselves. For EV charging, a comprehensive review of data management and handling procedures does not require in-person site visits.

Site visits are intended to provide verifiers with an opportunity to see a fuel production facility, assess its metering, and determine if there is reasonable risk that the facility is not accurately or truthfully reporting fuel quantities. This makes sense when a reporting entity is reporting fuel that comes from a small handful of facilities, or even one facility, and a verifier can travel to a few locations and verify large fuel quantities reported by the entity. However, for EV charging, there is not one or even a small handful of facilities – there are hundreds or thousands. Given the number of locations, a site visit to EV charging “facilities” is impractical, as it would require verifiers to travel to specific EV charging stations dispersed across the state. Aside from being an added cost on a nascent industry, which may even erase all value earned under the program for some smaller reporting entities, visiting a handful of EV charging sites is not an effective way to assess the material risks of misreporting.

Any altering of data from a particular charging station is likely to occur once the data has been transmitted electronically, not at the site of the charging station, and would thus seemingly be addressed by a visit to a “central records location.” However, the central records location for most EV charging network operators is likely to be interpreted as their primary office space, which will likely lack any physical fueling records. The records for EV charging networks are all maintained electronically, mostly in cloud-based storage where the closest thing to a records location would likely be a data center with little connection to the operations of the EV company.

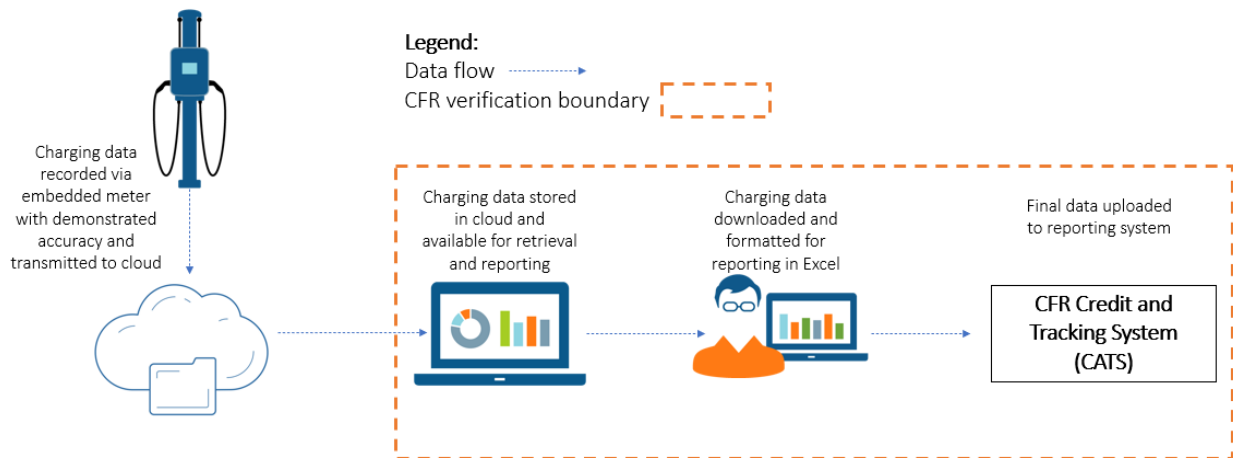


Figure 1 Block diagram outlining Canada's Clean Fuel Regulation reporting process

Rather than require site visits to facilities (chargers) or records locations (offices), verifiers can conduct interviews with key personnel, review IT schematics, quality control protocols, network-level certifications, trace raw metered data from inception to reporting, and gain a reasonable degree of confidence in reported charging data all via a desktop review. The orange dotted box in Figure 1 above illustrates how the scope of a desktop review can focus on appropriate data handling and management. Verifiers can also assess the security of data transmission from the station to the cloud, as the Canada CFR requires.

Site visits do not reasonably address the risks of misreporting, so EV charging should be exempt from site visit requirements. Data produced by chargers with meters demonstrated to be accurate by device type can then be reviewed by verifiers under a desktop/remote approach.

Summary

With charging meter accuracy able to be demonstrated by established certification standards and data integrity demonstrated by desktop reviews of charging data management, on-road EV charging QFTRs can be reasonably verified without a need for meter calibrations or site visits. Verifiers may assess two primary areas:

- Proof of product level C/NTEP or similar certification across the set of chargers being used for reporting to demonstrate data accuracy
- Management and data handling procedures for reporting electricity quantities to demonstrate data integrity

Both items combined ensure that data is accurate, untampered with, and properly reported.

Credit generation at multi-family residences

ChargePoint fully supports the proposal to allow multi-family housing to be classified as non-residential charging if parking spaces are not dedicated or restricted as this will help catalyze more investment in multifamily charging. **However, we recommend that parking spaces that are dedicated/restricted also be categorized as non-residential charging, which would allow the station owner to claim credits from these stations as well.** We see two issues with continuing to treat dedicated/restricted parking spaces as residential:

- 1) *Determining whether parking spaces are dedicated/restricted poses immense tracking challenges.*

Parking spaces may not have static dedicated/restricted classifications. Property owners could conceivably change their parking arrangement, which would then require a reallocation of credit generation rights under the current proposal. Furthermore, parking space use cases – in the context of EV charging – are generally not tracked or recorded in any scalable way that would allow for ready determination of classification by individual parking space, and any classification will likely be self-reported. This creates a large issue with verifying the status of parking spaces. Classifying all multi-family charging as non-residential would relieve this tracking burden, ultimately providing for better uptake in the multi-family space, which is an area critically in need of charging infrastructure investment.

- 2) *Regardless of parking configuration, the property owner/developer is likely to be the entity financing and owning/operating the stations.*

Multi-family units are often rental units, so residents typically would not directly participate in the purchase of stations. Given that the property developer/owner is the entity that will bear the cost, the most effective way to incentivize station installation is to provide LCFS value directly to those property developers/owners. Arbitrarily deciding whether to provide value to a property owner based on their parking configuration choice seems like an irrelevant issue and would slow down the installation of stations at multi-family units. Furthermore, even in multi-family housing where the members own their units, the process for installing EV chargers requires coordination across common areas and in some cases collective payment for the system. Given this coordination, the homeowners associations will typically be involved in developing and potentially financing some or all of the project. In this case, the homeowner's association or the owners are the critical entity for making station installation happen, so they should see the benefit from LCFS revenues to drive investment.

To address these two issues, we propose that CARB remove the dedicated/restricted delineation and instead classifies all charging at multi-family housing, regardless of parking configuration, as non-residential.

By allowing multifamily station owners (i.e., property owners and developers) to claim credits for chargers regardless of difficult to determine parking restrictions, it will better align the benefits of

the LCFS with the cost of multifamily EV charging and help unlock critical new financing for this segment in need of investment.

Fast Charging Infrastructure (FCI) Credits

We would like to specifically thank ARB for taking the time over the summer to work with the charging industry on honing the FCI pathways, specifically the heavy-duty (HD) pathway. This being a new pathway with several critical differences than the existing light-duty (LD) FCI pathway, we appreciate how ARB collaborated with industry and took a thoughtful approach to the HD pathway that in the end is more workable and will result in faster HD electrification.

For the proposed light and medium duty (LMD) FCI pathway, we support how ARB combined light and medium duty into one pathway, separate from HD, which better matches the differences in use cases. We also appreciate how ARB accommodated shared public/private sites within the pathway, as we see more of the market trending towards this model.

Automatic Acceleration Mechanism (AAM)

ChargePoint supports the proposal to establish the AAM but recommends that CARB make the mechanism stronger. As proposed, the AAM would not have been triggered in any of the years after the 2018 amendments. These years include 2022, a year when the credit market price declined by ~50%. The AAM should be designed specifically to counteract this type of negative price movement, so a mechanism that would not have reacted in 2022 is not strong enough. **To strengthen the mechanism, we recommend that ARB amend the first condition of the AAM to be reached when the credit bank to average quarterly deficit ratio is greater than 2.5.** With this update the AAM would have been triggered in 2022 but not any of the other years following the 2018 amendments. Since these other years saw price increases or modest declines, the new threshold suggests a balanced mechanism that reacts only to large price decreases.

Furthermore, we recommend that the AAM be allowed to trigger starting in 2026 based on 2025 data. The AAM is based on aggregate market data and can be operationalized immediately without needing to wait for the impact of other amendments to occur. Also, the market price continues to remain at low levels and the credit bank continues to build. If the AAM were in place currently, it would have been activated based on 2023 data with the current triggering conditions, so evidently the market is in a state that would benefit from AAM activation as soon as possible.

Near and long-term solutions to address the oversupply in the credit market

We strongly support ARB's decision to increase the stringency of the CI curve by 9% starting in 2025 to slow the growth of the bank and help support low carbon fuel suppliers in California and would even suggest ARB increase the step-down by as much as 12%. We also support ARB's proposal to give the Executive Officer greater discretion in the future to limit or adjust the use of certain pathways should California's transportation market evolve or new information answers important land use change questions regarding biofuels. This discretion should help streamline future changes to the program without rulemaking should they be necessary. In the interim, time will tell if

the amendments in the 15-Day Proposal will be sufficient to restore balance to the credit market. Recent research into earlier proposed amendments to the LCFS by UC Davis concludes that even with more stringent short term CI targets, renewable diesel will continue to dominate credit supply and crowd out investment in zero and near-zero carbon technologies⁵. These findings are supported by research by the International Council on Clean Transportation⁶. ARB's proposed percentage-based cap on soybean and canola-based biomass-based diesel (between the Summary of Proposed Modifications and the proposed regulatory text, it is unclear if the 20% limit applies to only *virgin* soy and canola-oil or all soy and canola), while a good first step, may not have its intended effect if non-soy and canola feedstocks continue to supply more renewable diesel, as they have in recent years (CARB LCFS data on biomass-based diesel feedstocks). The precipitous decline in credit prices has affected investment in electrification; it has made infrastructure financing more difficult and pushed out investment in fleet electrification. While we support ARB's proposal to increase program stringency in the short-term and believe this will have a positive effect on electrification investment, it remains to be seen if these amendments will address the more fundamental issue of oversupply in the long run.

Conclusion

In conclusion, with the exception of the proposed language on verification of on-road EV charging, ChargePoint supports the 15-Day Proposal and thanks staff for all the hard work put into this rulemaking. We oppose the current framework for verifying EV charging on the grounds that certain aspects are redundant, and if approved, will either result in significant and unnecessary costs to the industry, or a drop in EV charging-participation under the LCFS. We again urge ARB to allow for an alternative approach, similar to what we have proposed here, that is better suited to the EV charging use case. We stand ready to work with staff to clarify our recommendations or help think through implementation challenges. Please feel free to reach out for a discussion or if you have any questions.

Thank you,

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⁵ Colin Murphy and Jin Wook Ro. "Updated Fuel Portfolio Scenario Modeling to Inform 2024 (California) Low Carbon Fuel Standard Rulemaking". University of California Davis Policy Institute for Energy, Environment, and Economy. February 2024.

⁶ O'Malley, J. et al. "Setting a Lipids Fuel Cap Under the California Low Carbon Fuel Standard". International Council on Clean Transportation. August 2022.



August 27, 2024

Governor Gavin Newsom
California State Capitol
Sacramento, CA 95814

Liane Randolph, Chair
Members of the Board
Dr. Steven Cliff, Executive Officer
California Air Resources Board
1001 "I" Street
Sacramento, CA 95814

Submitted electronically via

https://www.arb.ca.gov/lispub/comm/iframe_bcsbform.php?listname=lcfs2024&comm_period=1

Re: Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information for the Proposed Low Carbon Fuel Standard Amendments (lcfs2024)

To Esteemed Responsible Officials:

Our organization Biofuelwatch appreciates the opportunity to submit this brief letter to the California Air Resources Board (CARB) as comment on the **Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information for the Proposed Low Carbon Fuel Standard Amendments (lcfs2024)**¹. Our organization has previously commented on the LCFS amendment package². We reference those comments for consideration alongside this new letter.

Biofuelwatch³ is an international organization that works to increase public understanding and civic engagement on the land-use implications of climate policy. We have a particular focus on the environmental harms and social inequities of large-scale industrial bioenergy projects, and we work extensively on addressing the negative ecological and social outcomes of policy and actions that are justified as being beneficial to the global climate, yet carry with them risks and threats to public health and safety, economic stability and natural resources. Due to circumstance, more than due to an innate desire, we have developed extensive experience with

¹ <https://ww2.arb.ca.gov/rulemaking/2024/lcfs2024>

² <https://www.arb.ca.gov/lists/com-attach/7028-lcfs2024-B2VdMIA+AjcFdIA1.pdf>

³ <http://www.biofuelwatch.org.uk/>

the negative real-world outcomes associated with the Low Carbon Fuel Standard (LCFS). In particular, over the last nearly four years our organization has been deeply engaged in tracking and documenting the irregular governance of the conversion of two refineries in the San Francisco Bay Area to manufacturing liquid biofuels, the Phillips 66 Rodeo Renewed Project (Phillips 66 Project)⁴ being one of those controversial refinery conversion projects and the Marathon-Neste biofuel refinery joint venture in Martinez (Marathon-Neste Project)⁵ being the other.

217.2

In the context of the environmental review of the refinery conversion projects, the proposed changes to the LCFS are particularly important, as there is a clear admittance that climate and biodiversity impacts from deforestation and land use change, direct and indirect, for the provision of feedstocks for liquid biofuels like 'renewable diesel' (RD), are of serious concern. This contrasts dramatically with previous public positions communicated by CARB leadership. It is worth reminding members of the Board that, during the California Environmental Quality Act (CEQA) review by Contra Costa County of both the Phillips 66 Project and the Marathon-Neste Project, CARB executive staff came to county proceedings to make broad statements that deforestation was not a concern, and that the LCFS guards stringently against such negative environmental and climate impacts.

How remarkable it is that CARB now, in both this current version and in the initial set of amendments for the LCFS, has been so explicit as to recognize the globally understood threat to natural ecosystems that is embodied in an increase in demand for high deforestation risk commodities like soy for making energy products. When these concerns arose during the irregular and controversial environmental review process of the refinery conversions CARB staff minimized them and dismissed relevant evidence as being insignificant. The truth is that CARB executive staff were involved to an unprecedented degree in county level processes to push the refinery conversion environmental review process to the finish line, acting as aggressive proponents of transnational energy sector company proposals and playing a key role in the irregular governance of the refinery conversions, not only as a regulator but as a political player. Though it is gratifying to see CARB now admit to the real environmental threats that leadership of the agency had publicly denied, it is also horrifying to watch how a regulatory agency fails to act in the public interest and instead rallies to the cause of protecting the economic agenda of polluting industry. Note that the legal challenge to the Contra Costa County certification of the Final Environmental Impact Report for the Marathon-Neste Project will be heard in State Appeals Court later in September. The legacy of CARB executive leadership having taking such a prominent role in the permitting of the conversion of SF Bay Area refineries to manufacturing high emissions high deforestation risk liquid biofuels is still being defined. Unfortunately, the arbitrary behaviors of the agency do not bode well for the communities living under the increasingly flaring cloud of these refineries, nor for the communities bearing the brunt of the environmentally damaging and socially conflictive agroindustrial model that produces the feedstock commodities upon which these fuels are based.

⁴ <https://www.contracosta.ca.gov/RodeoRenewed>

⁵ <https://www.marathonmartinezrenewables.com/>

Sustainability Certification Safeguards Remain Inadequate and Reek of Greenwashing

Staff at our organization collectively have decades of experience working with certification processes and schemes. We have direct experience in the development of guidelines and protocols while participating in technical committees for standard development at the International Organization for Standardization⁶, and staff from our organization have worked from both the industry side and civil society side of stakeholder processes with certification schemes as diverse as the Forest Stewardship Council (FSC), the Sustainable Biomass Program (SBM), the Roundtable on Sustainable Palm Oil (RSPO), the Round Table on Responsible Soy (RTRS), the International Sustainability and Carbon Certification (ISCC), and others. We have just in the last 3 years worked in more than a dozen different countries on matters that directly included certification schemes, in one form or another. Suffice it to say that our experience is immense, from design, to implementation, to accountability, to research on the outcomes. After all these years it is truly apparent to our organization that certification schemes may serve as a tool for a company to pursue due diligence, but that such schemes are totally inadequate to meet goals to mitigate environmental and social harms as described by CARB in both the original and the current set of amendments.

217.3

It is essential for members of the Board to understand that certification schemes are proven ineffective for removing deforestation from commodity supply chains. The amendments are suggesting that certification of feedstock commodities will mitigate or address the harms that arise from increased demand for these products – yet the evidence shows otherwise: certification is an ineffective tool for assuring sustainability in supply chains⁷.

Considering the known shortcomings of certification schemes it is troubling that CARB is doubling down on such an approach to mitigate harms from feedstock production for liquid biofuels like ‘renewable diesel.’ Fundamentally, as stated above, certification is not designed to prevent deforestation and other environmental harms. There are a number of reasons why. In many instances certification does not identify or prevent harms because audit and certification teams do not have the time, or even the expertise, to address complex social and human rights issues. Evidence shows that certification does not assure the legality of the product. Certification will repeatedly fail to provide transparency or essential information on geographical origin of the commodity. Certification has also been proven time and time again to provide opportunities for greenwashing, and to increase corporate power over natural resources. These are just a few of the problems with certification schemes that numerous studies have quantified and identified.

217.4

Also problematic is the role of the third-party certifying entities, which the CARB proposal relies on heavily. One proven problematic dynamic is that certifying bodies are not liable for the harm

⁶ <https://www.iso.org/home.html>

⁷ There are numerous examples of robust studies exploring the inadequacies of certification schemes. For examples see <https://www.earthrights.org.uk/news/green-labels-EUDR>; <https://www.sciencedirect.com/science/article/abs/pii/S1389934124000893?via%3Dihub>; <https://news.mongabay.com/2021/11/relying-on-green-labels-to-address-our-thirst-for-the-products-of-deforestation-would-be-a-disaster-commentary/>; https://www.greenpeace.org/static/planet4-international-stateless/2021/04/b1e486be-greenpeace-international-report-destruction-certified_finaloptimised.pdf.

217.4
cont.

they cause. The outsourcing of control of compliance to third-parties in an unregulated market has repeatedly created accountability problems, where failures to comply with the certification standards are unaddressed. Ultimately, the certification bodies are not independent of the companies that they are working for, resulting in conflicts of interest and increased violations. CARB makes gestures to addressing conflict of interest, but such proposed measures are far short of providing the oversight that is desperately needed of the totally and shamefully unregulated audit and certification body sector.

217.5

The reason why certification schemes cannot achieve the outcomes listed by CARB in the amendments packages is because that is not what they are designed to do. The lack of accountability and the repeated instances of violations going unaddressed, even when stakeholders are able to present substantive evidence during engagement processes, is fundamental to how certification schemes prioritize keeping participants within the program. Certification schemes are recognized to increase demand for the high deforestation risk commodity in question, perversely driving the very motor of destruction that the certification scheme was intended to curb. Market forces remain paramount. Because of economic considerations, the agenda of the interests utilizing the certification scheme takes precedence over the protection of the environment or respect for the rights of local and indigenous communities, and even over the reliability or brand reputation of the certification scheme itself. There is a lot of study that members of the Board must do before they can sign off on the reliance on certification schemes in the LCFS that staff are proposing.

217.6

CARB staff have taken steps now that require members of the Board to become expert in certification schemes; to advance the amendments and to approve in concept the proposal by CARB staff to rely on certification schemes to address the environmental harms associated with the production of feedstocks like soy requires doing serious due diligence. This decision cannot be taken lightly, we are putting the evidence in front of the board that certification schemes are not up to the task. We encourage members of the Board to be cognizant of the significance of this decision. As the legacy of the conversion of SF Bay Area refineries to making high emissions high deforestation risk liquid biofuels is still being defined, it would certainly behoove members of the Board to consider what they would like that legacy to be, how they will contribute to that legacy, and what their responsibility will be in shaping that legacy.

217.7

Faux Company Level Cap Is Overly Complicated and Reveals CARB Desperation

There is not much to be said about the proposal to only offer LCFS credits for 20% of a company's renewable diesel production, other than that it is a useless gesture⁸. CARB is trying to throw a bone to the environmental stakeholders demanding a cap in the production of crop-based liquid biofuels like renewable diesel, yet the CARB amendments proposal has loopholes in it big enough to fit the Phillips 66 Rodeo refinery. This gesture is clearly as desperate as it seems. And it does nothing to assure that California does not become addicted to high emissions high deforestation risk liquid biofuels like soy-based renewable diesel. We don't need to say anything more about

⁸ See p. 37 of Proposed Changes Attachment A-1:

https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_atta-1.pdf

217.7
cont. this proposed measure, other than how ironic it is for the refineries to discover that after CARB went to bat for them to push the permitting of the refinery conversions through to the finish line, that CARB is now desperately casting around for a way to put the high deforestation risk liquid biofuels Pandora back in their box. This ploy with a faux cap should make members of the Board extremely leery of what CARB staff are proposing with these new amendments. Some serious Board scrutiny and questioning of the context and the content of these proposed amendments would serve the public well. This is no time for members of the Board to rely on their rubber stamp as they have on previous occasions. Rubber stamping bad policy and bad projects is what got us into this problem, it most certainly is not going to get us out of the problem.

Deforestation From Livestock and Fraud in Used Cooking Oil Supply Chains Remains Ignored

217.8 A great deal of emphasis is made in the proposed amendments to addressing the clear deforestation risks arising from making fuels from virgin soy and canola oil. We have already addressed the inadequacies of the plan for mitigating those harms. What has not been mentioned, either in this letter or in the amendments, are the environmental harms associated with the reliance on animal tallow from the global livestock industry as a feedstock for making liquid biofuels. It is well known that the links between the livestock industry and the soy agroindustrial model are very strong, especially in vulnerable landscapes in regions like South America. The amendments do nothing to recognize or mitigate the harms from what we are calling the 'great California fats grab' – the way that the LCFS is incentivizing fuel producers to secure access to as many animal fats and related feedstocks from around the world to make fuels to sell in California. These dynamics bring up another crucial issue that the amendments fail to address, that of Indirect Land Use Change (ILUC). Market elasticity and existing uses for the commodities that are coveted now for making fuels like renewable diesel result in increased demand for fats products that must be then be replaced and substituted for their existing uses. The amendments do nothing to address these concerns. The other matter that is not addressed is the risk of palm oil being laundered as Used Cooking Oil, a real and present problem in global markets that CARB has not wanted to recognize. The recent publication by the European organization Transport and Environment titled "*UCO: Unknown Cooking Oil*"⁹ explores the realities and evidence of virgin vegetable oils being trafficked as UCO; again, CARB has refused to address this problem in a substantive manner.

Conclusion: Halt Deforestation-Driving Soy Biofuels Before It Is Too Late

217.11 Considering the urgency of the situation, another item that would serve members of the Board to take into consideration is the December 2023 report from the same organization Transport and Environment titled "*Halt Deforestation-Driving Soy Biofuels Before it is Too Late*."¹⁰

In this report clear arguments are made that soy must be considered a high-ILUC risk feedstock (something that the current LCFS Rulemaking fails to do) and that **in order to protect global**

⁹ <https://www.transportenvironment.org/articles/uco-unknown-cooking-oil-high-hopes-on-limited-and-suspicious-materials>

¹⁰ <https://www.transportenvironment.org/wp-content/uploads/2023/12/Halt-deforestation-driving-soy-biofuels-before-it-is-too-late.pdf>

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cont.

forests an aggressive phase out of palm and soy-based biofuels is needed immediately. There are many lessons to be learned from the European experience on these matters of global deforestation and biofuels, and CARB staff and leadership need to take measures to update their approach to assessing the climate impacts from high deforestation risk feedstocks like soy.

Much more research and analysis need to be done about the viability and environmental repercussions of granting a special climate value to making liquid biofuels from soy. The available evidence shows that this is not a climate solution. By rushing forward with these amendments to reinforce existing credit pathways for making liquid biofuels from commodities like soy CARB is exacerbating the existing risk of elevating California climate policy to become a driver of global deforestation.

It is certainly noteworthy that in 2024 CARB staff and leadership have admitted to what they so vigorously denied for so long: that deforestation is a real problem associated with making liquid biofuels from soy and other vegetable oils. Now we need the agency to take action in a responsible manner, and not just put a sheen of certification window dressing on the problem to distract the public with known tools of greenwashing. As it stands, the current package of amendments to the LCFS fails to meet those responsibilities. We beseech the members of the Board to demand a course correction, and to anticipate now what it will take to reject the current amendments and remove high emissions high deforestation risk biofuels from the portfolio of climate solutions being promoted by state authorities. There is no time left for inaction.

Sincerely,



Gary Graham Hughes
Americas Program Coordinator, Biofuelwatch
garyhughes.bfw@gmail.com / +1-707-223-5434



August 27, 2024
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Via electronic submission: <https://ww2.arb.ca.gov/lispub/comm/bclist.php>

Re: Proposed Amendments to the LCFS

I. Introduction

The Sustainable Advanced Biofuel Refiners (SABR) Coalition appreciates the opportunity to comment on the California Air Resources Board's (CARB) proposed changes to the Low Carbon Fuel Standard (LCFS) program. SABR is a national biodiesel trade association made up of nearly sixty organizational members from virtually every state including California, and most of whom do business in California. SABR's members have invested in building out America's first advanced biofuel. SABR members include stakeholders from every link in the value chain from feedstock growers to biodiesel producers, distributors, retailers, and consumers, as well as infrastructure and products and services suppliers. Biodiesel can be produced from a range of feedstocks, including oil from numerous oilseed crops.

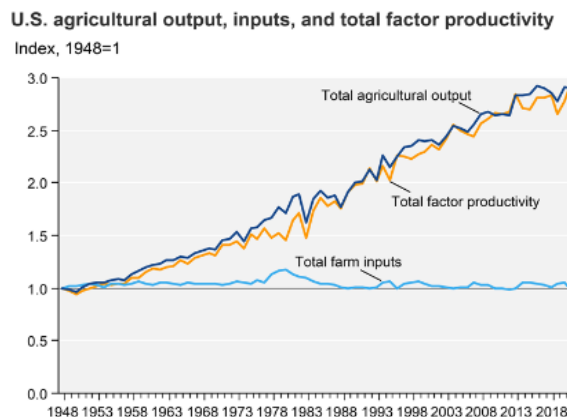
SABR members include soybean farmers who produce the nation's most abundant biomass-based diesel feedstock in the United States. Soy oil is a highly sustainable feedstock. Unlike baseline petroleum diesel, which gets more carbon intensive each year, soy-based biodiesel gets less carbon intensive and more sustainable every year. The soybean industry invests heavily in plant science research that results in continuous yield improvements as well as drought and pest tolerance. US soybean farmers are among the highest adopters of technology improvements among all industrial sectors.¹ Farmers have adopted a broad range of precision agriculture technologies that allow them to use fewer energy and inputs to produce more crops on less land each year. See Figure 1.

218.1

¹ USDA, Economic Research Service, U.S. Soybean Production Expands Since 2002 as Farmers Adopt New Practices, Technologies. July 2023. <https://www.ers.usda.gov/amber-waves/2023/july/u-s-soybean-production-expands-since-2002-as-farmers-adopt-new-practices-technologies/#:~:text=Soybean%20farmers%20also%20use%20many,application%20levels%20according%20to%20need.>

These precision agricultural technologies and practices increase productivity and yield, enhance resilience to environmental changes, and reduce GHG emissions.² These practices incrementally build on existing practices, like cover cropping, nutrient management, and conservation tillage.³ Other practices include, but are not limited to, fertilizer management and on-farm energy efficiency improvements (e.g., improved irrigation efficiency, reduced fuel use, and energy conservation).⁴ For these and other reasons, SABR has significant concerns about CARB's proposed changes to the LCFS.

Figure 1:



Technological developments in agriculture have been influential in driving changes in the farm sector. Innovations in animal and crop genetics, chemicals, equipment, and farm organization have enabled continuing output growth without adding much to inputs. As a result, even as the amount of land, labor, and other inputs used in farming declined, total farm output nearly tripled between 1948 and 2021.

II. Proposed Cap on Crop-Based Fuels

SABR's top concern is the proposed cap on soy and canola-based biomass-based diesel. This proposed measure is constructed around misplaced negative biases about modern production agriculture and based on contrived theories of indirect land use change (ILUC) that have not held up to nearly two decades of actual scientific evidence and data. The LCFS already has embedded layers of punitive measures against crop-based fuels which makes the LCFS program more expensive with no added benefit. The proposed cap will make the program even more expensive and incentivize even more imports, most notably from China at the expense of America's farmers and rural communities.

The theory of ILUC starts with the flawed assumption that when an agricultural material is used to produce a gallon of biofuel, then agricultural land is necessarily expanded causing a conversion of land from grassland or forestland to cropland. Figure 1 debunks that assumption. The US, as well as much of the rest of the world, is growing more crops on less acres nearly every year. And these crops are harvesting more CO₂ and sunshine from the atmosphere every year to produce renewable energy. In the case of soybeans, a legume, they are plants that also harvest nitrogen from the atmosphere, breaking it down for its

² USDA, *Climate-Smart Agriculture and Forestry*, <https://www.farmers.gov/conservation/climate-smart> (last visited July 22, 2024).

³ *Id.*

⁴ USDA, *Climate-Smart Agriculture and Forestry Strategy: 90-Day Progress Report*, at 2 (2021), available at <https://www.usda.gov/sites/default/files/documents/climate-smart-ag-forestry-strategy-90-day-progress-report.pdf>.

own use and returning vital natural nutrients to the soil. This is why most soybean crops require little to no nitrogen fertilizer.⁵

Soybeans are approximately 20% oil and 80% protein meal. The 80% protein meal drives soybean production for food and feed uses. As more soybeans are grown, making more soybean oil available for more renewable, low-carbon biodiesel, the soybeans are co-producing more of the 80% protein meal making more of some of the healthiest and most efficient plant-based protein to feed the world. According to the USDA, the 2024 US soybean harvest will set an all-time record.⁶ Soybeans are currently selling at \$9.65 per bushel. That is in a similar range they were selling for twenty years ago in 2004 – *not* adjusted for inflation.⁷

III. ILUC Modeling Methods Must Be Reconsidered

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ILUC theories and assumptions have been *modeled* for nearly 20 years to forecast future ILUC; those modeled forecasts have been used to assign penalties in real time in the form of carbon scoring to crop-based fuels. We now have the benefit of hindsight to look at two decades of historic data and determine whether the models produced accurate forecasts. They did not.

Just this month, eight scientists told the U.S. Court of Appeals for the District of Columbia Circuit that claims made that the Renewable Fuel Standard (RFS) program has led to the loss of habitat for endangered species and loss of grasslands are untrue.⁸ The brief was filed in response to challenges brought by environmental groups to the 2023-2025 renewable fuel standards in *Center for Biological Diversity v. EPA*, Case No. 23-1277 (D.C. Cir. filed July 3, 2024). The scientists said, in the brief, that: “There is no compelling scientific evidence linking the RFS to the conversion of grasslands and loss of biodiversity. Research based on misclassifications of land use and flawed assumptions and methodologies spurred skepticism about the environmental and GHG emission reduction benefits of biofuels but that research has since been disproven.”⁹ Indeed, the scientists noted that “analyses based on more complete, updated data, found that the average carbon intensity of biofuels is significantly less than conventional gasoline,” with this benefit “growing at an accelerated pace” as technologies and practices evolve.¹⁰

The International Standards Organization (ISO) also has recognized the uncertainty and lack of evidence of indirect emissions from biofuel production. “The conclusion, based on the expertise

⁵ Nitrogen-fixing crops, Wikipedia. https://en.wikipedia.org/wiki/Category:Nitrogen-fixing_crops#:~:text=Plants%20that%20contribute%20to%20nitrogen,lupins%2C%20peanuts%2C%20and%20rooibos.

⁶ Record US Soybean Forecast for 2024, Worldgrain.com. <https://www.world-grain.com/articles/20369-record-us-soybean-crop-forecast-in-2024#:~:text=The%20USDA%20on%20Aug.%2012,or%2010%25%2C%20from%202023.>

⁷ Soybean prices, 45-Year Historical Chart. https://www.macrotrends.net/2531/soybean-prices-historical-chart-data#google_vignette

⁸ Todd Neeley, *Scientists: RFS Land Use Claims False*, Progressive Farmer, July 8, 2024, <https://www.dtnpf.com/agriculture/web/ag/news/business-inputs/article/2024/07/08/scientists-push-court-reject-land.>

⁹ *Id.*

¹⁰ *Id.*

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of, and literature reviewed by, the work group, is that the ‘state of science,’ in terms of evidence-based research, is inconclusive or contradictory regarding indirect effects of bioenergy.”¹¹ There also is substantial question as to whether the indirect effects of petroleum-based fuels have been adequately assessed. The ISO Work Group went on to say, “There has been more emphasis on sustainability and indirect effects of bioenergy than on fossil fuel scenarios. There needs to be equitable treatment of direct and indirect effects for any energy options being analyzed including baseline fuels.”¹²

Equitable treatment of the baseline fuel is also a necessary part of any lifecycle analysis. It should be noted that since 2008, the hydraulic fracturing boom has caused land use changes from fracking wells that can be seen from nearly any domestic commercial airline flight. Yet this land use change from the baseline fuel, which can be seen with the naked eye, is often not included in emissions models for the petroleum baseline.

The RFS statute required that the EPA use 2005 petroleum carbon emissions as the baseline for comparison with measuring biofuel emissions. The EPA declined to include indirect emissions in the petroleum baseline and assumed them to be zero. Both EPA and CARB have historically and to this day cling to the theories that biofuels create significant indirect emissions and baseline petroleum creates no indirect emissions. These theories and assumptions did not factor in major technological developments in both the baseline petroleum and biofuel making both assumptions wrong.



The assumption that biofuels create ILUC emissions did not factor in major yield improvements as discussed above enabled by the broad adoption of precision agricultural technology and sustainable farming practices. And the assumption that there are no indirect emissions including ILUC from baseline petroleum did not factor in the development of hydraulic fracturing, horizontal drilling, and seismic metering, which, along with significant government subsidies, set off the fracking boom in the US. Fracking has improved the nation’s energy independence and energy trade balance. ***But fracking has also created significant land use changes*** for baseline petroleum that can be seen from Google Earth. Continuing to follow the assumptions that crop-based fuels create land use changes and petroleum baseline fuels do not, is counter to the evidence.

IV. Updating Model Versions

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The factors discussed above highlight the importance of using the most current data available rather than outdated and therefore incorrect data. If CARB is going to continue to attempt to

¹¹ ISO/Technical Committee 248 Sustainability Metrics for Bioenergy, Work Group 4 on Indirect Effects, 2015 State of Science Consensus Statement.

¹² *Id.*

model indirect emissions for biofuels, it is imperative that CARB adopt the most current version of the GTAP model.

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cont. CARB has indicated plans to update all major models for lifecycle emissions calculations except for GTAP-BIO in the upcoming LCFS amendments. The soy industry has made vast improvements in sustainability and efficiency over the past two decades, with even greater improvement goals ahead. Yet CARB continues to rely on a 2014 model that uses data from 2004. The ILUC score accounts for half or more of the CI score for soy-based biofuels. CARB's current modeling assigns soy biomass-based diesel with an ILUC impact of 29.1 g CO₂e/MJ whereas updated results from the model used to calculate ILUC scores indicate a value of between 9 and 10 gCO₂e/MJ for soybeans¹³. The recently released 40BSAF-GREET 2024 model has an ILUC score of 12.2 for soy-based SAF in federal programs.

V. Double Counting of Indirect Emissions at the Federal and State Levels

The re-evaluation of indirect emissions modeling for crop-based biofuels becomes especially important when the Clean Transportation Production Credit (Section 45z) goes into effect in 2025. To the extent Section 45z embraces a California-style carbon intensity scoring system in its incentive structure, it will likely apply indirect land use change (ILUC) penalties to crop-based fuels. Currently approximately half of the nation's biodiesel and renewable diesel fuels (and nearly all the nation's SAF) are sold in California or one of the other states that have embraced a California-style LCFS state programs.

218.5 Under the current expected approach, a gallon of biodiesel from soybean oil will have an ILUC penalty of 10 g/MJ of CO₂ for assumed land conversion (for which there is no conclusive scientific evidence) assigned at the federal level. If that same gallon is consumed in California, the same 10 g/MJ ILUC penalty is applied again to the same gallon under the LCFS, as if the gallon was burned twice and the same land was converted twice. The combination of the federal 45z and California LCFS will have assigned 20 g/MJ of CO₂.¹⁴ And this is the best-case scenario assuming that CARB updates its version of the GTAP-BIO model, which it has not indicated a willingness to do. If it does not, CARB will assign an ILUC penalty of 29.1 g/MJ of CO₂, making a total combined ILUC penalty of 49.1 g/MJ on the gallon of soy biodiesel that is applied against the combined value stack of credits. This is nearly five times the amount of ILUC penalty that the GREET model has forecasted that a gallon of soy biodiesel should be assigned. When in reality there is no solidly consistent scientific evidence that the gallon of soy biodiesel will ever cause any land conversion.

This double counting is already happening today with SAF under the federal SAF credit (40B) combined with the California LCFS. Such a flawed policy is already leading to an alarming spike in questionable used cooking oil imports from China into California. These imports are displacing soybean oil, our nation's most abundant and sustainable agricultural feedstock. This outcome results in bad carbon policy, as well as bad agricultural, energy, trade and economic

¹³ Taheripour, F., Karmai, O., and Sajedinia, E. (2023). *Biodiesel Induced Land Use Changes: An Assessment Using GTAP-BIO 2014 Data Base*. Purdue University

¹⁴ A gallon of biodiesel contains approximately 125 MJ of energy.
<https://indico.ictp.it/event/8008/session/3/contribution/23/material/slides/2.pdf>

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policy. All of these factors make it critical that flawed indirect emissions modeling be re-evaluated using current science and actual scientific evidence. This reconsideration should rely on the hindsight of 20 years of data-gathering and actual science rather than relying on future forecasts, failed theories, flawed assumptions and outdated data. There has been twenty years to prove the theory that land use change would be caused by US crop-based fuels, but there is more evidence to the contrary.

VI. Biodiesel is the Lowest Cost, Lowest Carbon Fuel

All of the biofuels that are regulated by CARB, fall under the umbrella of the federal RFS and count toward the RFS's annual volume requirements (renewable volume obligations "RVOs"). The RFS was intended to be a floor in the market, but it has become both a floor and a ceiling. This makes the annual RVOs roughly a finite number and a zero-sum game. Since the EPA has categorized biodiesel, renewable diesel, and SAF all in the same biomass-based diesel (D4) category, these fuels compete with each other to fill the volumes in the biomass-based diesel category on a national basis.

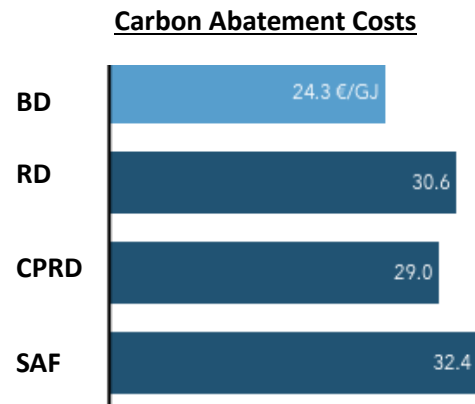
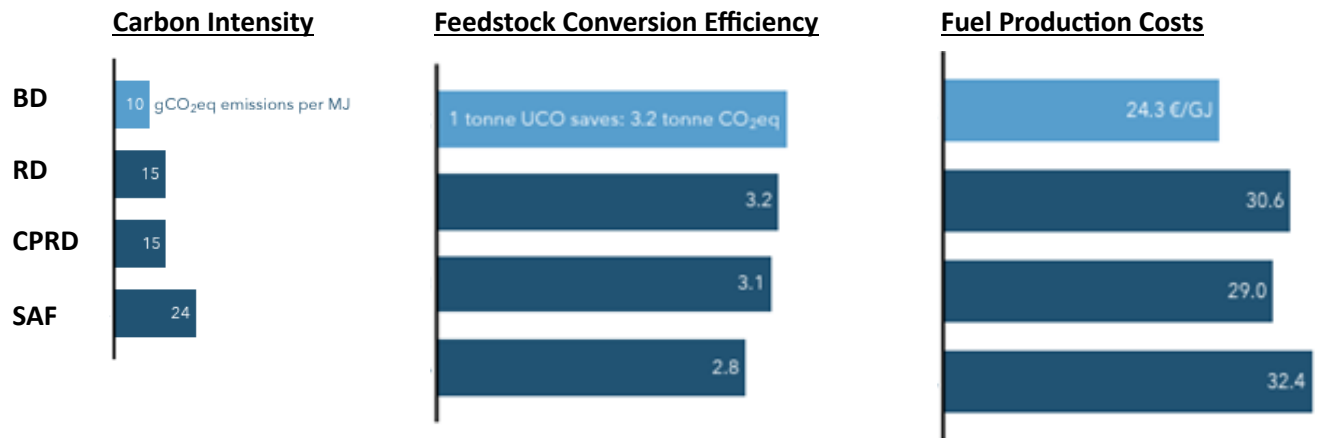
218.6

Since California currently represents roughly half of the nation's fuel volume that falls into that BBD category, and that portion is projected to grow, California has an outsized influence on the national market. SABR requests that CARB be mindful of how biofuel regulatory measures taken by California, combined with federal regulatory measures, can create market distortions on the entire US market. Advantaged treatment of SAF for example that results in more gallons of SAF made from imported UCO that comes online in California, means that a gallon of soy biodiesel goes offline somewhere else in the country. This effectively results in an increase in carbon since biodiesel is the lowest cost, lowest carbon biomass-based diesel.

A 2021 European study by a group of scientists in the Netherlands compared four biomass-based diesel fuels including biodiesel (BD), renewable diesel (RD), co-processed renewable diesel (CPRD), and sustainable aviation fuel (SAF).¹⁵ The study was peer reviewed by prominent North American scientists. It compared fuel production costs, conversion efficiencies and carbon reduction abilities of the four fuels using the same feedstock (UCO in this case but the findings would apply to any feedstock when held constant) to determine which fuel was superior in carbon abatement. Their main finding: ***"We find that of all four pathways, biodiesel has the lowest production costs, the highest feedstock efficiency, the highest emission reduction performance and, consequently, the lowest carbon abatement costs."***

See charts below.

¹⁵ Carlo Hamelinck et al., "Conversion Efficiencies of Fuel Pathways for Used Cooking Oil Study Commissioned by EWABA and MVaK Final Report," 2021, https://www.studiogearup.com/wp-content/uploads/2021/03/2021_sGU_EWABA-and-MVaK_Options-for-the-deployment-of-UCO.pdf.



When a gallon of RD or SAF replaces a gallon of biodiesel or BioHeat™ in the biomass-based diesel (D4) category of the RFS, carbon emissions increase by as much as 15% at an increased cost to taxpayers and consumers.

VII. Cite to other Comments

In addition to these comments, SABR supports the comments submitted by the American Soybean Association (ASA) and the National Association of Truck Stop Operators (NATSO).

VIII. Conclusion

SABR is very concerned about CARB's proposal to cap crop-based feedstocks in the LCFS program. This proposal is unjustified and not supported by scientific evidence and will significantly diminish the benefits of the LCFS policy. SABR urges CARB to reconsider its approach to ILUC modeling methods. The preponderance of the scientific evidence indicates that crop-based biofuel does not result in land use changes, and that the baseline petroleum does; yet CARB continues to assume the opposite. CARB has proposed updating all of its models to the most recent versions with the most current data sets, except for the version of GTAP-BIO it uses to measure indirect emissions of crop-based biofuels. If CARB is going to attempt to measure indirect emissions it is critical that it uses the most current data available. CARB should not

218.10 double - count carbon emissions assigned to crop-based fuels under the state LCFS program that have already been accounted for under federal biofuel programs.

218.11 Finally, CARB should be mindful of the outsized impact that its regulatory measures have on the entire nation's biomass-based diesel fuel and feedstock markets. And it should be mindful of how those regulatory measures interact with federal biofuel policies. All biomass-based diesel fuels only exist because of carbon policy, and biodiesel is the lowest cost, lowest carbon fuel. Biodiesel is a high performing oxygenated fuel that has demonstrated its ability to seamlessly integrate into the nation's infrastructure. Policy advantages given to SAF or RD in the LCFS for example that result in the cannibalization of biodiesel by those fuels, can have the unintended outcome of increasing carbon emissions at a higher cost to consumers and taxpayers.

We appreciate the opportunity to comment on these important policy matters. We thank you for your work and look forward to working with you going forward to help the LCFS realize its important carbon reduction goals. Please contact me if you have any questions.

Sincerely,



Joe Jobe, CEO
Sustainable Advanced Biofuel Refiners Coalition
joe@rockhouse.us
573.680.1948

Comment Log Display

Here is the comment you selected to display.

Comment 219 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Nikita
Last Name	Pavlenko
Email Address	n.pavlenko@theicct.org
Affiliation	ICCT
Subject	ICCT Comments on August 15-day LCFS Changes

Comment

These comments are submitted by the International Council on Clean Transportation (ICCT). The ICCT is an independent nonprofit organization founded to provide unbiased research and technical analysis to environmental regulators. Our mission is to improve the environmental performance and energy efficiency of road, marine, and air transportation, in order to benefit public health and mitigate climate change. We promote best practices and comprehensive solutions to increase vehicle efficiency, increase the sustainability of alternative fuels, reduce pollution from the in-use fleet, and curtail emissions of local air pollutants and greenhouse gases (GHG) from international goods movement.

The ICCT welcomes the opportunity to provide comments on the Air Resources Board's proposed 15-day changes to the Low Carbon Fuel Standard amendments. We commend the agency for its technical analysis and interest in continuing to improve the effectiveness of one of its flagship climate programs. The comments below offer a number of technical observations and recommendations for ARB to consider in aligning the program with the goals of the 2022 Scoping Plan, restoring stable credit prices, and maintaining the environmental integrity of the program.

Attachment

www.arb.ca.gov/lists/com-attach/7554-lcfs2024-Bm8BZAZkAyQCWwBj.pdf

Original File Name

ICCT comments on 15-day LCFS package_Clean.pdf

**Date and Time Comment Was
Submitted**

2024-08-27 18:28:52

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

August 27, 2024

RE: International Council on Clean Transportation comments on the
Proposed 15-day changes to Proposed Regulation Order

These comments are submitted by the International Council on Clean Transportation (ICCT). The ICCT is an independent nonprofit organization founded to provide unbiased research and technical analysis to environmental regulators. Our mission is to improve the environmental performance and energy efficiency of road, marine, and air transportation, in order to benefit public health and mitigate climate change. We promote best practices and comprehensive solutions to increase vehicle efficiency, increase the sustainability of alternative fuels, reduce pollution from the in-use fleet, and curtail emissions of local air pollutants and greenhouse gases (GHG) from international goods movement.

The ICCT welcomes the opportunity to provide comments on the Air Resources Board's proposed 15-day changes to the Low Carbon Fuel Standard amendments. We commend the agency for its technical analysis and interest in continuing to improve the effectiveness of one of its flagship climate programs. The comments below offer a number of technical observations and recommendations for ARB to consider in aligning the program with the goals of the 2022 Scoping Plan, restoring stable credit prices, and maintaining the environmental integrity of the program.

We would be glad to clarify or elaborate on any points made in the below comments. If there are any questions, ARB staff can feel free to contact Nik Pavlenko (n.pavlenko@theicct.org) and Dr. Stephanie Searle (stephanie@theicct.org).

Nikita Pavlenko
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Summary of comments

These comments respond to the 15-day Low Carbon Fuel Standard (LCFS) package released on August 12th, 2024.¹ This package includes detailed changes to proposed regulatory amendments that were first published in December 2023. Recent amendments were made to better align the LCFS program with California's 2022 Scoping Plan goals and stabilize credit prices following consistent overcompliance with annual carbon intensity (CI) benchmark targets. Consistent over-compliance with the annual CI reduction target since 2020 has led to an excess of banked credits that must be drawn down before credit prices begin to rise.² In recent years, California's transportation sector has also undergone major changes to its transportation fuel mix, including rapid growth in renewable diesel, biomethane, and electricity crediting. Many of these developments were a direct result of LCFS policy although other external factors such as zero-emission vehicle (ZEV) mandates and federal fuel subsidies have accelerated growth in alternative fuel markets.

In the detailed technical comments below, we make several key recommendations:

- The cap on crediting for soy and canola biomass-based diesel beyond 20% of a company's volumes should be extended to all vegetable oils. For vegetable oils blended in excess of the cap, those fuels should be assigned the fossil diesel baseline CI rather than the benchmark CI.
- Vegetable oil-derived SAF has the same sustainability concerns as vegetable oil-derived biomass-based diesel, therefore it should not be excluded from crediting limitations.
- Update ILUC assessments for crop-derived biofuels to include more recent data and additional models.
- Implement third-party sustainability requirements for waste and residue biomass
- Restore the originally proposed obligation on intrastate jet fuel.
- Restore the originally proposed Clean Fuel Reward program for MDHDV rebates funded by base credit generation in lieu of the August proposal to issue base credits to light-duty OEMs.
- There is a sizeable long-term incentive in the LCFS to support out-of-state, out-of-sector dairy manure management projects through book-and-claim crediting for hydrogen projects. CARB should

¹ https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_notice.pdf

² <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>

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implement deliverability requirements for biomethane-derived hydrogen consistent with biomethane-derived RNG and electricity.

These comments focus on substantial changes made to biomass-based diesel (BBD) and jet fuel crediting, reallocation of electricity base credits generated during private charging events, and updates made to direct air capture (DAC), hydrogen, and medium and heavy-duty infrastructure crediting. We also discuss discrepancies and changes to input assumptions in the CATS model that notably differ from previous modeling runs.

Strengthen the Crediting Limit for Vegetable Oil-derived Biomass-Based Diesel

CARB made substantial changes to biomass-based diesel (BBD) crediting guidance in the 15-day package amendments. The revised text now sets a limit on the quantity of BBD derived from soybean and canola oil that can receive LCFS credits. The crediting restriction is applied at the company level and takes effect immediately for newly certified pathways and facilities that blended less than 20 percent of their certified volumes during 2023 LCFS reporting year. For all other facilities, the crediting restriction takes effect in 2028.

219.10

The proposed restriction on soybean and canola oil crediting is a commendable step to mitigate the unintended emissions consequences of crop-based fuel production. However, by itself, the proposal will have little effect on the consumption of vegetable oils in U.S. biofuel markets due to loose compliance requirements and likelihood of feedstock shuffling. If other states and neighboring regions such as Canada fail to implement their own crop-based fuel safeguards, it is likely that fuel suppliers will instead sell these products in new markets with little net climate benefit. CARB's proposal also sets a moving target based on annual BBD production rates rather than a total energy-based or volumetric feedstock consumption limit that would be more closely aligned with an estimate of sustainable feedstock availability.³

Though the proposed vegetable oil limitation is intended to mitigate the unintended, indirect consequences of the LCFS program on vegetable oil demand, we find that its effectiveness may be limited for several different reasons. First, we find that the proposed treatment of vegetable oils in excess of the proposed limit of 20% by volume still preserves valuable

³ <https://theicct.org/wp-content/uploads/2022/08/lipids-cap-ca-lcfs-aug22.pdf>

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incentives for their use, diluting the impact of any restrictions. Second, CARB's crediting restriction only applies to soybean and canola oil consumed as BBD, which could incentivize the consumption of other vegetable oils and oilseed cover crops with their own market and environmental risks. As written, the proposal also preserves incentives for soybean and canola oil that are processed into jet fuel. Lastly, we find that design of the grandfathering provisions could allow for a significant expansion of vegetable oil volumes over present-day consumption. We discuss each of these issues in more detail below.

219.11
cont.

Even with a limit in place, we find that there is still a valuable financial incentive for vegetable oils in the California LCFS. The proposal specifies that soy and canola oil-derived biofuels in excess of the 20% limit would be assigned the benchmark CI rather than the fossil CI, thus not generating any deficits. In addition to LCFS credits, BBD producers that sell fuel in California benefit from a federal tax credit, to be converted into the 45Z tax credit in 2025 and federal Renewable Identification Number (RIN) credits; while refiners benefit from avoided cap-and-trade penalties that apply to petroleum fuel.⁴ This corresponds to a net incentive of \$2.66 per gallon of soybean oil BBD and \$3.33 per gallon of used cooking oil (UCO) BBD sold in 2025, based on the average CI of these feedstock-specific pathways approved under the LCFS. If the CI for excess BBD is instead updated to the CI of fossil diesel, vegetable oil BBD blended in excess of the limit will generate LCFS deficits and dampen the growth trajectories of the riskiest feedstocks. We estimate that this change would reduce the net value of RD sold in California by \$0.21/gallon, assuming a \$70 per tonne LCFS credit price.⁵

219.12

The proposed exclusion of SAF produced from vegetable oils from any crediting restrictions does not have any scientific justification and would undermine the integrity and intention of the limits. Given that the proposed crediting restrictions were drafted in response to concerns over the unintended impacts of the LCFS program's demand for crops on land-use and climate, the end-use sector of said crop-based biofuels is not relevant for the purposes of the safeguard. In other words, whether that soy oil is used in the road sector or the aviation sector is not relevant to the underlying problem posed by the feedstock used to make that biofuel. Further, excluding aviation fuels from these restrictions poses an important risk, as there may be a valuable incentive to blend vegetable oil-derived SAF's in excess of the cap. Combining credit incentives from the LCFS, RINs, and 45Z

⁴ <https://www.c2es.org/content/california-cap-and-trade/>

⁵ <https://www.neste.com/investors/market-data/lcfs-fuel-standard-credit-price>

tax credits, this amounts to approximately \$2.30/gallon for soybean oil-derived SAF sold in 2025.⁶

Refiners typically prioritize BBD over SAF production due its lower net production cost.⁷ For example, under the 45Z tax credit incentives, UCO receives \$0.83/gallon when sold as SAF and \$0.48/gallon when sold as renewable diesel, a \$0.36 price differential. Renewable diesel receives slightly higher financial incentives than SAF when sold as RIN credits due to its higher energy density and near equivalent incentives when sold on the LCFS credit market. In total, we find that this difference in incentive value is not high enough to overcome SAF’s production cost premium of \$0.56 per gallon. We estimate this production cost gap based on recent data reported by S&P Global for renewable diesel and SAF produced in Northwest Europe.⁸ We display the incentive values for BBD and SAF derived from soybean oil and UCO in Table 1 below.

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Table 1. Value of BBD and SAF crediting in California

Fuel	45Z tax credit (\$/gallon)	RIN (\$/gallon)	LCFS credit (\$/gallon)	Avoided Cap & Trade Penalty (\$/gallon)	Net incentive (\$/gallon)
Used cooking oil					
SAF	\$0.83	\$1.89	\$0.50	N/A	\$3.22
BBD	\$0.48	\$2.01	\$0.52	\$0.33	\$3.33
Soybean oil					
SAF	\$0.23	\$1.89	\$0.18	N/A	\$2.30
BBD	\$0.13	\$2.01	\$0.19	\$0.33	\$2.66

Note: The life-cycle CI values used in this table are calculated based on the average CI of approved HVO and SAF pathways in California. For soybean oil, we replace CARB’s ILUC value with the ILUC values used in GREET 2023 to calculate maximum 45Z credit incentives assuming that the 40B default LCA values will carry over to 45Z. RFS RIN values are based on the 2019-2023 average price.

Although the production cost gap between RD and SAF is not expected to change substantially in the future, refineries may alter their product slate to produce higher volumes of SAF to avoid feedstock curtailment once fuel producers approach the vegetable oil cap. Optimizing SAF output could result in over 2 billion gallons of soy and canola-based fuel that is not subject

⁶ We note that under the default configuration of the 40B GREET model, soy oil jet fuel has a GHG reduction higher than that in CA-LCFS, largely due to the use of a much lower ILUC factor.

⁷

https://theicct.org/sites/default/files/publications/Alternative_jet_fuels_cost_EU_20190320.pdf

⁸ <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/oil/110223-decarbonizing-aviation-passengers-likely-to-shoulder-price-of-saf>

- 219.12 cont. to any crediting restrictions, far higher than the potential volume limit on credit generation.⁹
- 219.13 We therefore recommend that the vegetable oil derived BBD beyond the 20 percent limit is assigned the carbon intensity of fossil diesel rather than substituted with the annual CI reduction target; thus, producing neither credits nor deficits. The current amendment text is inconsistent with text for biomass that does not meet third party certification requirements (Section 95488.9(g)(1)) under which biomass that fails to meet minimum sustainability requirements is assigned the CI of fossil diesel.¹⁰ CARB's proposed guidance ensures that soy and canola oil BBD will not generate program deficits above the 20 percent production limit and thus incur no financial penalties when they are sold in the California market. This in turn provides a weak signal to bio-refiners to make meaningful changes to their operations to comply with the annual CI benchmark. Likewise, we
- 219.14 recommend that vegetable oil-derived SAF's are treated consistently with road sector fuels, and are not excluded from any crediting restrictions.
- 219.15 We recommend that the 20 percent crediting restriction on these feedstocks should be broadened to include all crop-based BBD to reduce growth in other oilseed crop markets that are linked to their own market-mediated emissions impacts. Setting a narrow definition for vegetable oils as currently proposed could incentivize imports from lesser consumed biofuel feedstocks in the future such as sunflower and peanut oil. Valin et al. estimate that sunflower oil has a LUC value of 63 gCO₂e/MJ in their impact assessment that informed the European Renewable Energy Directive (RED).¹¹ The LUC value of peanut oil has not yet been assessed in major studies or regulations; however, a 2015 study indicates that peanut oil may have a worse environmental performance on a life-cycle basis than other common biofuel feedstocks such as canola and palm oil.¹²
- 219.16 Further, we recommend that the restriction on vegetable oil crediting is introduced under a more accelerated timeframe to strengthen its impact in the near-term. Due to the current grandfathering provision, any BBD producer that blended soybean and canola oil at greater than 20 percent of

⁹ This calculation is based on the combined hydrotreatment capacity in Table 2 below, assuming a 55% SAF share when optimized to maximize SAF output.

¹⁰ CARB proposes to assign the CI of CARBOB to biomass that is processed into ethanol and the CI of ULSD to all other biofuels

¹¹ Valin, Hugo, Daan Peters, Maarten van der Berg, Stefan Frank, David Havlik, Nicklas Forsell, Koen Overmars, and Carlo Hamelinck. "The Land Use Change Impact of Biofuels Consumed in the EU: Quantification of Area and Greenhouse Gas Impacts," August 27, 2015.

¹² <https://www.sciencedirect.com/science/article/abs/pii/S0959652614010518>

their certified volumes during 2023 LCFS reporting does not have to adhere to the crediting restriction until 2028. This creates room under the crediting limit for refinery expansion and higher soy and canola blend rates in the interim years.

Rapid refinery expansion over the last several years is projected to keep pace through the end of 2025.¹³ This includes capacity expansions at the Martinez and Phillips 66 refineries in California; by the end of 2024, these facilities are anticipated to operate at nameplate capacities of 775 and 808 million gallons, respectively.¹⁴ We calculate what the maximum output of renewable diesel at refineries that currently process soybean and canola oil could be based on California’s certified fuel pathway table.¹⁵ We draw refinery nameplate capacity data from the U.S. Energy Information Administration’s (EIA) renewable diesel plant database.¹⁶

We only consider refineries that currently process canola, soybean oil, or a combination of both in our maximum capacity calculations. We adjust the nameplate capacity for bio-refineries by a factor of 95% assuming that 5% of the product slate is sold as light ends that remain exempt from the credit restriction. We make this adjustment because CARB’s proposed feedstock cap only applies to biomass-based diesel; thus, capped volumes exclude the share of naphtha and SAF produced as part of the distillate product slate. In total, we calculate that these plants could produce a maximum of 850 million gallons of soy and canola-derived RD once the crediting restriction comes into force (Table 2).

Table 2. Crediting limit at eligible renewable diesel refineries

Facility	Total capacity (million gallons)	Proposed cap, Q1 2024 capacity (million gallons)	Proposed cap, maximum capacity (million gallons)
Phillips 66 Company	808	92.1	153.5
Wyoming Renewable Diesel Company LLC	117	22.2	22.2
Dakota Prairie Refining	192	36.5	36.5

¹³ <https://www.eia.gov/todayinenergy/detail.php?id=55399>

¹⁴ <https://biodieselmagazine.com/articles/marathon-martinez-renewables-to-reach-100-capacity-by-year-end>; <https://investor.phillips66.com/financial-information/news-releases/news-release-details/2024/Phillips-66-Announces-Major-Milestone-in-Production-of-Renewable-Diesel/default.aspx>

¹⁵ <https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities>

¹⁶

https://atlas.eia.gov/datasets/b6327e97caef493d9c74695d420cbc11_245/explore?location=38.619967%2C-116.456270%2C6.26

Wynnewood Refining Company, LLC	121	23.0	23.0
Reg Geismar, LLC	101	5.3	5.3
Chevron Products Company	31	5.9	5.9
Cheyenne Renewable Diesel Company LLC	92	17.5	17.5
Diamond Green Diesel Holdings LLC	537	102.0	102.0
Artesia Renewable Diesel Company LLC	141	26.8	26.8
Martinez Renewables LLC	775	73.7	147.3
Jaxon Energy, LLC	25	4.8	4.8
Montana Renewables, LLC	184	9.6	9.6
St Bernard Renewables LLC	320	60.8	60.8
Diamond Green Diesel Holdings LLC	982	186.6	186.6
Cvr Renewables Wyn, LLC	121	23.0	23.0
Altair Paramount, LLC	42	2.2	2.2
Vertex Renewables Alabama LLC	123	23.3	23.3
Total	4,712	715	850

Similarly, we estimate the feedstock cap for biodiesel (i.e., FAME) derived from existing plants that currently process soybean, canola oil, or a combination of both. We reference capacity data from EIA's U.S. Biodiesel Plant Production Capacity dataset to match the nameplate capacity from U.S. biodiesel plants to fuel producers currently generating LCFS credits in California (Table 3).¹⁷ In total, we calculate that these plants could produce a maximum of 221 million gallons of soy and canola-derived biodiesel.

Table 3. Crediting limit at eligible biodiesel refineries

Facility	Total capacity (million gallons)	Proposed cap, maximum capacity (million gallons)
Biox Canada Limited	227	45.4
Reg Newton, LLC	38	7.6
Reg Danville, LLC	50	10
Global Alternative Fuels, LLC	15	3
Ag Processing Inc	42	8.4

¹⁷ <https://www.eia.gov/biofuels/biodiesel/capacity/>

Reg Grays Harbor, LLC	107	21.4
Canary Biofuels Inc.	20	4
Reg Albert Lea, LLC	46	9.2
High Plains Bioenergy	40	8
Bioenergy Development Group LLC	36	7.2
Reg Seneca, LLC	76	15.2
Canary Renewables Corp.	20	4
Cargill Biodiesel	56	11.2
World Energy Harrisburg LLC	19	3.8
Ag Processing Inc	76	15.2
Western Iowa Energy	45	9
REG Mason City, LLC	39	7.8
Archer Daniels Midland Co	85	17
ADM Agri-Industries Company	70	14
Total	1,107	221

We estimate that the maximum combined vegetable oil crediting limit is roughly 1,070 million gallons, far higher than our 2022 estimate of soy and canola oil feedstock availability in California in 2030 (approximately 100 million gallons—California’s market-adjusted share of the total nationwide soy BBD consumption). That estimate draws upon a 2022 ICCT analysis of U.S. feedstock availability, 2021 soy oil consumption in transport, and applies a factor 7.3% to represent California’s share of the distillate fuel market.¹⁸ This volume limit exceeds current consumption of soybean and canola oil-derived BBD in California (roughly 434 million gallons in 2023) that currently accounts for 32% of total vegetable oil-derived BBD volumes.¹⁹ However, because the crediting limit will not come into effect until 2028 for facilities already consuming greater than a 20% share of vegetable oil, there is an opportunity for the consumption of vegetable oils to continue to expand until 2028. For example, the Martinez and Phillips 66 refineries are the two largest in California with a combined theoretical capacity of 1.58 billion gallons, much higher than their current capacity utilization. If they are grandfathered under the crediting proposal and process soybean and canola oil at full capacity, this could push the crediting restriction significantly upwards.

CARB has acknowledged these risks given that its entire diesel fuel pool is larger than the federal RFS renewable volume obligation (RVO) and that other states and provinces have begun to introduce their own clean fuel

¹⁸ <https://theicct.org/wp-content/uploads/2022/08/lipids-cap-ca-lcfs-aug22.pdf>

¹⁹ <https://ww2.arb.ca.gov/resources/documents/low-carbon-fuel-standard-reporting-tool-quarterly-summaries>

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standard programs.²⁰ These programs are expected to increase competition for resource-limited feedstocks and could reverse the current trend of rapid BBD growth in California. However, if California continues to provide an excess price signal for BBD (and further if the AAM is triggered), limited feedstock resources will continue to flow to the state and could crowd out investment in other lower-carbon technology pathways.

219.19

While the proposed restriction on soybean and canola oil crediting is a first step in acknowledging these risks, it does not go far enough to mitigate them. Setting a volume or energy-based cap on the quantity of lipids eligible under the LCFS program would be a far stronger approach in reducing vegetable and waste oil consumption in BBD markets. This approach was taken by Germany in its implementation of the EU RED.²¹ Research has found that the indirect land use change (LUC) emissions impacts of vegetable oil feedstocks may be even worse than that of fossil fuels due to market linkages that trigger the conversion of primary forestland or peatland.²²

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219.21

Though waste oils do not present the same LUC risk, traceability and fraud risk remain a significant concern.

Implement Third-Party Sustainability Certification for Biomass Wastes and Residues

219.22

We strongly recommend that CARB expand third-party certification requirements to include biofuels made from wastes and residues. Though the 15-day package expands the certification requirements to include forest biomass, it is unclear if this provision extends to other sources of biomass. Waste oils have made up the largest share of BBD credits since the start of the LCFS program and are incentivized due to their low CI value relative to crop-based fuel pathways. Waste oils are closely linked with reporting fraud, which has been under increasing scrutiny in the U.S. and Europe. EPA is currently investigating two renewable fuel producers for used cooking oil (UCO) fraud and the EU is undergoing similar investigations.²³ A renewed focus on fraud comes after a sharp rise in UCO imports from Asia, which

²⁰ https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_attc.pdf

²¹ <https://germanlawarchive.iuscomp.org/?p=315>

²² Hugo Valin et al., *The Land Use Change Impact of Biofuels Consumed in the EU: Quantification of Area and Greenhouse Gas Impacts* (Utrecht, Netherlands: Ecofys, 2015)

²³ <https://www.reuters.com/business/energy/us-epa-says-it-is-auditing-biofuel-producers-used-cooking-oil-supply-2024-08-07/>; <https://www.reuters.com/sustainability/climate-energy/france-germany-urge-tougher-eu-checks-biofuel-imports-fraud-probe-2024-05-31/>

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grew from 0.4 thousand tonnes to 718 thousand tonnes between 2022 and 2023 alone.²⁴

219.23

UCO fraud is prevalent due to the difficulty in distinguishing between filtered UCO and vegetable oil during chemical testing. The European Anti-Fraud Office has investigated cases where virgin vegetable oil was fraudulently labeled as UCO to avoid anti-dumping fees and benefit from national-level renewable energy incentives.²⁵ In 2020, the Dutch company Sunoil forged sustainability certification scheme (SCS) certificates that credited crop-based biofuels as waste-based biofuels.²⁶ Similar fraud schemes have occurred in the U.S. in early years of the Renewable Fuel Standard (RFS) program where biodiesel producers forged quality tests for UCO biodiesel as well as overstated production quantities that received RIN credits.²⁷ An ICCT study that compiled data on UCO trade, collection rates, and resource potential in various Asian countries found that UCO exports may already exceed volumes that are plausibly produced and imported.²⁸ This risk is exacerbated if BBD demand continues to grow due to policy incentives from federal and state-level fuel programs.

The use of third-party auditors such as those approved under CORSIA and the EU Renewable Energy Directive (RED) can help mitigate the risk of reporting and testing fraud; however, they cannot eliminate this risk entirely.²⁹ However, a third-party certification can still help to improve the integrity of waste oils credited within the LCFS. For example, the RSB certification for advanced biofuels includes detailed requirements for traceability of waste biomass, specifying that 1) collectors and aggregators in the waste supply chain maintain data and a mass balance system to track their material flows, 2) that collectors maintain evidence to track material

²⁴

<https://comtradeplus.un.org/TradeFlow?Frequency=A&Flows=M&CommodityCodes=151800&Partners=842&Reporters=all&period=2023&AggregateBy=none&BreakdownMode=plus>

²⁵ https://anti-fraud.ec.europa.eu/system/files/2021-09/olaf_report_2019_en.pdf

²⁶ <https://op.europa.eu/en/publication-detail/-/publication/ec9c1003-76a7-11ed-9887-01aa75ed71a1/language-en>

²⁷ United States Department of Justice, “Pennsylvania Biofuel Company and Owners Sentenced on Environmental and Tax Crime Convictions Arising out of Renewable Fuels Fraud,” news release, October 20, 2020, <https://www.justice.gov/opa/pr/pennsylvania-biofuel-company-and-owners-sentencedenvironmental-and-tax-crime-convictions>.

²⁸ https://theicct.org/wp-content/uploads/2023/02/US-UCO-potential_fs_final.pdf

²⁹ <https://www.icao.int/environmental-protection/CORSIA/Documents/ICAO%20document%2004%20-%20Approved%20SCSs.pdf>

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back to its point of origin, and 3) that points of origin can be accessed and audited.³⁰

Improve and Update ILUC Assessments for Crop-Derived Biofuels

The proposed 15-day changes also indicate that CARB may choose to reassess indirect land use change (ILUC) values for crop-based fuel pathways based on new data or applications for feedstocks and regions that have not yet been assessed.³¹ The current ILUC values are based on a 2015 LUC assessment that used the GTAP-BIO and AEZ-EF models with stakeholder input from an expert working group. CARB recognizes that, because the previous LUC assessment was conducted for domestic feedstocks, current values may not represent a conservative estimate of the market-mediated impacts of biofuels. Specifically, these proposed changes are implemented to protect against “a rapid increase in oil crop demand for biofuel production could potentially add pressure to convert forested land or other land types into biofuel crop production.”³²

ILUC values vary widely across the literature; however, clear trends emerge. Vegetable oil feedstocks have the highest LUC impacts when they are grown on high carbon-stock land such as peatland and primary forestland.³³ Due to the prevalence of feedstock substitution, these feedstocks can trigger global land conversion even when they are planted on existing cropland. EPA’s recent modeling comparison document finds that the ILUC emissions for soybean biodiesel range between 9 and 280 gCO₂e/MJ.³⁴ If the ADAGE is removed as an outlier, soybean biodiesel LUC emissions range by 49 gCO₂e/MJ, more than half the certified CI of fossil diesel in California.

219.24

Due to significant modeling uncertainty, adopting more conservative ILUC values can help address the potential for unintended indirect emissions from biofuel demand in the LCFS program. There is a risk that the current set of ILUC values adopted by CARB could underestimate these emissions impacts due to recently challenged modeling assumptions within GTAP-BIO such as the modeling of unmanaged forest land and high rates of yield

³⁰ <https://rsb.org/wp-content/uploads/2020/06/RSB-STD-11-001-01-010-v.2.1-RSB-EU-RED-Standard-Adv-Fuels.pdf>

³¹ https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_notice.pdf

³² <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>

³³ Hugo Valin et al., *The Land Use Change Impact of Biofuels Consumed in the EU: Quantification of Area and Greenhouse Gas Impacts* (Utrecht, Netherlands: Ecofys, 2015) https://pure.iiasa.ac.at/id/eprint/12310/1/Final%20Report_GLOBIOM_publication.pdf;

³⁴ <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1017P9B.pdf>

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intensification, as explained in our February comments to the proposed LCFS amendments.³⁵ Similarly, recent research from a contributor to CARB's 2015 ILUC analysis has identified major structural issues associated with the GTAP ILUC model, including the model's use of correlational behavior rather than empirical studies that establish causality and misapplication of these relationships to different geographic regions and functional forms.³⁶ Berry notes that GTAP predicts low rates of deforestation and high rates of afforestation based on assumptions from a single study that misrepresents real-world economic behavior; thus, the GTAP model highly underestimates forestland conversion and associated ILUC. GTAP also relies on outdated trade data that does not predict the complete effects of US trade policy on global land use. Further, CARB's 2015 analysis is inadequate to assess the risk of ILUC from new feedstocks and production regions.

We encourage CARB to evaluate ILUC emissions for new geographic regions based on empirical data. Updating the LUC values in Table 6 of the regulation could lead to a meaningful change in the BBD compliance trajectory that could be implemented within the existing structure of the LCFS that is not sufficiently addressed under the current proposals. Due to some of the limitations with the GTAP-BIO model that may result in systematic underestimation of ILUC emissions highlighted above, we also recommend that CARB either use a combination of models or use an alternative model in order to generate a more scientifically robust analysis. Examples of a multi-model approach include the 2019 ICAO-CORSIA analysis of ILUC emissions for SAFs³⁷ and EPA's 2023 model comparison exercise for corn ethanol and soy biodiesel.³⁸

Issues in the CATS model that require further evaluation

CARB made updates to its scenario modeling of the ISOR proposal in the 15-day package. It also assessed three uncertainty scenarios with a focus on AAM impacts, zero-emission vehicle (ZEV) adoption and renewable diesel consumption. The largest changes include a higher step-down of the 2025 compliance target from 5% to 9%. Other changes also include increases to

³⁵ <https://www.arb.ca.gov/lists/com-attach/6886-lcfs2024-AmsCZwFjACcAWQJu.pdf>

³⁶ <https://www.arb.ca.gov/lists/com-attach/6987-lcfs2024-AXVUPQNgUWsDa1AP.pdf>

³⁷ https://www.icao.int/environmental-protection/CORSIA/Documents/CORSIA_Eligible_Fuels/CORSIA_Supporting_Document_CORSIA%20Eligible%20Fuels_LCA_Methodology_V5.pdf

³⁸ <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1017P9B.pdf>

credit generation from fixed-guideway vehicles and changes to the EER for electric forklifts.

219.25

While CARB estimates that renewable diesel volumes will grow to more than 3 billion gallons as a result of the CI target step-down that aligns more closely with our own projections modeled in our April 10th workshop comments, we find that none of the updates to the ISOR scenario and data published following the April 10th LCFS workshop make any adjustments to lipid fuel conversion costs or feedstock availability. In our previous comments, we noted that CATS model refinery conversion costs for renewable diesel were far higher than values reported in the literature and market data (roughly \$1,000 per ton), and had potentially mistakenly included feedstock cost within the conversion cost. Brown et al. (2020), Witcover and Williams (2020) and Pavlenko et al. (2019) estimate the levelized cost for hydroprocessed fuels, with estimates ranging from approximately \$3.50 to \$5.50 per gallon, adjusted for inflation.³⁹ Drawing from the analysis of Pavlenko et al. (2019), we estimated that the non-feedstock conversion costs alone were roughly \$300 per ton for soy renewable diesel, suggesting a slight price premium vs. conventional soy biodiesel (\$100/ton), but substantially lower than the original assumption.

ICCT's projections for RD growth published in our April workshop comments are consequently higher than CARB's estimates due to adjustments we made to the vegetable and waste oil supply curves and renewable diesel refinery conversion costs.⁴⁰ Recent changes to the proposed amendments (i.e., 15-day package) may change this trajectory. Using the same conversion costs and feedstock supply curve as in ICCT's April 2024 comments, we estimate the compliance trajectory of lipid-based biofuel compliance (including SAF's) in response to the central compliance scenario modeled by CARB in the 15-day package. We find that there is overall a higher volume of renewable diesel consumed in the transport sector in the ICCT scenario, due to the lower production costs. Whereas the share of biofuels in the diesel mix peaks at 90% in the CARB proposal in 2025 and then declines, the ICCT scenario reaches 100% BBD blending in 2027 and stabilizes. This suggests

³⁹ Nikita Pavlenko, Stephanie Searle, and Adam Christensen, "The Cost of Supporting Alternative Jet Fuels in the European Union." (Washington, DC: ICCT, 2019), https://theicct.org/sites/default/files/publications/Alternative_jet_fuels_cost_EU_2020_06_v3.pdf; Julie Witcover and Robert B. Williams, "Comparison of 'Advanced' Biofuel Cost Estimates: Trends during Rollout of Low Carbon Fuel Policies," *Transportation Research Part D: Transport and Environment* 79 (February 1, 2020): 102211, <https://doi.org/10.1016/j.trd.2019.102211>; Adam Brown et al., "Advanced Biofuels – Potential for Cost Reduction" (IEA Bioenergy, 2020), https://www.ieabioenergy.com/wp-content/uploads/2020/02/T41_CostReductionBiofuels-11_02_19-final.pdf.

⁴⁰ <https://www.epa.gov/renewable-fuel-standard-program/final-renewable-fuels-standards-rule-2023-2024-and-2025>

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that the CARB scenario may still be understating the impact of the proposal on lipid demand, and further, given that the bulk of the growth occurs before 2028, is stimulating demand before the vegetable oil crediting limit tightens.

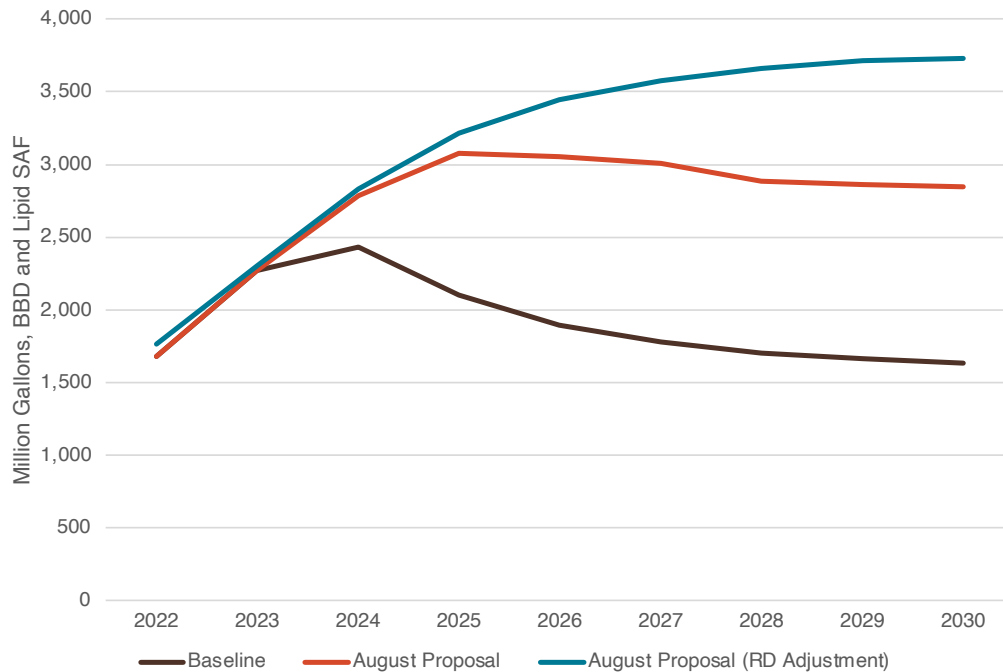


Figure 1: Comparison of Lipid-Based Biofuel Volumes in CARB Baseline + 15-Day Period CATS Scenarios with RD cost & feedstock adjusted ICCT CATS model scenario

We also note several possible errors in CARB’s modeling analysis, suggesting that additional analytical work may be necessary to update the model and properly evaluate the proposed 15-day changes. These include several issues:

219.26

- The CATS model inputs hard-code substantial increase in SAF deployment despite the removal of the aviation fuel obligation in the LCFS, as well as a simultaneous substantial decline in the benchmark for conventional jet fuel. In the model results, this leads to a decline in the average CI of jet fuel to approximately 74 gCO₂e/MJ by 2030 in the central scenario. The modelers assume that the hard-coded increase in SAF production will come from waste oils, despite the parallel exclusion of virgin vegetable oil-derived SAF’s from crediting that is proposed for road sector fuels.

219.27

- As noted in our April comments, the model and inputs still do not correctly quantify the treatment of biomethane-derived CNG in the ISOR. Though certified pathways approved prior to 2030 are allowed to be grandfathered for multiple 10-year periods, the quantity of CNG credited abruptly declines to 0 in 2030 in the central scenario.

- 219.28
- The quantity of infrastructure credits is the same between the ISOR and the 15-day package, despite the change from the ISOR.
 - There is likely a model or input error for fixed-guideway transit, eCargo Handling Equipment, and refrigeration equipment. Starting in the mid-2020s, the model assumes that the credit generation for these pathways will remain fixed and stays constant each year. However, as the policy benchmark is declining each year, the difference between the electricity CI for these pathways and the benchmark should be narrowing, resulting in fewer credits each subsequent year.
- 219.29

Restore the Proposed Jet Fuel Obligation in the LCFS

CARB's initial proposal to obligate intrastate jet fuel under the LCFS was removed in the recent package, however, CARB is exploring other methods to improve the environmental performance of its aviation sector. This includes regulating mobile source pollutants at large commercial airports, deploying zero-emission buses and ground support equipment, and collaborating with FAA to maintain fleet average NOx emissions and remove lead from aviation gasoline.⁴¹ ICCT supports these complementary activities to reduce the direct air quality impacts of aviation.

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- While we note that CARB is correct that an obligation on the aviation sector would not itself secure SAF usage, as those deficits could be met with other sources of credits. However, expanding the LCFS obligation to the aviation sector would still provide a meaningful decarbonization signal to the industry by attributing deficits to fossil aviation fuel. Previous ICCT analysis has found that the current, opt-in approach will only motivate small quantities of SAF deployment, far short of California's goals.⁴² Additionally, it would also continue the status quo of having the road sector continue to finance the burden of decarbonizing the state's aviation emissions.

To summarize, though we support expanding the scope of the LCFS to include the aviation sector, we caution that it must be done without exacerbating the underlying problems in the LCFS. If aviation is obligated without a separate safeguard on vegetable oils or lipid-based fuels, this could undermine the GHG emission and public health benefits of regulating aviation emissions. Thus, we recommend that CARB obligate jet fuel consumed over the entire CA airspace to spur growth in nascent SAF

⁴¹ https://ww2.arb.ca.gov/sites/default/files/2024-08/California%20Aircraft%20and%20Airports%20Fact%20Sheet%20-%20July%202024_0.pdf

⁴² <https://theicct.org/wp-content/uploads/2023/01/ca-aviation-decarbonization-jan23.pdf>

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markets and deliver public health benefits but only if this obligation is paired with a cap on the consumption of lipid-based fuels. We also recommend that this obligation take effect in 2025 to increase cumulative SAF output and signal earlier support for the production scale-up of advanced fuel pathways.

Implement Deliverability Requirements for Biomethane-derived Hydrogen

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The 15-day package does not contain any meaningful deliverability requirements for biomethane-derived hydrogen despite the risk of dilution of the LCFS's signal on supporting out-of-state, out-of-sector manure management projects. In many cases, RNG projects credited under the LCFS are located outside of California that have no direct impact on California's greenhouse gas (GHG) emissions or in-state agricultural practices. In other words, natural gas suppliers may gain revenue from LCFS credits for a unit of fossil gas produced and consumed in California (often in non-transportation uses) with an equivalent unit of renewable natural gas (RNG) produced across the country and injected into the national natural gas transmission grid.

The effect of book-and-claim crediting is particularly egregious for biomethane-derived hydrogen fuel pathways, as these pathways are fully excluded from deliverability requirements until 2046. Producing this hydrogen is a fully mature technology done via steam methane reforming at facilities connected to the existing natural gas grid, drawing upon the grid gas mix, but pairing that hydrogen with a book-and-claim environmental attribute. Despite achieving a higher theoretical credit price than green hydrogen, green hydrogen made from low-CI electricity must satisfy a more rigorous series of requirements than biomethane-derived hydrogen. Electrolytic green hydrogen must ensure deliverability, proof that low-CI electricity comes from new generation, and that there is no double-counting. In contrast, biomethane producers who sell their environmental attributes to existing grey hydrogen producers must only demonstrate the retirement of environmental attributes. Thus, a pathway that enables further use of existing natural gas SMR technology generates higher credit values in the LCFS and has looser book and-claim requirements than a green hydrogen pathway that involves deploying new electrolyzer technology.

The figure below illustrates the LCFS policy value for dairy manure derived hydrogen with a CI of $-187 \text{ gCO}_2\text{e/MJ}$, similar to current certified pathways, across a range of LCFS credit values. These values are compared to the

LCFS value for zero-carbon electrolytic green hydrogen and the red-dotted line indicates the maximum tax credit (\$3/kg H₂) that could be received via Inflation Reduction Act's (IRA) Clean Hydrogen Production Credit (Section 45V), which provides tax credits for hydrogen produced with minimal greenhouse gas emissions (below 4kg CO₂e/kg H₂ or 33 gCO₂e/MJ H₂).⁴³ Dairy biomethane-derived hydrogen could generate a credit value of between \$3.3 and \$8.8/kg H₂, depending on the LCFS credit price. Even with a conservative credit price of \$75/t CO₂e, the policy value for dairy hydrogen surpasses the maximum tax credit a producer could receive from IRA 45V, awarded to low CI hydrogen pathways with GHG emissions less than 0.45kg CO₂e/kg H₂ (3.8 gCO₂e/MJ H₂). Given the high LCFS compliance values shown here, we recommend safeguards for biomethane-derived H₂ to better ensure that this pathway's GHG reductions are attributable to the LCFS and the fuel is being used in the transport sector.

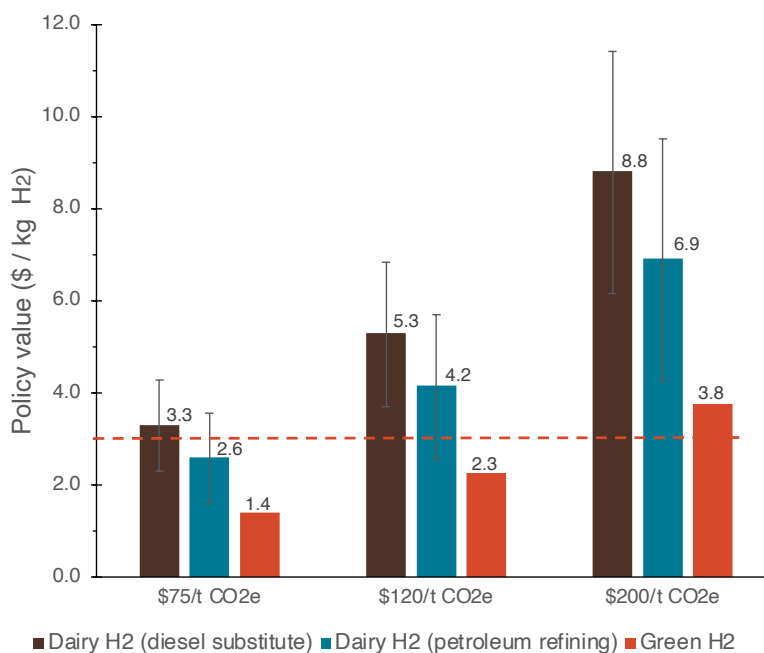


Figure 2. Policy values for dairy biomethane-derived gaseous hydrogen (G.H₂) at sample LCFS credit prices estimated using the average CI of LCFS certified pathways. The error bars correspond to the range of CI values from certified pathways. The red line indicates the maximum tax credit (\$3/kg H₂) that could be received via IRA's Clean Hydrogen Production Credit (Section 45V).

⁴³ Yifan Ding, Chelsea Baldino, and Yuanrong Zhou, "Understanding the Proposed Guidance for the Inflation Reduction Act's Section 45V Clean Hydrogen Production Tax Credit," 2024, <https://theicct.org/publication/proposed-guidance-for-the-inflation-reduction-act-45v-clean-hydrogen-tax-credit-mar29/>.

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Figure 3 below displays the original geographic source of biomethane for certified dairy hydrogen projects in California.⁴⁴ Not a single certified biomethane hydrogen pathway in the LCFS actually captures methane in or near California. Based on the lax book-and-claim requirements proposed, we can anticipate there could be significantly more out-of-state farms taking advantage of the LCFS credits in the coming years, with minimal impact on California's transport sector goals or agricultural methane targets.

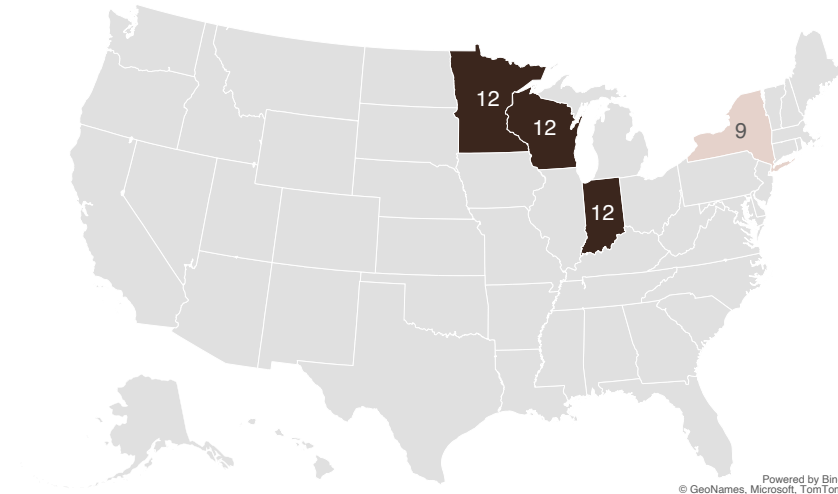


Figure 3. Number of projects and geographic source of dairy biomethane for certified hydrogen pathways in California.

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To assess the potential risk from out-of-state farms, we draw upon data from the Census of Agriculture⁴⁵ to identify the number of large-scale centralized farms that could be eligible to participate in the LCFS program. In a previous assessment of cost-viable RNG production potential over a 10-year project crediting period, we performed a discounted cash flow analysis and estimated the size of dairy projects that would result in breakeven project cost.⁴⁶ Accordingly, a farm should have at least 2,300 dairy cattle to be economically feasible. As the Census data only provides data on certain ranges, we use 2,500 dairy cattle as cut-off. Figure 4 displays the distribution of farms with corresponding dairy cattle numbers indicating the risk for

⁴⁴ California Air Resources Board, "Current Fuel Pathways."

⁴⁵ U.S. Department of Agriculture, "Census of Agriculture, 2022 Census Volume 1, Chapter 1: State Level," 2024, https://www.nass.usda.gov/Publications/AgCensus/2022/Full_Report/Volume_1,_Chapter_1_State_Level/.

⁴⁶ Jane O'Malley, Nikita Pavlenko, and Yi Hyun Kim, "2030 California Renewable Natural Gas Outlook: Resource Assessment, Market Opportunities, and Environmental Performance" (Washington, D.C.: International Council on Clean Transportation, May 22, 2023), <https://theicct.org/publication/california-rng-outlook-2030-may23/>.

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potential out-of-state farms making use of the LCFS crediting system. While California is home to 255 of breakeven farms (31%), there are also a substantial pool of at least 579 out-of-state farms that could qualify for LCFS credits.

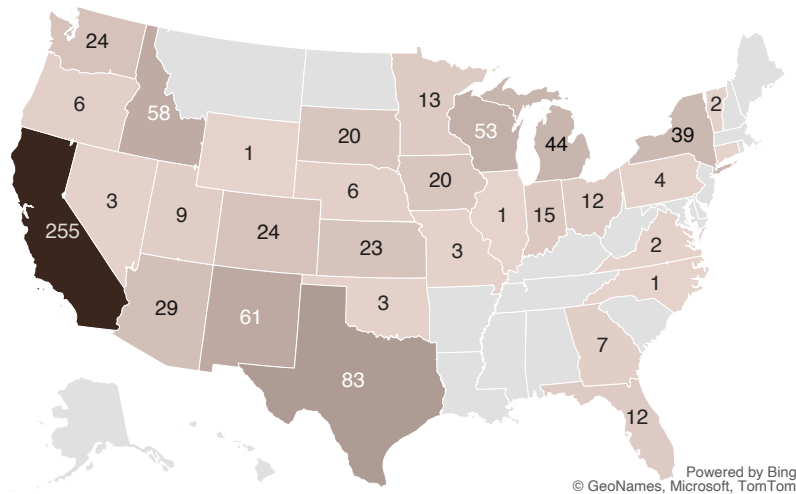


Figure 4. Distribution of dairy farms per state with 2,500 and more dairy cattle.

The Agricultural Census data also reveals that farms with 2,500 or more dairy cattle have increased 17% between 2017 and 2022 in California. Though it is difficult to distinguish causality here, one should also consider the potential risk of consolidation in the industry at the expense of small farms to take advantage of high LCFS credits for RNG.⁴⁷ Installing digesters might provide methane reductions when administered properly yet the potential risks should be carefully considered.

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The potential of out-of-state farms capturing biogas, and taking advantage of the LCFS crediting is particularly remarkable for the swine industry, which is largely concentrated outside of California. We illustrate this in Figure 5, where we considered farms with greater than 5,000 heads as cut-off since manure per head is lower for swine, and this is the highest range of data available from the Census of Agriculture. Accordingly, there is a total of 3,540 swine farms of this size, and only 2 of them are in California. In this case, the lack of geographical deliverability requirements for biomethane derived hydrogen could lead to an abundance of out-of-state credits generated by an industry without a sizeable in-state counterpart. There are already a few certified pathways for swine manure-derived RNG from Missouri being used as an offset for carbon intensity reductions for hydrogen

⁴⁷ R Lazenby, "Mitigating Emissions from California's Dairies" (Emmett Institute on Climate Change & the Environment, 2024), <https://law.ucla.edu/news/mitigating-emissions-californias-dairies-considering-role-anaerobic-digesters>.

production in California. These also have similarly low CIs as the dairy farms at an average of -357.4 gCO₂e/MJ of hydrogen.

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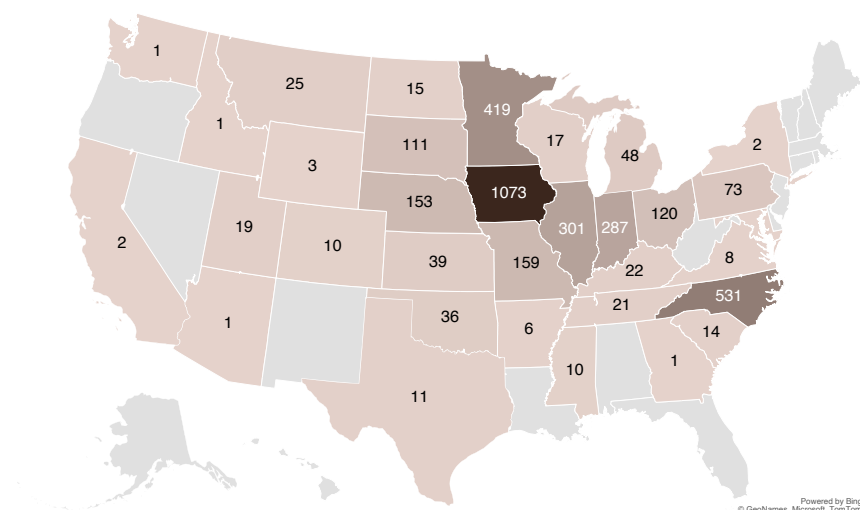


Figure 5. Distribution of swine operations per state with 5,000 and more hogs and pigs.

Thus, there is a possibility that further, long-term loose book-and-claim requirements would largely facilitate deployment of digesters at out-of-state farms with little impact on California's own methane goals or its transport sector emissions. There are hundreds of out-of-state dairy and thousands of swine farms that could take advantage of these incentives. Therefore, we recommend that deliverability requirements for biomethane-derived hydrogen are made consistent with those for biomethane-derived RNG and electricity prior to 2030, in order to prevent this issue from growing and diluting the impact of the LCFS on its transport sector goals.

219.34

Attributing Electricity to Direct Air Capture

The proposed changes to the 15-day package loosen the criteria used to attribute low-CI electricity production to direct air capture (DAC) via indirect accounting. Indirect attribution of electricity for producing e-fuels, hydrogen or capturing CO₂ can have unintended emissions consequences, as modeled by Ricks et al. (2023)⁴⁸ and highlighted by the U.S. Treasury department in its proposed guidance for the GHG accounting for electrolytic hydrogen.⁴⁹ While the exact indirect emissions effects of hourly vs. book-and-claim electricity matching are a source of uncertainty and academic debate for hydrogen production, they are also significant for DAC projects.

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⁴⁸ <https://iopscience.iop.org/article/10.1088/1748-9326/acacb5>

⁴⁹ <https://www.federalregister.gov/documents/2023/12/26/2023-28359/section-45v-credit-for-production-of-clean-hydrogen-section-48a15-election-to-treat-clean-hydrogen>

Due to the intermittency of renewable electricity generation, there is a risk that industrial projects that create demand for electricity outside of the times when intermittent renewables generate electricity will create additional demand for fossil electricity, thus increasing the de facto life-cycle emissions of those projects. Furthermore, California in particular is at risk of large seasonal variation in renewable electricity supply, with a large discrepancy between the total solar generation during the summer months and that generated during winter; this may pose a particular challenge to the integrity of three-quarter book-and-claim attribution given the seasonal renewable electricity imbalance.⁵⁰ Thus, annual matching or three quarter matching of environmental attribute certificates (EAC's) from renewable generation from other regions and other times of day to the electricity consumed by those projects may thus systematically underestimate the actual emissions attributable to them.

Because DAC is intended to be a direct source of CO₂ reduction (and is credited as such) in the LCFS, any effects that could affect its net CO₂ balance warrant close scrutiny. Casaban and Tsalaporta (2023) estimate that the energy consumption for a near-term DAC facility under development in Europe requires approximately 500 kWh of electricity and 1500 kWh of waste heat per tonne of CO₂ captured based on industry data, with the potential for efficiency improvements such that the energy needs decline to 444 kWh and 1,333 kWh.⁵¹ While the contribution of electricity generated from zero-CI sources under the LCFS would therefore be 0 kgCO₂e per tonne CO₂ captured, this could increase significantly depending on the degree to which three-quarter EAC matching diverges from hourly electricity consumption. If we assume that the supplied electricity is the CA grid average of 80.55 gCO₂e/MJ in 2024⁵², the upstream emissions impact of electricity to provide DAC increases to approximately 145 kgCO₂e/tonne CO₂ captured. If marginal generating resources are used during off-peak times, as suggested in the electricity sector modeling conducted by Ricks et al. (2023), the natural gas power plant emission factor of 149 gCO₂e/MJ estimated in GREET_2023 may be more appropriate, generating emissions of approximately 268 kgCO₂e/tonne CO₂ captured. While many DAC LCA's

⁵⁰ Mahmoud Y. Abido, Zabir Mahmud, Pedro Andrés Sánchez-Pérez, Sarah R. Kurtz, Seasonal challenges for a California renewable- energy-driven grid, iScience, Volume 25, Issue 1, 2022, 103577, ISSN 2589-0042, <https://doi.org/10.1016/j.isci.2021.103577>.

⁵¹ Casaban, D., Tsalaporta, E. Life cycle assessment of a direct air capture and storage plant in Ireland. *Sci Rep* **13**, 18309 (2023). <https://doi.org/10.1038/s41598-023-44709-z>

⁵² https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/comments/2024_elec_update.pdf?_ga=2.215521363.579411473.1718133376-1766514414.1711042709#:~:text=The%20resulting%20average%20CI%20for,for%20use%20in%202023%20reporting.

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assume that zero-CI waste heat is used to supply heat, the use of electricity to generate heat (for example, in a region where waste heat is unavailable or inaccessible) may push the indirect GHG emissions even higher. Taking for example a hypothetical all-electric DAC configuration using heat pumps to supply heat⁵³, the facility would consume approximately 3.1 times as much electricity for heat & power as electricity alone; this could increase emissions to approximately 450 to 831 kgCO₂e/tonne CO₂ captured using the emission factors above, substantially reducing the net climate benefit for DAC.

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Given that relaxing the electricity attribution for DAC can make a substantial impact on the net CO₂ balance for DAC, we recommend restoring the requirement for book-and-claim electricity accounting to quarterly rather than the proposed three-quarter match. Longer-term, in order to mitigate potential unintended emissions, we recommend that CARB implement an hourly matching system for DAC projects, consistent with the approach proposed by Treasury for the 45V hydrogen production tax credit.

Restore the Clean Fuel Reward Rebate Program for Medium and Heavy-Duty Vehicles

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The proposed change to base electric vehicle crediting greatly changes the scope and scale of LCFS support for medium and heavy-duty electrification. Whereas the ISOR reserved a significant portion of base credit generation from electrical distribution utilities (EDU's) to be set aside for the Clean Fuel Reward program to fund purchase rebates for the purchase of medium- and heavy-duty ZEV's, that funding is now being set aside for light-duty vehicle OEM's if LDV ZEV sales fall below a threshold of 30% for 2024—a high benchmark designed to be failed. This change constitutes a meaningful blow to CARB's ambition to support the challenging MDHDV electrification transition, which is still in its early stages and which faces stronger barriers than the comparatively more mature ZEV LDV industry.

The proposed changes shift a substantial quantity of funding from MDHDV ZEV's towards LDV with little justification and unclear trade-offs. Based on CARB's modeling outputs in the central scenario, this could amount to approximately 7.5 million credits by 2030 in CARB's central scenario.⁵⁴

⁵³ Gutsch, M., Leker, J. Co-assessment of costs and environmental impacts for off-grid direct air carbon capture and storage systems. *Commun Eng* 3, 14 (2024). <https://doi.org/10.1038/s44172-023-00152-6>

⁵⁴ Based on total electricity consumption in the proposed scenario in the 15-day package CATS modeling, adjusting based on the LDV share of electricity consumption and 45% of credits diverted to OEMs.

Depending on LCFS credit prices, this could range from approximately \$375 million to \$1.2 billion in value based on an LCFS credit price range of \$50-\$150, but with far less oversight on how this money would be spent. Examples of allowed activities in the 15-day package include rebates, marketing, installing charging infrastructure, and projects that promote transportation electrification; however, it is unclear how these would be enforced and whether it would lead to meaningful changes to OEM behavior as these are already routine activities. There is also no guidance on how long this credit diversion would remain in place or how money would be allocated across OEM's.

At a minimum, ICCT recommends providing more clear guidance for how this program would be administered, offer a sunset date prior to 2030, and reduce the share of credits reinvested to OEM's. However, given the state of MDHDV ZEV deployment and the need to support California's ambitious Advanced Clean Trucks and Advanced Clean Fleets rules, we recommend restoring the Clean Fuel Reward program and the use of base credits to support MDHDV rebates in order to maximize the effectiveness of the LCFS and use it as a lever to support MDHDV decarbonization.

Changes to Heavy-duty FCI Crediting

Infrastructure crediting is a critical strategy to incentive public fast charger deployment in California to match rapid growth in heavy-duty vehicle (HDV) sales. We support the changes made in the 15-day package to increase ZEV uptake in the medium and heavy-duty vehicle segments, although additional analysis is required.

In its proposed 15-day package changes, CARB loosened restrictions on medium and heavy-duty infrastructure crediting from the ISOR that will provide additional flexibility to charge-point operators to generate LCFS credits. These changes include removing a minimum charger count requirement for HD-FCI applications, extending geographic restrictions to chargers located within 5 miles from Federal Highway Administration Alternative Fuel Corridor, and increasing the total power limit per applicant to 40 MW. We commend CARB for this decision, as it provides more flexibility to deploy charging infrastructure necessary for the electric transition for the MDHDV fleet.

Preliminary ICCT research finds that California will require more than 11,000 medium and heavy-duty vehicle chargers to meet its 2030 charging needs, assuming that the state follows EPA's Phase 3 emissions standard. If

California complies with its Advanced Clean Trucks (ACT) and Advanced Clean Fleets (ACF) regulations that lead to more rapid electric vehicle deployment, charging needs increase to nearly 33,500 medium and heavy chargers. This preliminary research is an update to an analysis published in May 2023 that follows the same study methodology.⁵⁵ Recent analysis includes updates to EV stock shares based on MOVES4 and longer overnight charging duration that reduce overall charging needs from earlier estimates.⁵⁶ Further analysis is needed to refine the above projections and determine whether the proposed 2.5% cap on MHD-FCI credits should be raised or adjusted to be better aligned with the state's charging needs.

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⁵⁵ <https://theicct.org/wp-content/uploads/2023/05/infrastructure-deployment-mhdv-may23.pdf>

⁵⁶ <https://www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves>

VIA ELECTRONIC FILING

August 27, 2024

Matthew Botill
California Air Resources Board
1001 I Street
Sacramento, California 95814

Re: Anew Climate Comments on the Proposed Low Carbon Fuel Standard 15-Day Amendments

Dear Mr. Botill:

Anew Climate, LLC (“Anew”) is one of the largest climate solutions providers in North America and has an established track record of participating in California’s various sustainability programs, including the Low Carbon Fuel Standard (“LCFS”). We commend the California Air Resources Board (“CARB”) and its staff for its successful implementation of the LCFS, driving the decarbonization of California’s transportation sector, and proposing amendments to the LCFS in response to the 2022 Scoping Plan Update. The LCFS has a significant role in helping California achieve its ambitious climate goals and we appreciate the opportunity to provide comments in response to the August 12, 2024 Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information for the Proposed Low Carbon Fuel Standard (LCFS) Amendments (15-Day Package).

We Support an Immediate Step-Down of CI Targets by at least 9%, effective January 1, 2025, as Critical to the LCFS Program’s Success

220.1 Anew supports the proposal in the 15-Day Package to modify the near-term increase in stringency to a 9% CI reduction in 2025 from the 5% year-to-year increase included in the initial proposal. Given the LCFS credit surpluses generated over the last two years, a significant and near-term step-down of at least 9% is critical. Based on available market information to date, the LCFS credit bank will continue to grow for the remainder of 2024 as more credits are being generated than are needed to meet the current CI benchmarks. Without intervention, this will cause the market to stall or even fall further, undermining a key goal of the program—to incentivize investment in low-carbon fuels and fuel technologies. The step-down reflects the current effectiveness of the program, which suggests that the pace of CI reductions can be increased through the benchmarks.”¹

220.2 We further support making the step-down effective as of January 1, 2025, even if retroactive application is required. Many groups had initially urged CARB to target an implementation date of no later than January 2024. Given the dramatic oversupply in the market, implementation of a

¹ California Air Resources Board, Initial Statement of Reasons (“ISOR”), January 5, 2024, p. 25

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cont. step-down as soon as possible is critical to the integrity of the market going forward. Near-term action by CARB would send a strong signal that California remains committed to rapid decarbonization of its transportation sector and that investments in low-carbon fuels continue to be adequately rewarded and incentivized in California.

220.3 We believe that immediate implementation of a step-down of at least 9% is one of the most consequential and important steps CARB could take in this rulemaking process, and it is vital to the future of the LCFS program.

We Support a 30% or Greater Reduction in Carbon Intensity by 2030

220.4 While we would also support a higher CI reduction target, we recognize that a reduction scenario of at least 30% would help set California on a path to meet its ambitious target of at least a 40% reduction in economy-wide GHGs by 2030 and carbon neutrality by 2045. Strong CI reduction goals will continue to accelerate carbon reductions in the transportation sector while establishing clear market signals that will drive innovation and investments. We are also supportive of the proposal to smooth out the compliance target curve between 2025 and 2030 as included in the 15-Day Package.

We Support Tightening the Automatic Acceleration Mechanism

220.5 We have consistently supported the concept of creating an automatic adjustment mechanism (“AAM”) as a tool within the LCFS and appreciate the inclusion of the AAM in CARB’s proposal. We urge CARB to design the details of the mechanism to ensure that the AAM is triggered when the market truly needs it. The AAM should be amended such that it could be triggered as soon as 2026 if the applicable trigger conditions are met. Additionally, the AAM should be triggered when both the “Credit Bank to Average Quarterly Deficit Ratio” exceeds 2.5 and the annual credit generation exceeds the annual deficit generation for the compliance year preceding the year of the May 15 announcement.

Additional RNG-Related Comments

220.6 Anew appreciates the many occasions on which CARB staff has explicitly reiterated the Board’s support for RNG throughout the informal workshop process and in the proposed 45-day and 15-day changes. If CARB truly wants methane abatement from sources such as agricultural wastes to continue, this rulemaking must convince the clean fuel investment community that RNG will remain a viable and important contributor to the LCFS framework.

We Appreciate CARB’s Continued Recognition that LCFS Crediting Does Not Incentivize Increased Farm Sizes

220.7 Despite assertions to the contrary, there is no credible evidence that decarbonization programs like the LCFS incentivize the growth or consolidation of large dairies or other concentrated animal feeding operations (“CAFOs”). Even skeptical academic experts studying this issue have found no empirical evidence to support the “perverse incentive” claims made by some opponents of avoided

methane crediting.² Anew is partnered with swine and dairy farmers who are committed to reducing emissions from their waste products. Our direct experience aligns fully with what the data indicates: decisions around development and operations in the dairy and swine livestock sectors are firmly driven by strategic intent to maximize current and future value in the meat and milk markets, while maintaining strong environmental stewardship – not by increasing RNG value or an intent to incur additional waste production.

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As Americans consume meat and dairy products, the companies developing RNG projects are investing at-risk capital to abate emissions from the waste products of an essential industry. The capture and conversion of methane creates undeniable and immediate climate benefits. The LCFS today correctly recognizes RNG from agricultural digesters as an impactful methane abatement opportunity for lowering GHG emissions of livestock operations – we urge CARB to stay the course towards realizing the full climate benefit of the substantial investments made to date and providing investors with the clarity and confidence necessary for continued development.

We Oppose Any Arbitrary End Date for Avoided Methane Crediting and Oppose Reduction of Eligible Crediting Periods from Three to Two

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We strongly urge CARB to refrain from imposing any arbitrary end-date for avoided methane crediting. We especially oppose the new staff proposal in the 15-Day Package to cut down the number of avoided methane crediting periods from three to two for projects that break ground before January 1, 2030. Any such measure would not only hinder continued investment into methane abatement at farms that LCFS has been instrumental in catalyzing, but also jeopardize the continued operation of existing RNG production assets, which require significant operational expense. This new change would significantly impact existing projects, especially those that have already been in operation for several years and would unexpectedly have less than a full crediting period of eligibility remaining. Leaving investors with stranded assets by suddenly and significantly curtailing the expected lifespan of projects and their return on investment undermines California's goals of attracting investment into low-carbon transportation fuels and methane abatement.

Methane is the second-largest contributor to global warming after carbon dioxide due to its alarmingly high concentration in the atmosphere and the fact that it is a potent greenhouse gas (GHG) with impact over 80 times greater than carbon dioxide over a 20-year period. The critical need to address methane as a potent short lived climate pollutant was well-stated in CARB's 2017 Short Lived Climate Pollutant (SLCP) Reduction Strategy and echoed by other leading authorities. There is no more effective or immediate step that can be taken to address climate change than aggressively and rapidly reversing emissions of fugitive methane from all sectors, including society's organic waste streams.

220.10

Mandatory methane abatement from farming operations is not currently on the horizon either at the state level in California or at the federal level. If mandatory abatement is implemented, the

² Smith, Aaron, "Are Manure Subsidies Causing Farmers to Milk More Cows?" April 8, 2023. Available at https://agdatanews.substack.com/p/are-manure-subsidies-causing-farmers?r=i2qe&utm_campaign=post&utm_medium=web

current LCFS regulation already contemplates in Section 95488.9(f)(3)(B) the phase-out of avoided methane crediting for projects subject to mandatory abatement. Given the absence of mandatory methane abatement and the continued methane emissions from farming operations that are meeting America’s meat and dairy demands, imposing a specific date for phasing out avoided methane crediting does not make sense for the climate. Capturing methane from California’s methane sources (e.g., landfills, dairies, and wastewater) is critical for achieving California’s climate targets. As staff noted in the ISOR, “[...] capturing methane from dairies is one of the primary measures for achieving the state’s 2045 greenhouse gas reduction targets and SB 1383 methane reduction target.”³ Without anaerobic digesters, California would not be able to meet its SB 1383 methane reduction goals. Eliminating biomethane pathways used to produce hydrogen may also unduly restrict the development of low-CI hydrogen supply that California needs in order to displace fossil fuels. Increasing the supply of low-CI renewable hydrogen is a key strategy identified in the 2022 Scoping Plan Update and supports MDV and HDV ZEVs.”⁴

While we oppose putting any end-date on avoided methane crediting, we recognize that CARB has faced unsubstantiated criticism and repeated calls for an immediate or near-term phase-out. We have previously applauded CARB for taking a measured position in support of avoided methane crediting generally and opposing any near-term phase out. Cutting down the number of crediting periods from three to two is a step in the wrong direction. We strongly urge CARB to continue following climate science on a technology-neutral basis and to maintain the framework that has catalyzed unparalleled investment into methane abatement at swine and dairy operations.

We Support Maintaining LCFS Eligibility of Biomethane from All Sources and Oppose Flow Direction Requirements for Delivery

CARB should maintain eligibility for delivery of biomethane from all sources. We therefore oppose CARB’s proposal to impose directional flow requirements on deliveries from biomethane projects that break ground in 2030 or later. We further oppose the new proposal in the 15-Day Package to pull the deadline for indirect accounting of bio-CNG, bio-LNG, and bio-LCNG forward from December 31, 2040 to December 31, 2037 in the event that the Executive Office adopts a new gas map.

Currently, the LCFS regulation allows for indirect accounting of biomethane when injected into the North American natural gas pipeline system. In the ISOR, staff proposed that biomethane projects that break ground after December 31, 2029 from which biomethane is injected into a common carrier pipeline or claimed indirectly under the LCFS program for use as a transportation fuel or input to hydrogen production must meet new deliverability requirements. Starting January 1, 2041 for bio-CNG, bio-LNG and bio-LCNG pathways and January 1, 2046 for biomethane used as an input to hydrogen production, the entity reporting biomethane must demonstrate that the pipeline or pipelines along the delivery path physically flow from the initial injection point toward the fuel dispensing facility at least 50 percent of the time on an annual basis. The stated reason for

³ ISOR, p. 124

⁴ Ibid.

these new deliverability requirements is that these requirements would “help ensure that California is making progress on the state’s methane reduction targets.”⁵ In the 15-Day Package, CARB added the new proposal to bring the deadline for bio-CNG, bio-LNG, and bio-LCNG pathways forward another three years, to December 31, 2037, in the event that the Executive Office adopts a new gas map. This latest proposal introduces significant uncertainty into the market.

We appreciate that CARB has resisted pressure to include immediate directional flow requirements for biomethane pathways, and that the proposal would not impact any biomethane fuel pathways for projects that break ground before January 1, 2030. However, we do not agree with CARB’s decision to impose directional flow requirements on deliveries from biomethane projects that break ground in 2030 or later. Given the realities of the interconnected U.S. gas market, the 50% directional flow requirement is arbitrary and provides preferential treatment to fossil gas imported to California relative to imported RNG.

We Support a Full Credit True Up, Which Reflects the True Environmental Performance of RNG Pathways, and We Oppose the 4x Penalty for CI Exceedance

We support inclusion of a “Credit True Up” for temporary pathways after Annual Verification as proposed in the 15-Day Package. When implemented properly, such a concept can ensure that the LCFS program correctly accounts for the full GHG benefits all fuel pathways produce.

Biological systems such as anaerobic digesters experience substantial increases and decreases in gas production due to weather, livestock herd changes, and other factors that are not present in other fuel pathways. Because the carbon intensity of the gas from these systems is calculated against a quantity of avoided methane emissions, these variations in biogas production operating conditions result in outsized changes in the digesters’ carbon intensity (CI) scores every year. Pathways should be allowed to fully “true up” LCFS credit generation to their actual CI score once that score is determinable based on actual greenhouse gas performance data.

We support the provisions in the proposed rule that provide for generation of additional credits if the verified CI is lower than the certified pathway CI based on the incrementally lower verified score using backward-looking actual performance. This true up process should be automated by CARB in the LRT-CBTS system for all fuels. However, we do not support the Proposed Rule’s approach requiring a 4x “pay back” in cases where a verified CI exceeds the certified CI. This is overly punitive and not symmetrical. Instead, we recommend that if the verified CI is higher than the certified CI, the project should simply repay CARB for any excess credits claimed, and not be subject to any further enforcement liability unless there is malfeasance or other conduct contrary to the objectives of the program. The absence of intent to benefit from over crediting would be evidenced by retention of a number of LCFS credits greater than or equal to the excess generation for any reporting period to ensure pricing variability is not incentivizing over generation.

⁵ ISOR, p. 31.

Anew is proactively developing an updated CI management approach to ensure we continue to provide maximum value recognition potential to our partners coupled with compliance risk mitigation.

We also respectfully request that CARB consider allowing a portfolio-wide true up as opposed to providing for true ups solely on a project-specific basis. Given that LCFS credits are fungible and are not associated with a specific project once generated, we believe allowing pathway holders to true up based on the performance of a portfolio would make it easier for participants to accurately align credit generation to the actual performance of projects.

We Support the Proposed Tier 1 Calculator Improvements

Anew supports allowing fuel pathway applicants to submit site specific inputs to demonstrate fugitive emissions on the ‘Biogas-to-RNG’ tab as outlined in comments submitted by the Coalition for Renewable Natural Gas in response to the draft Tier 1 Calculator. In addition, Anew requests that CARB allow fuel pathway applicants to submit site specific inputs to demonstrate digester leakage emissions on the ‘Avoided Emissions’ tab. This would allow projects to provide actual operating values that may differ from the default values of 2% for enclosed vessels and 5% for covered lagoons.

Entry of Site-Specific Cleanout Frequency in Tier 1 Calculator or via Tier 2 Application

Regarding GREET inputs for L1. (1-6).14 Retention Time and Drainage, it is Anew’s understanding that in the proposed GREET calculator for each September, “System Emptied in This Month” must be selected by the fuel pathway applicant. This assumption requires that all projects model their operations to include a complete annual cleanout of volatile solids. A complete annual cleanout is currently only required as a baseline assumption for greenfield projects in Table A.10 of the Compliance Offset Protocol for Livestock Projects.

The implementation of this proposed default assumption could result in non-greenfield projects being certified with a carbon intensity that is not representative of normal operating conditions. It could also result in a project’s baseline methane emission levels being set below what would have otherwise been emitted to the atmosphere. This proposed default assumption may be more applicable to the average dairy operation, but the same conclusion is not as appropriate for the average swine operation. Swine industry leaders and project operators have expressed that lagoons are cleaned out far less frequently than annually over a 10 to 15-year time frame. Therefore, on the ‘Manure-to-Biogas (LOP Inputs)’ tab, applicants should be able to enter the project-specific lagoon cleanout frequency for swine livestock populations in the Tier 1 Calculator. Applicants should be able to select from lagoon cleanout frequencies that are less frequent than annual and have default inputs “amortized” according to CARB’s current guidance document.

As an alternative, Anew encourages CARB to consider allowing swine projects to submit their site-specific lagoon clean out frequencies as part of a Tier 2 fuel pathway registration. The annual loss in volatile solids results in a significant detrimental impact to the baseline methane emissions of swine projects and unfairly penalizes the project’s CI score. Anew appreciates CARB’s intention to simplify and streamline the project registration process, however, this should not be

220.20 cont. done at the expense of swine projects. To accurately reflect actual operating conditions of swine manure projects and minimize pathway registration processing time, we urge CARB to consider allowing applicants to enter actual cleanout frequencies by project in the Tier 1 Calculator.

Additional Issues

We Oppose the Changes to Forest Biomass Waste Eligibility

220.21 We oppose the changes to the definition of forest biomass waste made in the 15-Day Package. Restricting qualified forest biomass feedstock to “non-industrial forestlands” will significantly restrict the amount of material available for cellulosic biofuels projects. Industrial forestland owners are the only large landowners in the state that can offer reliable long-term forest biomass supply agreements for cellulosic fuel production. At this time, there are no organizations or entities that can reliably aggregate supply from smaller nonindustrial landowners. Cellulosic fuel production will provide the necessary financial incentives to extract hundreds of thousands of bone dry tons of biomass annually, which supports the treatment of tens of thousands of acres of forests each year. However, if this new requirement is adopted, over one third of private forestlands will be eliminated from the potential wood supply basket and result in biomass from 75% of all California forests being unviable for biofuels production. Excluding large landowners from participating in the LCFS program is clearly self-defeating as they are key partners in any successful long-term solution that scales up forest management successfully in California. Excluding them from the program will ultimately result in higher fuel loads on those lands and thus a heightened fire risk and ultimately higher emissions if/when there is a wildfire, which runs counter to the stated goals and policy direction on wildfires in the 2022 Scoping Plan.

EV Considerations

220.22 Anew is supportive of the additions and latest modifications CARB has made to the Fast Charging Infrastructure (“FCI”) credit opportunities for light, medium, and heavy duty charging as well as the ability to allocate base credits to the vehicle manufacturers. Anew continues to have concerns regarding the verification requirements including site visits for EV credits given the large costs this could incur for credit generators with large numbers of smaller sites or for customers with secure or limited-access operations where site visits by a third-party could be impactful to operations or security.

220.23

We thank CARB for its important work in implementing the LCFS program. Should you have any questions about anything we have stated here or require further clarification, please contact Andy Brosnan at abrosnan@anewclimate.com.

Sincerely,

Anew Climate, LLC



August 27th, 2024
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Proposed 15-Day Changes to Proposed Regulation Order

Dear CARB Staff,

EnviroVoters appreciates the opportunity to provide comments on the proposed 15-day changes to the initial proposed amendments previously shared by staff. We recognize that these changes reflect willingness from staff to incorporate feedback shared by various stakeholder groups, and we welcome the opportunity to further refine such a critical program. In the state's comprehensive plans for slashing emissions, the Low Carbon Fuel Standard (LCFS) remains influential. As we anticipate the LCFS program to do so much of the heavy lifting in reducing emissions from the transportation sector, it's critical that we utilize this amendment period to address areas of improvement that have arisen since the program's inception.

221.1

We are heartened by certain items in the package of 15-day changes, which we believe are indicative of productive collaboration between staff and stakeholders to identify opportunities to improve upon the current program. **Removing the pre-2011/post-2010 delineation for Fixed Guideway System crediting** is one such fix that we appreciate as it creates more comprehensive crediting across transportation modes, which should be the ultimate goal of the program.

As such, we are discouraged to see proposed changes that would hinder the ability of the program to decarbonize multiple areas within California's broader transportation sector.

221.2

- **Returning to exempting fossil jet fuel as a deficit generator.** Staff's initial proposal to regulate fossil jet fuel for intrastate flights within the LCFS program, or about 10% of all fossil jet fuel in the state, was a promising step to address harmful emissions from airports. Per CARB's California Aircraft and Airports Fact Sheet released earlier in the year, there are multiple efforts being made to reduce emissions on several fronts as airports act as mobile source hotspots¹. The actions and future initiatives from CARB and other relevant bodies remain promising strategies to cut emissions from vehicles and non-aircraft sources, however maintaining status quo on fossil jet fuel is a lost opportunity to begin this critical work. Intrastate flights are a logical starting point, and we urge staff to reconsider.

221.3

- **Lack of crediting for zero-emission shipping fuels.** We would also like to incorporate crediting zero-emission shipping fuels. This, paired with simplifying crediting for shore power installations for electric harbor crafts are both necessary actions to reduce emissions from ports, another mobile source magnet. Such updates to the LCFS would

¹ "California's Actions in Reducing Emissions from Airports and Aircraft". CARB (2024).
https://ww2.arb.ca.gov/sites/default/files/2024-08/California%20Aircraft%20and%20Airports%20Fact%20Sheet%20-%20July%202024_0.pdf

221.3
cont.

be on par with commitments from major cargo owners and shipping to transition to zero-carbon shipping fuels by 2040². It is crucial that any hydrogen used in this sector can and should be truly green hydrogen. Green hydrogen should only be considered electrolytic hydrogen produced using truly clean sources of energy (wind, solar, geothermal) and the production must adhere to the three pillars of 1) additionality, 2) hourly matching, and 3) deliverability in order to not risk increasing emissions. We hope to see staff include zero emission shipping fuels to broaden the scope of the LCFS's decarbonization strategy.

221.4

Regarding staff's proposal to **remove credit generation eligibility for hydrogen produced using fossil gas as a feedstock effective 2031**, this change is a step in the right direction as we should not be encouraging fossil fuel pathways. We would also like this change to be more comprehensive – the program appears to allow for the crediting of hydrogen produced using biomethane. This feedstock is a combustion fuel like fossil gas, and will behave the same, which makes it nonsensical to differentiate from fossil gas in this setting.

221.5

In this amendment process, **it remains key that the LCFS program doesn't further incentivize fuels or feedstocks with known environmental and public health impacts**. Currently, the program rewards fuels with dubious air quality benefits and environmental issues associated with their production. The carbon intensity of some of these fuels does not reflect their true environmental impact, which is something we cannot move forward with if we truly intend to decarbonize the transportation sector. Moreover, inaccurate accounting of these fuels' carbon intensities will continue to skew credit prices.

221.6

We strongly encourage staff to reconsider capping lipid-based biofuels at 2020 levels. A 20% limit on the number of credits producers can receive for canola- and soybean- based biofuels is a promising start, and we appreciate staff bringing this solution to the table. This, coupled with new updates to LUC factors, reflects concerns about how ramping up use of biofuels will have impacts deforestation and global hunger as these feedstocks are in greater demand. However, we remain concerned that biofuel production maintains the legacy of harmful emissions for communities adjacent to refineries. The proposed 20% limit on crediting these specific fuel types is a good signal but is not as inclusive as a volume-based cap for all lipid-based biofuels. The latter may provide more opportunities to limit environmental and credit price impacts by being more expansive in its scope.

221.7

Avoided methane crediting provides incentives for dairy operations to collect methane, contingent upon lucrative credit sales. Without incentives like this, open venting of methane is the status quo. Not only is this drastically different than other regulated methane-producing industries like oil and gas facilities and landfills, but this can yield a setting in which optimizing credit generation is prioritized. Given that the dairy sector is the largest contributor of methane emissions³, we should instead be putting greater emphasis on implementing thorough and multifaceted mitigation strategies. Community members who live in proximity to dairy operations

² Leading Cargo Owners Stand Together for Maritime Decarbonization." Cargo Owners for Zero Emission Vessels (2021). https://www.cozev.org/img/FINAL-coZEV-2040-Ambition-Statement_2021-10-18-144834_uorz.pdf

³ "California Dairy Sector Workshop – August 22nd, 2024". CARB (2024).

https://ww2.arb.ca.gov/sites/default/files/2024-08/CARB_Dairy_Sector_Workshop_Staff_Presentation_08-22-2024.pdf

221.7
cont.

have shared their experiences with air and water quality issues, as well as lasting health impacts. Avoided methane crediting is not the standard for other industries, nor should it be for the sector that contributes the most to California's methane inventory. **Staff's proposed phase-out date for avoided methane crediting is 2040 – this timeline must be expedited to see** immediate benefits for community members, as well as to improve out short-lived climate pollutant management strategy. This distant date is incongruent with our state climate goals as well as commitment to environmental justice.

221.8

We also urge staff to undertake the dairy methane rulemaking as soon as possible. While the recent petition to initiate this process was partially denied as CARB staff has more to carry out before starting, this issue is critical. California's commitment to methane mitigation is undeniable, especially in the wake of the Subnational Methane Action Coalition debuted at COP28 last year. To prolong action on regulating dairy sector methane is a missed opportunity to limit emissions from our state's biggest contributor. The recent dairy sector methane workshop indicates a need for a multi-faceted strategy, one that doesn't wholly rely on financial incentives like that of LCFS credits to help us meet our 2030 target.

221.9

LCFS has the potential to be an incredibly exhaustive tool in our comprehensive strategy to cut emissions from transportation. The Scoping Plan relies on massive emissions reductions from this sector for California to see substantial progress toward its climate goals - acting on lessons learned throughout the program's history cannot be undervalued.

We appreciate CARB staff's work on this topic as we navigate toward solutions that protect climate justice and have potential to positively impact the credit market. The contents of these 15-day changes are a promising step in this robust rulemaking process. We look forward to making progress on these outstanding issues between now and the scheduled November vote.

Regards,



Gracyna Mohabir
Clean Air and Energy Regulatory Advocate
California Environmental Voters

Comment Log Display

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Comment 222 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Sasan
Last Name	Saadat
Email Address	ssaadat@earthjustice.org
Affiliation	Earthjustice
Subject	Earthjustice Comments on 15-Day Change Proposal
Comment	<div>Please find attached our comments on the amended LCFS proposal, as well as an appendix including details from a multi-stakeholder workshop on labor, academic, and public interest groups desired reforms for the program. Thank you!</div>
Attachment	www.arb.ca.gov/lists/com-attach/7557-lcfs2024-VmRUYgQ3WT4LIAg4.pdf

Original File Name	2024-0827 Earthjustice Comments on LCFS 15-Day Changes.pdf
Date and Time Comment Was Submitted	2024-08-27 19:13:49

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)



August 27, 2024

Matthew Botill, Chief, Industrial Strategies Division
Jordan Ramalingam, Policy Manager, Low Carbon Fuel Standard
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Via Electronic Submittal

RE: Earthjustice Comments on the Low Carbon Fuel Standard 15-Day Changes

Dear Mr. Botill and Mr. Ramalingam,

Thank you for considering Earthjustice's comments on the California Air Resources Board's (CARB) proposed 15-day changes for amending the Low Carbon Fuel Standard (LCFS) Regulation.

222.1 In our February comments on CARB's Initial Statement of Reasons (ISOR), Earthjustice provided detailed recommendations for modernizing the LCFS to align it with California's air quality, zero-emissions, and environmental justice goals.¹ These recommendations complemented those of numerous other environmental and environmental justice (EJ) organizations as well as organized labor and members of the scientific community, all of which have registered grave concerns about the LCFS's support for combustion fuels and the program's adverse impacts on California communities, global food prices, and sensitive ecosystems. This coalition not only provided written comments, but it also convened a People's LCFS Workshop on May 30, 2024, after CARB Staff failed to address key topics in the single workshop it held after the release of the ISOR. A summary of the findings and recommendations presented at the People's Workshop were circulated to Board Members and are attached here as Appendix A.²

222.37 Despite our well-supported recommendations for improvements to the LCFS and CARB's process, CARB has not incorporated any of them in the 15-day changes, with the single exception of improvements to fixed guideway crediting. Further, CARB had nearly six months to revise its initial proposal, but is now giving the public only 15 days to review and comment on

¹ See Earthjustice Comments on ISOR (Feb. 20, 2024), <https://www.arb.ca.gov/lists/com-attach/7077-lcfs2024-Wz4BZgd0BCNVOWJo.pdf>.

² The People's Workshop materials are also available at <https://www.fixlcfs.com/the-peoples-workshop>.

these substantial and complex changes. Such a process is not conducive to public understanding and discourse around the significant changes proposed.

In these comments, Earthjustice identifies numerous problems with the proposed 15-day changes and proposes recommended solutions, including the following:

222.2

- 1. Failure to constrain lipid biofuels volumes.** While CARB recognizes that the glut of biofuels in the program poses risks, the measures that Staff propose will not address the massive, fundamental problems with unconstrained volumes that threaten the LCFS's integrity. According to CARB's own modeling in the 15-day changes, the projected volumes of renewable diesel (RD) are actually 50% higher than those modeled in the ISOR, which did not include the proposed 20% credit limit. This data reveals the ineffectiveness of Staff's proposed measures.

➔ CARB should impose a lipid biofuels volume limit in this rulemaking.

222.3

- 2. Failure to phase out distortionary avoided methane crediting.** Avoided methane crediting distorts the fuels market and perversely rewards polluters. Despite the overwhelming evidence about its adverse impacts to communities and to attainment of California's clean air and climate goals, Staff's proposed changes fail to phase out avoided methane crediting on the necessary timeline. This directly contradicts the direction that many Board member provided at the September 2023 Board Meeting.

➔ CARB should immediately end avoided methane crediting for new pathways and phase out avoided methane crediting for existing projects at the end of their current crediting period.

- 3. Failure to end the practice of allowing compressed natural gas (CNG) companies to greenwash fossil methane through the purchase of unbundled biomethane credits.**

222.4

➔ Starting in 2025, CARB should align its biomethane deliverability requirements with the Renewable Portfolio Standard (RPS) and only allow an entity to claim it dispenses biomethane if (1) it buys biomethane (bundled with its environmental attributes) and (2) contracts for its delivery to California and any interstate deliveries via common carrier pipelines use pipelines that flow toward California.

222.5

- 4. Failure to propose meaningful deliverability requirements that prevent lavish subsidies for fossil fuel derived hydrogen.** Staff's proposed changes to hydrogen crediting continue to allow fossil gas-derived hydrogen to generate credits so long as producers purchase unbundled environmental attributes from biomethane producers,

222.5
cont.

which are almost exclusively out-of-state. This proposal perversely undermines in-state green hydrogen production and harms California communities near dirty hydrogen facilities. Staff's proposed changes to deliverability requirements for biomethane are vague, contingent, and unhelpful.

→ Consistent with the RPS, CARB should require deliverability for biomethane by 2025 and end avoided methane crediting for hydrogen production by 2025.

222.6

5. **Weakening of carbon accounting for electrolytic hydrogen.** The 15-day changes may render electrolytic hydrogen even more polluting than hydrogen produced from fossil gas. Staff propose a step backward from the ISOR's already inadequate quarterly matching of low carbon intensity (CI) energy generation with a facility's energy demand.

→ Consistent with the proposed federal rule, CARB should require hourly matching by 2028.

222.7

6. **Elimination of fossil jet fuel as a deficit generator.** Without sound justification, Staff propose this harmful step backwards, which would both exacerbate inequity and further weaken the program's credit price.

→ CARB should ensure all major polluters are covered under the LCFS and restore jet fuel as a deficit generator.

222.8

7. **Failure to analyze an EJ Scenario that analyzes limits on biofuels and biomethane supply.** Despite CARB's failure to accurately model the proposals of the EJ community in the ISOR and the many corrections provided in the People's Workshop, Staff fail to correct those errors and provide an EJ Scenario in the 15-day changes. This failure deprives Board Members of important information and analysis.

→ CARB should include an updated EJ Scenario that accurately reflects the proposals of stakeholders.

222.9

8. **CARB appropriately remedies the program's past failure to properly credit fixed guideway systems.**

→ CARB should take additional steps to boost transit, including applying a credit multiplier.

9. Failure to disclose and end substantial reliance on direct air capture (DAC) as an offset. CARB’s modeling shows that DAC projects, most of which will be out-of-state, will provide a massive offset for in-state fossil fuel use in the future. Despite the controversy surrounding offsets in the Cap-and-Trade program and the fact that DAC is not even a transportation fuel, CARB fails to fully disclose and address the offsetting role of DAC in the LCFS and places no limits on DAC use.

222.10

→ CARB should fully disclose the current proposal’s reliance on DAC and prohibit the use of direct capture as a transportation fuel offset.

Taken together, Staff’s proposed changes lack important analysis and consist of unhelpful tweaks and backsliding on key provisions. If adopted, the proposed amendments would cast doubt on CARB’s role as a global climate and environmental justice leader. We urge CARB to reorient and modernize the LCFS now. This requires focusing on restricting the combustion fuels that we do not need and on supporting California’s goals for electrification, clean air, and a just transition off of fossil fuels. Unless these critical changes are made to the LCFS, the program may thwart, rather than support, attainment of these goals.

222.11

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DISCUSSION

I. **The proposed 15-day changes will not address fundamental problems with unconstrained lipid biofuels; CARB should impose a volume limit.**

222.12

In our comments on the ISOR, we explained the reasons why a volume limit on lipid biofuels was necessary: (1) An unconstrained subsidy on combustion-based fuels increasingly sourced from food crops is driving both record-levels of unsustainable consumption and the glut of credits, depressing the credit price. (2) Staff's previous efforts to constrain fuels that increase pressure on global deforestation are no longer effective.³ We also explained that the two measures proposed by Staff (i.e. chain-of-custody certification and exclusion of palm-oil-derived fuels) will not solve the problem. We therefore recommended that CARB limit the generation of credits from all lipid-based fuel pathways to no higher than 2022 levels.

222.13

The 15-day changes fail to address this problem. While Staff appear to acknowledge that unconstrained lipid biofuels pose risks, the proposed changes fail to implement the necessary changes. This failure is particularly glaring because the evidence of the need for volume limits has mounted since the ISOR was issued. Staff's proposal is not a cap; rather it defines a per-company limit on credit generation for some fuel-feedstock combinations, which effectively does nothing. Indeed, according to CARB's own modeling in the 15-day changes, the projected volumes of RD are actually 50% higher than those modeled in the ISOR, which did not include the 20% credit limit. This data reveals the ineffectiveness of the proposed measure, as we describe in more detail below.

A. **Since the ISOR was published, the evidence has mounted that a volume limit on lipid biofuels is necessary.**

222.14

Even since December it has become increasingly clear that a volume limit on biomass-based diesel produced from lipids is not only necessary but also urgent. The evidence strongly suggests that without such a limit, the LCFS could continue to drive unsustainable practices that undermine the state's climate goals and disproportionately impact vulnerable communities.

For example, in June, 2024, U.S. Department of Agriculture (USDA) published a report that highlights significant concerns about the rapid growth of renewable diesel production and its impact on global feedstock trade.⁴ The report states that this growth is drastically affecting feedstock availability and contributing to unsustainable practices globally - and singles out California's LCFS as a major driving force. In response to this report, Staff only noted that the report mentions future market dynamics could potentially mitigate this trend. It would be an abdication of sound policy making to ignore the overwhelming evidence and stark conclusions presented in this report - from the normally very circumspect USDA - solely by pointing to the

³ See Earthjustice comment on ISOR (Feb. 20, 2024), <https://www.arb.ca.gov/lists/com-attach/7077-lcfs2024-Wz4BZgd0BCNVOWJo.pdf>.

⁴ O'Neil, Timothy, USDA Foreign Agricultural Service, *U.S. Renewable Diesel Production Growth Drastically Impacts Global Feedstock Trade* (June 2024). <https://fas.usda.gov/data/us-renewable-diesel-production-growth-drastically-impacts-global-feedstock-trade>.

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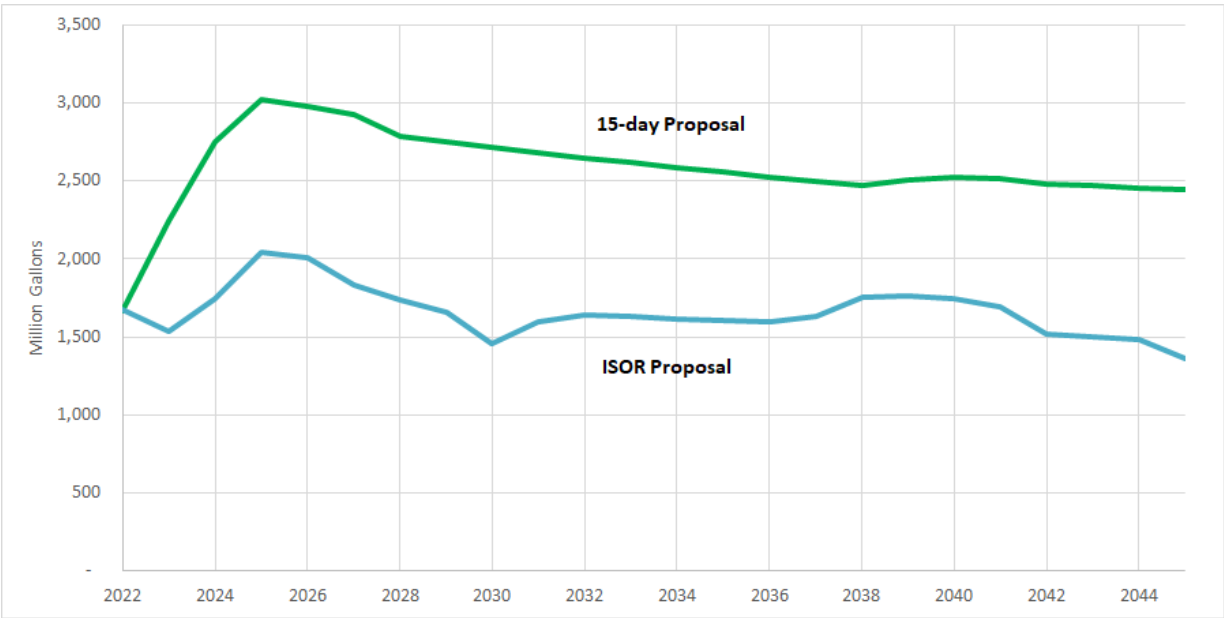
disclaimer that future market conditions **could** alter the outcomes we are now seeing. Such a disclaimer could be said about any worrisome trend, and in no other context would it be adequate basis for policy inaction. This evidence demonstrates a clear need for a volume limit to prevent further exacerbation of these issues.

222.15

B. Staff’s proposed 15-day changes will not address the problem of unconstrained lipid biofuels volumes.

The 15-day changes proposed by CARB Staff are insufficient and will not effectively address the problem of unconstrained lipid volumes. The proposed 20% credit limit on biomass-based diesel is not a genuine cap because it does not limit total volumes. By merely assigning any volumes above the 20% threshold the CI of the current benchmark, the policy falls far short of curbing the oversupply of RD. As a result of these deficiencies, it will do little if anything to prevent the anticipated massive influx of RD into California. According to CARB’s own modeling in the 15-day changes, the projected volumes of RD are actually 50% higher than those modeled in the ISOR (Figure 1), which did not include the 20% credit limit. This data reveals the ineffectiveness of the proposed measure. These superficial provisions are not aligned with the urgency of California’s climate goals and fail to send a meaningful signal to reduce reliance on even virgin soy and canola oil.

Figure 1. Renewable Diesel and Biodiesel Volumes



Data Source: CARB.⁵

Moreover, CARB’s decision to exclude from the 20% constraint other crop-based feedstocks and lipids such as carinata, camelina, and used cooking oil, as well as to exempt

⁵ Figure created from CARB modeling tables provided with proposed 15-day changes, available at <https://ww2.arb.ca.gov/resources/documents/supplemental-20232024-lcfs-modeling-documentation>.

222.15
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alternative jet fuel from the constraint, is not only ineffective but also counterproductive. The exclusion of these fuels opens the door for fuel shuffling and increases the likelihood that producers will simply switch to other problematic feedstocks, which risk driving up food prices and contributing to deforestation, the very outcome CARB is purportedly attempting to address. As has been repeatedly stressed by several commenters and researchers (and now corroborated by recent USDA analysis), if California's consumption of these other crop or waste based lipid fuels continues to grow further beyond its proportionate share, those fuels will simply be backfilled in the global market by soy and palm oil, increasingly sourced from Argentina, Brazil, Indonesia, and Malaysia. In other words, from regions where the threats to high carbon-stock forests are greatest.

We hope the Board members see this provision for what it is: a way to adopt an ineffective and potentially harmful policy.

C. A volume limit is necessary and provides key benefits that the proposed changes lack.

Given the evidence and the major deficiencies in Staff's proposal, we urge CARB to impose a volume limit on lipid-based diesel. Such a limit would provide many benefits that the current proposal lacks.

First, it provides a clear and enforceable mechanism to prevent the oversupply of renewable diesel, which is critical to aligning the LCFS with California's broader climate goals. A limit on these credits could be implemented in numerous ways, but Staff have failed to analyze and propose options to Board Members.

222.16

Second, a volume limit would help to ensure that the LCFS does not disproportionately benefit major oil companies at the expense of vulnerable communities. It is important to recognize that many biofuel producers are major oil companies. The current provision, as weak as it is, does little more than ensure these companies continue to reap the financial benefits of California's climate policies—on the backs of the very communities most impacted by their pollution. Even with volumes above 20% assigned to the benchmark CI, producers still have an incentive to deliver fuel to California. They would avoid generating deficits, benefit from higher diesel prices in California, and potentially evade Cap-and-Trade obligations. This is not the equitable transition that California has promised to its residents.

A standard response to the imposition of a volume limit is the concern that it could lead to an increase in fossil fuel use. However, this argument is unfounded. A well-designed volume limit would not lead to more fossil fuel consumption but rather to a more strategic and sustainable deployment of low-carbon fuels by tightening the credit market and providing more dollars to transition to zero-emission vehicles (ZEVs). The goal is not to restrict the use of all low-carbon fuels but to ensure that their production and use are aligned with environmental justice and sustainability goals and ensure the LCFS supports, rather than hampers, progress toward 100% ZEV goals. CARB has not evaluated a scenario that captures the real-world effects

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of providing more funding to the ZEV transition. That is, while other fuels are modeled to include benefits from incentive programs such as the Inflation Reduction Act, there is no mechanism that shows that more LCFS funding to ZEVs would lead to faster adoption of these technologies. Additionally, Staff have not updated the modeling to show more recent ZEV adoption. Despite previous calls to update the expected ZEV penetration rates to reflect more current data, Staff continue to rely on data from 2022. This leads to Staff underestimating the electricity fuel usage today and likely in the future, further countering Staff's assumption that only fossil rates could increase, not ZEV.

Third, a biofuels limit would provide a more sustainable and equitable solution to depressed credit prices that will continue to plague the program under Staff's proposed changes. Given the weaknesses in CARB's current modeling, including not accounting for actual ZEV sales which underrepresents electricity use and modeling unsustainable prices in its proposed scenario (i.e., multiple years of \$0 credit prices), it is highly likely that the automatic acceleration mechanism will be triggered, perhaps multiple times, further diluting the efficacy of this provision. Moreover, by continuing to allow large volumes of waste feedstock to be funneled into California, this policy contradicts CARB's stated goal of ensuring that the state does not take more than its fair share of other feedstocks.

We urge CARB to reconsider this provision and adopt stronger, more effective measures that truly align with California's climate goals and commitments to environmental justice. The time for half-measures is over. California must lead by example and implement policies that protect both our environment and our communities.

D. Additional authority to consider adjusting land use change values will not absolve the need for immediate action on the surge of crop biofuels.

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Staff added a provision⁶ that grants the Executive Officer (EO) the authority to assign a more conservative land use change (LUC) value. While we appreciate the recognition that more conservative LUC values may be necessary, the authority to consider making adjustments in the future cannot replace the need for immediate action now. There is already a sufficient basis to adopt more conservative LUC values and CARB should not delay taking important action.

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First, as we have explained in prior comments, the existing LUC evaluation framework is outdated and inappropriate. The most recent update was in 2015—well before the recent surge in renewable diesel (RD) production, which CARB did not anticipate at that time. This outdated evaluation does not accurately reflect the current landscape of biofuel production and its associated impacts. The spike in RD production over the past several years has likely altered the land use dynamics significantly, yet the regulatory framework has not kept pace with these changes. The inherent risk-amplification that comes from these much larger rates of consumption means that the EO is already unjustified in continuing to rely on outdated data,

⁶ See CARB, Proposed 15-day Changes, § 95488.3(d).

which cannot be considered a reliable safeguard against the environmental impacts of increased biofuel production.

Delaying action now by adopting a provision allowing a future adjustment will be less effective and raises serious questions about the adequacy and transparency of the land use change evaluations under the LCFS. We, along with others, have provided substantial evidence of the indirect land use risks associated with the unconstrained subsidy for biofuels. By acknowledging these risks, CARB has implicitly recognized the need for more accurate, higher, LUC factors for feedstocks. Given the substitutability of these feedstocks and their status as global commodities, CARB has a responsibility to act immediately and amend the Soy LUC factors, rather than merely granting themselves the authority to consider doing so in the future.

First, the provision raises substantial concerns about whether and how CARB would determine that a new, more conservative LUC factor is necessary. CARB has already approved pathways from various regions across the globe, including a pathway for Argentine soy-based RD in 2023,⁷ despite comments from experts that highlighted the problems.⁸ In that case, CARB accepted the applicant's proposal to apply the existing LUC impact value of 29.1 gCO₂e/MJ for Argentinian soybean oil-derived renewable diesel, as listed in Table 6 of the LCFS regulation. Given this precedent, we are not confident that CARB would now pivot to imposing a more conservative LUC value.

Moreover, the provision, in conjunction with the approval of pathways like the Argentine soy-based RD, highlights a troubling lack of transparency and public engagement in the LUC evaluation process. Under the current system, much of the evaluation is conducted by the fuel applicant, with limited opportunities for public input or scrutiny. This process lacks the necessary rigor and accountability to ensure that LUC values are accurately assessed and applied. The new provision further exacerbates this issue by centralizing more decision-making power with the EO, without providing any clear mechanisms for public oversight or involvement. This approach is wholly insufficient and fails to meet the standards of transparency and public participation that are critical for sound environmental governance.

E. The proposed changes to sustainability criteria are ineffective.

As we described in detail in our ISOR comments, CARB's proposal to rely primarily on sustainability criteria is not a solution to the oversupply of biofuels. Sustainability criteria do nothing to limit volumes and are subject to manipulation by industry. The proposed 15-day changes, which add reference to "best environmental management practices" do not address these fundamental shortcomings.

⁷ CARB, LCFS Pathway Number B052001, available at <https://ww2.arb.ca.gov/resources/documents/2023-lcfs-pathways-requiring-public-comments>.

⁸ See, e.g., Union of Concerned Scientists Comment on P66 Argentine Soy RD Pathway (Dec. 13, 2023), <https://ww2.arb.ca.gov/public-comments/lcfs-fuel-pathways-public-comments/webform/submission/7101?destination=/public-comments/lcfs-fuel-pathways-public-comments/webform/results/submissions>.

Numerous peer-reviewed studies have documented the direct and indirect impacts of biofuel feedstock production on deforestation. For instance, Curtis et al. (2018) found that 27% of global forest loss 2001-2015 was due to permanent land use changes for factors including commodity production, and the rate of commodity-driven deforestation has not decreased since 2001, despite corporate commitments.⁹

Further, the pressure to meet increasing demand for biofuels can lead to indirect land use changes (ILUC), where agricultural activities are displaced to forested areas as more land is allocated to biofuel feedstock production. This phenomenon, as described by scientist experts, exacerbates deforestation and results in significant carbon emissions, potentially offsetting the purported climate benefits of biofuels.¹⁰ Failure to address ILUC can undermine the environmental benefits of biofuels and contribute to further deforestation.¹¹

While sustainability criteria are designed to mitigate the environmental impacts of biofuel production, they are insufficient in addressing the scale and complexity of deforestation. These criteria often focus on preventing direct deforestation within certified areas but fail to account for the broader landscape-level impacts, including ILUC and the displacement of food production.

The provision requiring that biomass be sourced only from land cleared or cultivated prior to January 1, 2008, is insufficient and misleading as a guardrail. While it ostensibly aims to prevent deforestation and preserve natural habitats, it fails to address the broader issue of ILUC, where agricultural activities are displaced to other areas, leading to new deforestation and ecosystem disruption. This provision gives a false sense of security, as it does not account for the cascading effects of expanding biofuel production, which can indirectly incentivize the clearing of forests elsewhere, undermining the very environmental protections it seeks to uphold.

Sustainability criteria are limited in preventing deforestation, noting that certification schemes often lack the enforcement mechanisms needed to ensure compliance across entire supply chains. Moreover, many of these criteria do not adequately consider the cumulative impacts of expanding biofuel production, particularly in regions with weak governance and land tenure issues, where illegal deforestation is rampant.

The new provision¹² that requires best management practices represents a bare minimum requirement for mitigating the environmental impacts associated with biofuel production. The practices outlined—maintaining biodiversity, enhancing soil fertility, minimizing runoff, and reducing unsustainable water use—are critical not only for reducing GHG emissions but also for safeguarding California's natural resources. Delaying its implementation would risk exacerbating

⁹ Curtis, P. G., Slay, C. M., Harris, N. L., Tyukavina, A., & Hansen, M. C. (2018). Classifying drivers of global forest loss. *Science*, 361(6407), 1108-1111, <https://www.science.org/doi/10.1126/science.aau3445>.

¹⁰ Timothy Searchinger *et al.*, Use of U.S. Croplands for Biofuels Increases Greenhouse Gases Through Emissions from Land-Use Change. *Science* 319, 1238-1240(2008). DOI:[10.1126/science.1151861](https://doi.org/10.1126/science.1151861).

¹¹ *Id.*

¹² See CARB, Proposed 15-day Changes, § 95488.9(g)(1)(B).

emissions, degrading biodiversity, and contributing to soil and water contamination—outcomes directly counter to the broader mission of CARB to protect air quality and public health.

II. Staff’s proposed 15-day changes fail to address the major problems with avoided methane crediting; CARB should end avoided methane crediting for new pathways and phase out avoided methane crediting for existing projects at the end of their current crediting period.

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In our comments on the ISOR we explained that avoided methane crediting must end because it extravagantly rewards an unregulated industry with accounting that distorts the LCFS program, undermines transportation goals, and worsens environmental injustices for frontline communities.

To fix this problem, we recommended that CARB take two commonsense fixes: (1) End avoided methane credit for new projects starting in 2025 (2) Phase out avoided methane crediting for existing projects at the end of their current crediting period. As we explained in our comments, this approach is utterly reasonable and moderate as it allows producers currently participating in the program to continue using their existing pathway until the end of their current crediting period. It also avoided stranded assets by sending a signal now that future crediting will change. And critically, it does not end credit for biomethane producers, it just ends negative CI scoring – functionally a lucrative offset scheme for the agriculture sector that has nothing to do with transportation – because these negative values create powerful, perverse distortions in both the transportation and agriculture sector that are in conflict with State climate policies.

Despite the evidence presented and the moderate nature of our proposal, Staff have failed to implement these recommendations. Instead, the 15-day change proposal would allow pathways to continue claiming avoided methane credits until 2049 (or 2045 if they “break ground” on their project after 2029). There is no justification for this treatment to continue. **Nothing about livestock methane’s chemistry makes it better than landfill or wastewater methane at fighting climate change.** The avoided methane credits are premised entirely on the fact that CARB has so far refused its clear authority to regulate livestock methane. The 15-day change proposal effectively grants decades more of immunity to this major pollution source by treating its capture as an offset rather than an obligation.

Shockingly, the 15-day change proposal constitutes a massive step backwards from the Staff proposal presented in September 2023. The September 2023 draft allowed one 10 year crediting period for pathways certified prior to 2030, where the 15-day change version allows two. And the September draft would allow a 5 year crediting period for pathways certified between 2030 and 2034, implying that the practice would finally phase out for new pathways by 2035. The 15-day change proposal inexplicably abandons these distant restrictions, and furthermore shifts the goal posts from the date of certification to the date a project “breaks ground” (which can be 2 or more years prior to certification).

While the September 2023 proposal unjustifiably delayed action, it is incomprehensible that the new proposal is even weaker still. There is no public discussion for why this change has

been made, and there is no honest assessment of the September Board meeting that would indicate this change was made at the direction of the Board. At the hearing, the Board Members that did speak about avoided methane crediting and livestock methane virtually all raised concerns with the practice. These include the following statements:

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- **Board Member Hector De La Torre:** “The CI for avoided methane - I would like to see that tightened up... I understand the logic of why we do what we do, but I still think it is too generous in comparison to everything else. So, when I saw that chart that Staff presented that shows most things above the line and a couple things below the line. That gives me heartburn... We can make adjustments that are rational, that are based on science, and based on **our** judgements of what we’re looking to do”¹³
- **Board Member Gideon Kracov:** “We regulate every major source of methane and GHG emissions... But not the dairies? Instead, consumers pay them!... This is about LCFS and this exceptionalism seriously distorts our LCFS CI crediting. SB 1383 itself explicitly says this sector can be regulated in 2024. That’s in 3 months. That was the deal!... I would support this, and a Board resolution indicating that we will initiate in 2024 a rulemaking for this sector.”¹⁴
- **Board Member Davina Hurt:** “Dairy digesters are a small portion of the LCFS but it definitely has a large impact on communities struggling for clean air – in communities of color... How do we ensure that we are not incentivizing and subsidizing manure to be more valuable than milk? This is what I’m thinking about... I never want us to get to... I think the saying is the tail wagging the dog.”¹⁵
- **Board Member Diane Takvorian** (in a quote to Inside CalEPA): “I’m concerned about the irresponsibility of sending a signal that we want to continue that [avoided methane] crediting for another 17 years and increase the economic dependence on this system. I am very concerned in terms of the impact on human health, and our impacts on not incentivizing other methodologies as much as we can. . . . It just doesn’t make sense to me that some purely electric systems would have a higher carbon intensity than digesters.”
- **Board Member Henry Stern** (to a joint rally of airport workers and frontline factory farm residents): “This is the alliance that can win. I will stand with you at the Board meeting, and we’re going to keep fighting... Because so far it’s been all carrots and no regulation!”
- **Board Member Tania Pacheco-Werner:** “I think it’s important to think about everyone here as a partner. I really want all of us to think about: in our meeting the challenge to

¹³ CARB Board Meeting Transcript (Sept. 28, 2023) at 310, <https://ww2.arb.ca.gov/sites/default/files/barcu/board/mt/2023/mt092823.pdf> (emphasis added).

¹⁴ CARB Board Meeting Transcript (Sept. 28, 2023) at 318-319, <https://ww2.arb.ca.gov/sites/default/files/barcu/board/mt/2023/mt092823.pdf> (emphasis added).

¹⁵ CARB Board Meeting Transcript (Sept. 28, 2023) at 322, <https://ww2.arb.ca.gov/sites/default/files/barcu/board/mt/2023/mt092823.pdf> (emphasis added).

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save the planet - in 2045 when we look back, we can truly say we are proud of what we did, and that no community was sacrificed to make this happen. And I think if we use that as our North Star, we can come up with really good solutions that continue to see our industries as partners but also challenge them to build on the most innovative practices that yield the most public health benefit.”¹⁶

The Board thus clearly indicated support for reducing avoided methane crediting practices relative to the initial proposal from September. Yet, Staff have swung wildly in the other direction in the Staff Proposal. **To our knowledge, it is unprecedented for the Staff to advance a major policy change that run directly counter to the stated concerns of many Board members. In the 15-day proposal, Staff provide no public justification for this change.** CARB must correct course. In light of the long overdue nature of this phase-out, we urge CARB to ensure avoided methane crediting is eliminated from new pathways without further delay in this rulemaking.

III. Staff’s proposed 15-day changes continue to exempt biomethane from the deliverability requirements that apply to every other LCFS fuel; CARB must align deliverability requirements with the Renewable Portfolio Standard beginning in 2025.

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As we detailed in our ISOR comments, the LCFS’s failure to apply robust deliverability requirements to biomethane undermines the integrity of the program and thwarts its very purpose: to reduce the carbon intensity of transportation fuels in California. The LCFS gives CNG companies a unique greenwashing opportunity that is not available to any other fuel provider. The CNG industry, and no other that participates in the LCFS, can take credit for using low-carbon fuels that are never delivered to California. As a result, the CNG industry is now generating lavish credits for purchasing unbundled credits that do nothing to advance the fundamental purpose of the LCFS to reduce the carbon intensity of California’s transportation fuels. Further, this practice subsidizes the very technologies that CARB in other regulations and policies says we must move away from, including combustion CNG vehicles and dirty SMR hydrogen production discussed further in Section IV below.

Staff’s proposed change does nothing to solve this problem. Staff fail to require purchases and delivery contracts for biomethane as required by the federal government in the Renewable Fuels Standard (RFS) and the California Energy Commission’s (CEC) RPS.¹⁷ This failure persists in the proposed 15-day changes despite the fact that Staff had previously aspired to

¹⁶ CARB Board Meeting Transcript (Sept. 28, 2023) at 325, <https://ww2.arb.ca.gov/sites/default/files/barcu/board/mt/2023/mt092823.pdf> (emphasis added).

¹⁷ To use biomethane in the RPS, the CEC requires contracts for biomethane procurement, contracts for the delivery of the gas that cover the full route from the injection site to the final point of delivery, and that any pipeline delivery use pipelines that flow in the direction of California. CEC, RPS Eligibility Guidebook at 7, 9–10.

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alignment with the RPS.¹⁸ Moreover, Staff provide no rationale for adopting a deliverability requirement that lacks the commonsense elements of the RPS requirements. Instead, Staff propose weak deliverability requirements that will not apply for at least the next 14 years and likely not until 2041.

In the 15-day changes, Staff add a minimal, contingent three-year “acceleration” to the ISOR’s overly generous 2041 deadline for showing physical flow of biomethane to California.¹⁹ This provision is woefully inadequate, misleading, and counter to Board direction. Staff fail to explain why existing flow maps, such as those already identified by groups like Earthjustice, cannot be used immediately.²⁰ Staff also fail to explain why they built in a 12-year delay between identification of the appropriate pipeline flow map (which already exists), and the imposition of the physical flow requirement in 2038. The suggestion that a new map might be developed, depending on Executive Officer discretion, with no clear timeline or commitment, avoids taking real action while giving the appearance of progress. It is tantamount to telling the Board and EJ groups that CARB is addressing the problems with fossil CNG greenwashing when, in reality, it is merely delaying a true phase-out. And it is entirely unjustified given that meaningful deliverability requirements from the RFS and RPS are readily available to plug into this regulation. Furthermore, Staff’s proposed changes also fly in the face of Board direction at the September 2023 Board meeting. At that meeting Board Member Gideon Kracov stated that “these changes to the delivery requirements that are proposed should take effect immediately for all new projects, all the new crediting pathways.”²¹ Staff have done nothing of the sort.

Importantly, no other fuel suppliers can greenwash fossil fuels by purchasing the unbundled environmental attributes of fuels that are not delivered to California. To generate credits for selling renewable diesel, entities must procure and take delivery of that renewable diesel.²² Similarly, the LCFS’ book-and-claim rules for low-CI electricity require electricity to

¹⁸ As we explained previously, in the RFS program, U.S. Environmental Protection Agency only allows entities to take credit for biogas if several conditions are met, including that the “biogas/CNG/LNG was injected into and withdrawn from the same commercial distribution system” and that the entity contracted for the specific quantity of renewable CNG used as a transportation fuel. 40 Code of Federal Regulations § 80.1426(f)(11)(ii).

¹⁹ CARB, Proposed 15-Day Changes, § 95488.8 (i)(2)(B)(1).

²⁰ As we asserted in our ISOR comments, data is readily available on the flow of gas pipelines because the U.S. Energy Information Administration (EIA) publishes annual data on the volumes that flow in each interstate pipeline across state line. See EIA, Natural Gas, providing relevant data for download in the agency’s releases on U.S. state-to-state capacity, <https://www.eia.gov/naturalgas/data.php#pipelines>. The EIA has also synthesized this data into a map that shows the flow of the nation’s interstate gas pipelines. EIA, Natural Gas Market Module of the National Energy Modeling System: Model Documentation 2022 (Aug. 2022) at 3, [https://www.eia.gov/outlooks/aeo/news/documentation/ngmm/pdf/ngmm\(2022\).pdf](https://www.eia.gov/outlooks/aeo/news/documentation/ngmm/pdf/ngmm(2022).pdf).

²¹ CARB Board Meeting Transcript (Sept. 28, 2023) at 315, <https://ww2.arb.ca.gov/sites/default/files/barcu/board/mt/2023/mt092823.pdf>.

²² See California Code of Regulations § 95488.2(b)(4) (entities to specify a transport mode for each LCFS pathways registration); § 95481(a)(57) (defining “fuel transport mode” to mean “the applicable combination of actual fuel delivery methods, such as truck routes, rail lines, pipelines, and any other fuel

be generated within California or meet the deliverability requirements for Portfolio Content Category 1 Renewable Energy Certificates.²³ CARB must immediately end biomethane's unjustified exception from this rule.

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We urge CARB to align its biomethane deliverability requirements with the RPS and only allow an entity to claim it dispenses biomethane if (1) it buys biomethane (bundled with its environmental attributes) and (2) contracts for its delivery to California and any interstate deliveries via common carrier pipelines use pipelines that flow toward California. These requirements should apply starting in 2025.

If CARB fails to adopt these commonsense reforms and instead adopts Staff's proposal, the LCFS will continue to direct scarce public dollars to outdated, polluting dirty hydrogen production technologies. This perpetual subsidization of fossil fuel users will undermine CARB's standing as an environmental leader; no other California or federal climate program tolerates such gimmicks. CARB will also undermine its own ZEV and carbon neutrality goals, for the profit of mostly out-of-state companies, and at the expense of Californians. Correction of this deeply flawed practice must occur in this rulemaking.

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IV. The proposed changes continue to favor dirty hydrogen and out-of-state biomethane producers over clean, in-state hydrogen production; CARB should apply Renewable Portfolio Standard deliverability requirements starting in 2025 and end avoided methane crediting for methane used in hydrogen production starting in 2025.

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Although Staff propose to remove LCFS credit generation eligibility for hydrogen produced using fossil gas as a feedstock starting in 2031,²⁴ this change does nothing to remedy the most damaging and perverse feature of the LCFS's dirty hydrogen subsidy: the practice of allowing fossil methane-derived hydrogen to participate in the program and receive a negative CI score as long as the hydrogen producer buys environmental attributes from biomethane (which is likely from out of state). Staff's failure to fix this problem will have many perverse effects and must be remedied.

First, it sends exactly the wrong market signal, subsidizing the entrenched, dirty and lowest cost means of producing hydrogen rather than catalyzing the growth of new, green hydrogen production in California. Indeed, the LCFS's lavish treatment of dirty hydrogen paired with biomethane attributes directly undermines zero-emissions hydrogen because (1) their cleaner technology is newer and more expensive, and (2) the best CI they can achieve is 0, whereas SMR facilities that use book-and-claim biomethane can characterize their hydrogen as

distribution methods, and the distance through which the fuel was transported under contract from the entity that generated or produced the fuel, to any intermediate entities, and ending at the fuel blender, producer, importer, or provider in California. The fuel pathway holder and any entity reporting the fuel must demonstrate that the actual fuel transport mode and distance conforms to the stated mode and distance in the certified pathway.”).

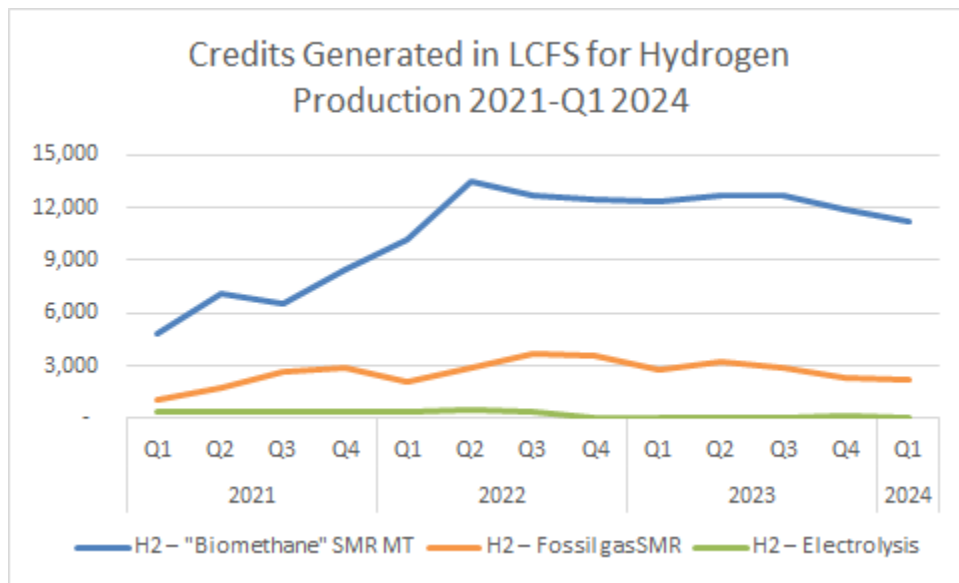
²³ CARB, LCFS Guidance 19-01 at 2,

https://www2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/guidance/lcfsguidance_19-01.pdf.

²⁴ CARB, Proposed 15-day Changes § 95482(h).

carbon negative and thus receive a higher price for their hydrogen. The chart below in Figure 2 shows the number of credits earned by the different hydrogen production pathways. While data are only available since 2021, the trend is clear—SMR hydrogen is the winner and electrolytic hydrogen is the loser. Staff’s proposal does nothing to address this perverse effect.

Figure 2: Credits Generated in the LCFS for Hydrogen Production



Data Source: CARB.²⁵

Although Staff’s proposal claims it will end in 2031 crediting for the fossil gas SMR hydrogen that is not paired with biomethane (the orange line in Figure 2), it will continue to reward fossil gas methane so long as it is paired with unbundled biomethane attributes (the blue line) and disfavor truly clean hydrogen (the green line).

Second, Staff fail to address impacts to air quality in communities impacted by SMR facilities that will continue to reap rewards from the LCFS. Evidence shows that SMR facilities emit health-harming pollution such as NOx, carbon monoxide, and fine particulate matter.²⁶ The LCFS’s generous crediting of SMR fossil hydrogen paired with biomethane attributes threatens the achievement of air quality standards in California’s most polluted air basins.

Third, reliance on out-of-state biomethane attributes will not help California meet its own climate goals as matching fossil hydrogen with biomethane attributes does not account towards its GHG inventory. Therefore, Staff’s allowance of this practice inconsistent with the Scoping Plan. As we detailed in our ISOR comments, the biomethane from which fossil hydrogen

²⁵ Figure generated by modeling data provided by CARB, available at https://ww2.arb.ca.gov/sites/default/files/2024-04/ISOR_Proposed_output.xlsx.

²⁶ Sun et al., Criteria Air Pollutants and Greenhouse Gas Emissions from Hydrogen Production in U.S. Steam Methane Reforming Facilities, Env’t Sci. & Tech., Vol. 53 (Apr. 2019), www.osti.gov/pages/servlets/purl/1546962.

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producers could purchase attributes have almost exclusively been produced out-of-state²⁷. Each of the certified hydrogen pathways listed as using biomethane from dairy manure pairs fossil gas feedstocks with unbundled purchases of environmental attributes from Indiana, Wisconsin, New York or Minnesota to earn a negative carbon intensity score.²⁸ Likewise, every single certified pathway for hydrogen that is characterized as using biomethane from swine manure is for a fossil SMR facility that purchases the environmental attributes of biomethane in Missouri, and the only pathway for producing hydrogen that claimed to use biomethane from wastewater sludge was for a fossil SMR facility that purchases environmental attributes from a water treatment plant in Texas.²⁹ Staff do not acknowledge this fact or provide any explanation as to why the LCFS should continue to provide a massive subsidy to out-of-state biomethane producers.

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There is a way to fix the problems caused by the LCFS's subsidy of dirty hydrogen: (1) Apply deliverability requirements for hydrogen used in the LCFS starting in 2025;³⁰ (2) End

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avoided methane crediting for biomethane used in hydrogen production starting in 2025. Given the grave problems detailed above, these changes should be a priority for CARB in this

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rulemaking. Indeed, there is no basis for delaying changes to the LCFS's treatment of fossil methane-derived hydrogen until 2046, as Staff propose. The longer the LCFS continues to reward fossil gas-derived hydrogen, which depends on fossil methane infrastructure, the greater the stranded asset burden California will face in the future.

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We urge CARB to send the signal now that it will favor investment in the necessary and nascent market for in-state zero-emissions hydrogen production over the production of polluting SMR of fossil gas, greenwashed with (largely out-of-state) biomethane attributes. Staff's proposed changes fail to do so and must be corrected.

V. The 15-day changes to accounting rules for electrolytic hydrogen may render electrolytic hydrogen even more polluting than hydrogen produced from fossil gas; CARB should require hourly matching by 2028.

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It is critical to get the carbon accounting right for electrolytic hydrogen because hydrogen produced with California's grid-average electricity creates even more climate pollution than hydrogen produced from fossil gas.³¹ As we explained in our ISOR comments, indirect accounting for low CI electricity that allows matching of low CI energy generation with a

²⁷ See CARB, LCFS Data Dashboard, Figure 10b (showing over 80% of biomethane from out-of-state), <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>.

²⁸ CARB, Current Fuel Pathways (Jan. 9, 2024 ed.), https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/current-pathways_all.xlsx.

²⁹ CARB, Current Fuel Pathways (Jan. 9, 2024 ed.), https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/current-pathways_all.xlsx.

³⁰ As discussed in detail in Section III above, consistent with the RPS's treatment of power plants, entities should only be allowed to claim they are using biomethane if they procure it, contract for its delivery, and the biomethane is injected into a pipeline that flows to California.

³¹ 17 CCR § 95488.5(e), Table 7-1 (providing a default CI value for hydrogen from grid average electricity of 164.46 gCO₂e/MJ and a default value of hydrogen from steam methane reformation of fossil gas of 117.67 gCO₂e/MJ).

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facility's energy demand on anything less frequent than an hourly basis would lead to emissions increases that are just as dramatic as relying on grid-average electricity.³² According to research from Princeton University, an hourly matching requirement is necessary to avoid spiking pollution on the power grid from electrolytic hydrogen production. Indeed, even a weekly matching standard would lead to emissions increases.³³

Unfortunately, the 15-day changes commit this very error by allowing book-and-claim accounting for low-CI electricity to span three quarters.³⁴ This change represents a step backwards from the already-deficient ISOR proposal, which required only quarterly matching. CARB fails to justify the basis for this backward movement and fails to account for the real risk that LCFS hydrogen could increase emissions under this accounting framework, directly counter to the very purpose of the program.

Weakening time-matching requirements will also increase power costs for ratepayers. Princeton's energy modelers found that failing to adhere to all of the "three pillars" (additionality, deliverability, and hourly-matching) would increase power prices in Southern California by 8%. Other studies in Europe examining hourly versus annual matching (which CARB's new proposal swings wildly closer to) resulted in a staggering 43% increase to power prices.³⁵ Increasing our already high electric rates and decreasing our grid's already fragile reliability for the sake of easing accounting rules for the heavily subsidized hydrogen industry is unjust and risks severely hampering the energy transition.

CARB should correct this glaring flaw and require electrolytic hydrogen producers who claim to use low CI electricity to meet an **hourly** matching requirement by 2028. Such a change would be in alignment with standards under development at the U.S. Treasury Department.

VI. Removal of jet fuel as a deficit generator is counterproductive and inequitable and lacks justification; CARB should restore jet fuel as a deficit generator.

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The removal of intrastate fossil jet fuel as a deficit generator in the LCFS's 15-day update is a significant step backwards and contradicts California's broader climate and environmental justice objectives, including those outlined in the state's Scoping Plan, the LCFS ISOR, and EJAC recommendations.³⁶ CARB should restore jet fuel as a deficit generator in its final rule.

³² Earthjustice ISOR comments at 31 (citing Wilson Ricks et al., *Minimizing emissions from grid-based hydrogen production in the United States*, Env't Rsch. Letters (Jan. 06, 2023), at 7–8, <https://iopscience.iop.org/article/10.1088/1748-9326/acacb5/pdf>).

³³ Wilson Ricks et al., *Minimizing emissions from grid-based hydrogen production in the United States*, Env't Rsch. Letters (Jan. 06, 2023), at 7–8, <https://iopscience.iop.org/article/10.1088/1748-9326/acacb5/pdf>.

³⁴ CARB, Proposed 15-day Changes, § 95488.8 (I)(1)(C)(4).

³⁵ Zeyen, E., I. Riepin, and T. Brown. "Hourly versus annually matched renewable supply for electrolytic hydrogen." Zenodo, Dec (2022).

³⁶ The ISOR states "Staff is also proposing to include deficit-generating fossil jet fuel for intrastate flights in the LCFS, beginning in 2028. This proposal aligns with the 2022 Scoping Plan Update toward

The initial proposal to include intrastate fossil jet fuel as a deficit generator was a step in the right direction. It recognized the need to hold all transportation fuels accountable for their environmental impact, aligning with the Scoping Plan's emphasis on comprehensive GHG reductions. By excluding fossil jet fuel from generating deficits, there is less incentive for airlines to invest in cleaner fuels, stalling progress in aviation, one of the most challenging sectors to decarbonize. Staff began to discuss this change in 2021³⁷ and the record supporting it is robust. Reversing such an important policy at the last minute is indefensible. It also contradicts the direction set by the Governor for CARB to adopt a 20% clean fuels target in the aviation sector and transition away from fossil fuels.³⁸

By exempting jet fuel from the LCFS, CARB is signaling that certain sectors of California's economy need not do their part to address the climate threat. Such a message is counterproductive and undermines the principle of equity in climate policy, where all sectors should contribute their fair share to emission reductions. In the context of jet fuel, an exemption is particularly regressive because those who can most afford to pay for decarbonization (i.e. airlines and Californians who can afford to purchase plane tickets) continue to be given a pass, while those least able to transition (i.e. Californians who continue to use gasoline cars because they cannot afford EVs) will be left to foot the bill, both financially and through health impacts. As scores of airport workers have made clear to CARB, the continued use of fossil fuels at airports and near their residences harms their lungs and the health of their family members.

By designating fossil jet fuel as a deficit generator, CARB would create substantial pressure on airlines to move beyond symbolic gestures and take concrete steps to reduce their emissions. This policy would not only support labor's call for a healthier work environment but also challenge airlines to meet their corporate sustainability goals—goals that many have publicly committed to but are currently falling short of achieving.

Airlines that fail to transition to SAF would face increased scrutiny from both regulators and the public, as their continued reliance on fossil jet fuel would directly contribute to the deficits they generate under the LCFS. This creates a strong incentive for airlines to purchase and use more SAF, thereby helping reduce their pollution burden.

CARB's regressive change will also damage the LCFS itself: the elimination of significant demand for LCFS credits at a time when there is an undisputed credit glut puts

decarbonizing the aviation sector, and with EJAC's recommendation to further integrate opt-in sectors into the regulation.^{79,80} The use of alternative jet fuels, which generate credits under the LCFS, will achieve particulate matter emissions reductions that benefit communities living near airports. Adding fossil jet fuel as a deficit generator also strengthens the signal to invest in zero-emission aviation technology, as modeled in the 2022 Scoping Plan Update in the 2040s."

³⁷See CARB, Public Workshop: Potential Future Changes to the LCFS Program (Dec. 21, 2021), https://ww2.arb.ca.gov/sites/default/files/2021-12/LCFS%2012_7%20Workshop%20Presentation_notes.pdf.

³⁸Governor Gavin Newsom, Letter to Liane Randolph (July 22, 2022), <https://www.gov.ca.gov/wp-content/uploads/2022/07/07.22.2022-Governors-Letter-to-CARB.pdf?emrc=1054d6>.

downward pressure on the credit price, compromising the program's overall effectiveness. By Staff's ISOR modeling, the detrimental change to jet fuel's status leaves over 26 million metric tons of deficits on the table -- credits that could help stabilize the program's credit price and 3 billion gallons of additional fossil jet fuel combusted.

CARB's stated basis for this rollback is unsupported. CARB states that "[p]ublic commenters noted that the original proposal did not guarantee that airlines would procure and use alternative jet fuel as a compliance response to the deficits generated from fossil jet fuel. Aviation fuel suppliers who would generate deficits under the initial proposal could simply acquire credits to meet that compliance obligation." Even if it were the case that airlines purchased credits instead of procuring alternative jet fuel, such an outcome would still lead to the positive outcomes described above (i.e. an equitably shifting of program costs to wealthier Californians, boost in demand for credits, and reduction of combustion). CARB's reference to a "fact sheet" regarding reduction of pollution at airports presents no meaningful solutions for airport workers and their communities. And to the extent there is concern about use of unsustainable crops for sustainable aviation, this creates yet another reason for limiting biofuel volumes.

Additionally, any narrative suggesting that removing fossil jet fuel as a deficit generator addresses environmental justice (EJ) concerns over biomass feedstock oversupply lacks substance and coherence when examined in the broader context of CARB's policy framework. If CARB were genuinely concerned about the impact of biomass feedstocks, it would implement a comprehensive biomass feedstock policy that applies to all biofuels, rather than proposing measures that could incentivize fuel shuffling and create loopholes.

Finally, as other states and countries look to California for leadership in climate policy, this decision could set a concerning precedent. Where other jurisdictions may have followed California's lead to include jet fuel, they may now be discouraged from taking bold actions in this sector, delaying needed and meaningful global reductions in a growing emissions sector.

Including jet fuel as a deficit generator would send a clear signal that the aviation sector is expected to take meaningful action toward reducing its carbon footprint. This aligns directly with labor's demands for stronger environmental protections that safeguard the health of workers and their communities. We urge CARB to restore jet fuel as a deficit generator to protect the health of California's airport workers, align with state climate goals, and maintain its status as a climate leader that ensures all polluters are held to account.

VII. Staff's 15-day package fails to model an Environmental Justice Scenario; CARB should include an updated Environmental Justice Scenario that accurately reflects the proposals of stakeholders.

We are deeply concerned about the inadequacy of the EJ Scenario presented in the ISOR, and the complete absence of an updated EJ Scenario in the 15-day package. This omission is particularly troubling given the significant problems we and other stakeholders identified with

the initial EJ Scenario modeling—issues that undermine the validity of CARB's findings and its commitment to addressing environmental and environmental justice concerns.

First, the modeling data for the EJ Scenario was only made publicly available two months after the close of the initial public comment period. This delay in access to crucial information severely limited stakeholders' ability to provide informed feedback on the scenario modeling. Such a lag in transparency is unacceptable, especially for a scenario that is supposed to reflect the critical needs and voices of the most impacted communities.

Second, once CARB finally made output files available to the public the day before the April Staff workshop, it became clear that the ISOR EJ modeling did not reflect actual EJ asks. As Stanford modelers explained in comments on Staff's April workshop,³⁹ and as panelists explained at the Peoples' Workshop, several significant discrepancies exist, including the following:

- **Transportation Electrification and ZEVs:** Despite EJ stakeholders advocating for increased funding for transportation electrification, the scenario did not model any changes in electrification. This omission is particularly problematic given the growing role of ZEVs within the LCFS framework. CARB developed the model with the knowledge that ZEVs would be a critical component of the regulation, yet the scenario fails to account for the billions of dollars expected to be generated through LCFS—funds that would logically have a substantial impact on ZEV penetration. It is inconceivable that CARB could suggest that such significant funding would have no effect on ZEV adoption. As evidenced by recent data, ZEV sales in California remain strong and are outpacing mandated goals, further underscoring the potential impact of increased funding on ZEV penetration⁴⁰.
- **Biomass-based Diesel Volumes:** EJ groups specifically requested that lipid diesel volumes be capped at 2022 levels to prevent further environmental harms. However, CARB's model inexplicably projected Renewable Diesel (RD) volumes at 60% below 2022 levels starting in 2024. This significant deviation from the requested cap undermines the entire premise of the EJ scenario, rendering any outputs or findings from this modeling effort fundamentally flawed. The failure to accurately represent the EJ ask in the model invalidates the results and dismisses the concerns of the communities that are most affected by these policies.

Third, despite the major flaws in the ISOR modeling of the EJ Scenario, Staff fail to include an updated EJ Scenario in the 15-day. Instead, Staff provide multiple “uncertainty” scenarios, including two that project CARB failing to meet its own ZEV regulations. None of the scenarios model outcomes that exceed the ZEV goals, despite current light-duty ZEV penetration

³⁹ See Stanford CEPP May 2024 LCFS Comments, available at <https://ww2.arb.ca.gov/form/public-comments/submissions/12056>.

⁴⁰ CEC, Zero-Emission Vehicle Sales Remain Strong in California (May 2024) <https://www.energy.ca.gov/news/2024-05/zero-emission-vehicle-sales-remain-strong-california>.

rates surpassing the mandated targets. This omission reflects a lack of commitment to the aggressive pursuit of electrification that EJ groups have been advocating for and that the current market trends clearly support.

222.34

Given these significant issues with Staff's deficient analysis, we urge the Board to direct Staff to conduct a new and accurate EJ modeling effort that reflects the actual proposals of environmental justice and environmental stakeholders. This updated modeling must take into account the actual impacts of increased funding on ZEV penetration and must adhere to the stakeholder proposal to cap bio-based diesel volumes at 2022 levels. Staff's failure to do this modeling in the 15-day package not only misrepresents the potential outcomes of the LCFS but also marginalizes the communities that the EJ Scenario program reforms seek to protect.

We respectfully request that the Board demand a higher standard of accuracy and accountability in CARB's EJ modeling, ensuring that the policies and projections put forward genuinely address the needs and concerns of the most impacted Californians.

VIII. CARB appropriately remedies the program's past failure to properly credit fixed guideway systems; CARB should further boost transit by including credit multipliers for transit.

222.35

We applaud Staff's proposal to remove the pre-2011/post-2010 delineation for fixed guideway system crediting. We agree that this adjustment improves LCFS support for transit services in California. This is a positive step that corrects a prior CARB error. CARB should maintain this improvement in the final rule. It should also take additional steps to boost to transit by also including credit multipliers, as we describe in our ISOR comments.⁴¹

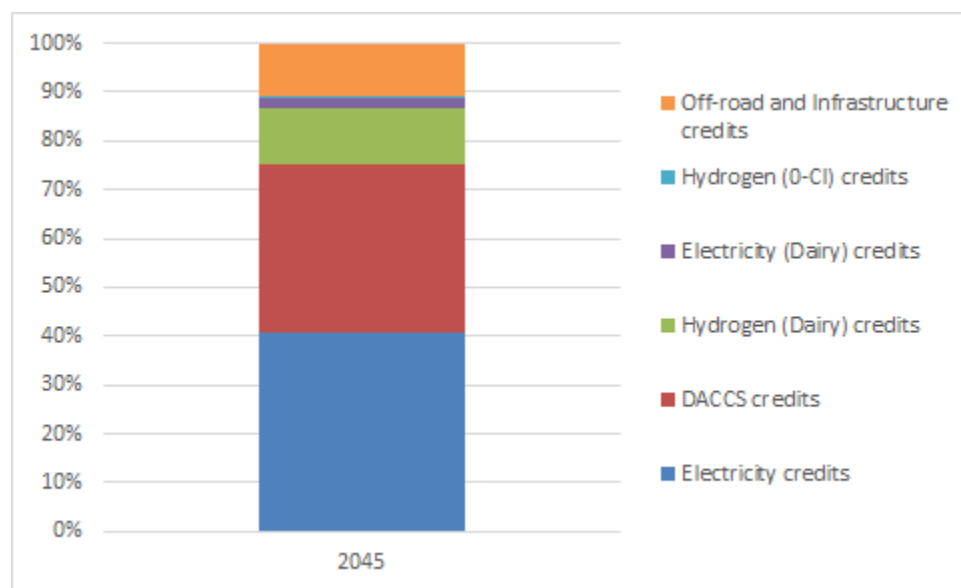
IX. Staff fail to disclose the program's heavy reliance on direct air capture, which benefits out-of-state companies and fossil fuel producers to the detriment of low-income Californians and with dubious climate benefits; CARB should prohibit the use of direct capture as a transportation offset in the LCFS.

222.36

Despite the concerns that we expressed in the Community Workshop about CARB's reliance on direct air capture (DAC) as a fossil fuel offset and the lack of transparency about this reliance, CARB has not been forthcoming about the significant feature of the proposed amendments. In the 15-day package, DAC will account for 35% of credits by 2045. This portion is almost as large as electricity credits, as illustrated in Figure 3.

⁴¹ See Earthjustice Comments on ISOR (Feb. 20, 2024) at 32-38, <https://www.arb.ca.gov/lists/com-attach/7077-lcfs2024-Wz4BZgd0BCNVOWJo.pdf>.

Figure 3: LCFS Credits in 2045



Data Source: CARB⁴²

Nowhere in the ISOR did CARB explain that a large portion of LCFS credits would eventually come from DAC projects. We only discovered this fact when we obtained access to the modeling two months after the close of the ISOR comment period and one day before Staff's April workshop.

The lack of disclosure is deeply concerning because offsets have long been a contentious issue in the Cap-and-Trade program, allowing industry to continue to pollute by paying their way out of reducing their GHG emissions. In the LCFS, the same concerns apply: DAC projects function as an offset for polluters, and they generate LCFS credits even though they do not require fuel production.

Even worse, while CARB limits the use of offsets in the Cap-and-Trade program, it does not do so in the current LCFS proposal. DAC projects are not evaluated against a declining benchmark, so there is no end to the subsidy as long as the LCFS exists. This treatment of DAC stands in sharp contrast to actual transportation fuels, where each gallon of low-carbon fuel gets fewer credits each year as the LCFS benchmark declines. The result is that DAC will get ever-increasing shares of the LCFS, essentially transforming the LCFS into a program where the most vulnerable (i.e., those who cannot transition to ZEVs) are paying for out-of-state, climate-dubious DAC projects that will profit industry.

Additionally, unlike the other provisions in the LCFS proposal, DAC projects are not prohibited from double-counting emissions reductions. While the proposal includes language that prohibits LCFS credit generation for environmental attributes claimed "in any other

⁴² Figure created from CARB modeling tables provided with 15-day changes, available at https://ww2.arb.ca.gov/sites/default/files/2024-08/15Day_Proposed_9step_30_final_posted_0.xlsx

222.36
cont.

voluntary or mandatory program” with few exceptions, this language does not cover DAC projects. This will allow DAC projects to sell the environmental attributes multiple times, thus getting paid multiple times for the same emission reductions, such as through the LCFS and voluntary markets.

We urge CARB to fully disclose Staff’s proposed reliance on DAC and to prohibit the use of DAC as a transportation offset in this program, or at the very least set limits on credits and prohibit double-counting.

CONCLUSION

We look forward to continuing to engage in the LCFS rulemaking process and working with Staff to ensure the program avoids perverse and harmful outcomes and provides needed support to the technologies that will enable achievement of California’s climate, air quality, and equity goals.

Sincerely,

Sasan Saadat
Nina Robertson
Earthjustice
50 California St., Suite 400
San Francisco, CA 94111

APPENDIX A:
MAY 30, 2024 PEOPLE'S WORKSHOP
MATERIALS

The People's LCFS Workshop - Questions & Answers

The May 30th People's LCFS Workshop featured a Questions & Answers session, in which panelists with diverse backgrounds and expertise responded to questions submitted by workshop attendees.

- 1. Q: CARB staff claims that their proposal provides greater health outcomes for frontline communities (with 80% of funds invested in biofuel production) than the EJ proposal that would cap biofuel production, eliminate avoided methane crediting, and invest far more in electrification. What is your response to this?**

Amelia Keyes with Communities for a Better Environment answered, *"I want to start by emphasizing that from the perspective of refinery communities, the benefits of biofuels are really not meaningful at all compared to fossil fuels like diesel. Something that people might not realize is that biofuels and fossil diesel are really similar products. They're refined using similar processes, they release similar pollutants during refining and they're burned in vehicles the exact same way. The benefits that CARB is touting from its proposal for the LCFS are really quite minimal in terms of air pollution benefits, and they're not going to meaningfully alleviate the pollution burden that exists in refinery communities. The other thing I wanted to note quickly is that CARB also isn't accounting for this scary reality that we're seeing, where biofuels are providing an opportunity to oil refineries to basically have a new life, where we expect to see refineries coming offline in coming years. Biofuels create a way for oil companies to keep using this otherwise defunct infrastructure and the consequences of that for refinery communities and community health and safety are really profound."*

Dr. Jeremy Martin with the Union of Concerned Scientists also shared, *"I'm calling for [the] stop of unsustainable growth of diesel. In Alternative One, in the EJ scenario, actually modeled something more extreme, which is the phase-out of these fuels and then replacing them with fossil diesel. There's a lot of room to check the growth and avoid these unsustainable outcomes without completely reversing course, and getting rid of those fuels. But we've not required big increases in the use of fossil diesel, or anything else, which is maybe suggested... by the way that Alternative One and other things were constructed in the analysis."*

- 2. Q: It is great to have such terrific academic leaders from Stanford and UC Davis working on the LCFS. We need these great institutions now more than ever given the serious deficiencies in the current trajectory of the program. The question I have is why is there such resistance to a cap on crop-based biofuels? Given your research, it would take some effort to implement, but this seems like a political problem, not a technical problem.**

Sasan Saadat with Earthjustice shared responded, *"Part of the reason that there's resistance to a cap is for good reasons, maybe reasonable reasons around differences of opinion about what we expect to happen. But I hope that through this workshop, you can see that the current trajectory and the very recent history of a massive surge of*

crop-based biofuels is already showing us that we need to take much more significant action. We're seeing a huge surge of crop-based fuels into the program. The other reason for resistance might be this feeling that if we don't use crop based biofuels, then we would instead be using fossil fuels. We've heard that a lot from CARB staff –and to that, our point would be what we've been trying to say for three-plus years (over the course of this rulemaking)... it should not be accepted as a given that biofuels are better than the petroleum that they displace. Subsidizing continued, unrestricted growth of biofuels consumption has very real harms for the program in terms of dampening credit price, but also, it has really real harms for food insecurity, deforestation, water, and ecosystem impacts. None of these concerns are really accounted for through anything more than that over a 10-year-old ILUC adjustment factor that's clearly not that successful at keeping crop-based biofuels off the program."

Dr. Colin Murphy with UC Davis shared, "I agree that politics is probably part of it. Possibly even the largest part of it and there's certainly a lot of companies out there who are looking to benefit from this. But beyond that, understanding these systems requires a lot of complex research and modeling and the data that really showed us conclusively that the market dynamics in the LCFS had shifted were really only available to us [at the] very end of last year and early this year. To some extent, renewable diesel has for a long time been one of the success stories, but we're hitting a spot where we've got too much of a good thing. Some of CARB's modeling has just not kept up with that because they probably didn't really have the resources to update their model and change their opinions. Then there's mental inertia that takes over from that where it's difficult to take something that has been a success for a long time. Then start saying, no we need to tap the brakes now, but that's just the nature of the space we're working in. When you are trying to transform a market like the California fuels system, things are going to change. That's just the nature of what we're trying to do. So the analysis [CARB does] has to keep up with it. And I just don't think it really has."

Dr. Martin added, "We have to learn from experience and experience shows that we have a problem, and we need to fix it. The mechanisms that are in place are not working, so we need to do something different."

3. Q: The current LCFS proposal will continue to significantly focus on funding for combustible fuels for more than a decade. Do communities see commonalities about the health harms that communities are facing from this continued focus of the LCFS?

David Rodriguez with Defensores shared, "There still needs to be more studies done and that's what [CARB doesn't] admit to. The rhetoric is completely in favor of dairies and they forget about the communities because you have the methane, you have your nitrates, you have the pollution that affects the communities. And as far as I'm concerned, the [San Joaquin Valley Air Pollution] Control District and CARB have ignored us for years and years and there must be a reason. The odor filters through town – [which] is a little bit over 4,000 [people] and the dairy has over 8,000 cows less than a

mile away. There needs to be more [studies done, and] more strict rules and regulations for these dairies. They're getting bigger and bigger, and they're getting subsidies from California. They're making more money, selling manure, methane, and milk so it's a win/win for them. But it's a [loss] for us. And that makes it harder for communities, especially rural areas, [and] people of color."

Jovan Houston, an employee at LAX, answered, *"Looking back, I'm one of the [many] examples in our community. Our communities are predominantly Black and Brown and we suffer a lot from this pollution in my neighborhood and other neighborhoods. Within a five-mile radius, we see dialysis facilities. Those are common in my neighborhood. We live with this and I'm sure other communities around any airport suffer."*

- 4. Q: Staff have said there is no evidence that the LCFS incentivizes the consolidation of dairies. Have you asked Staff for their data on this issue? And, what is your response to this evidence they provided?**

Phoebe Seaton with Leadership Counsel for Justice & Accountability (LCJA) responded, *"In the presentation, I showed data from USDA's recent census showing that concentration of... more cows in the San Joaquin Valley in larger farms, also the [region] of factory farm/gas infrastructure. [LCJA] and Food and Water Watch sent a public records request to CARB asking for records in CARB's possession that showed that the LCFS does not cause dairies to increase in size. The response to that PRA was that CARB has completed its analysis of documents and there are no documents responsive to the question, meaning CARB had no analysis, had no records, etc., supporting its claim that the LCFS does not cause dairies to increase in size. CARB has at its disposal several tools [to address livestock methane], most notably, its authority and responsibility to develop [a] regulation for livestock methane."*

- a. Q: If we eliminate avoided methane crediting in LCFS, won't this lead to far more methane emissions and a failure to meet climate goals?**

Phoebe also clarified, *"CARB has the authority and responsibility to implement regulations for livestock methane. They have not even begun the process to develop... or adapt those regulations. That is a process that we need for a vast array of stakeholders to inform what effective and equitable methane emissions reductions looks like."*

- 5. Q: CARB staff claim that limiting biofuels leads to more fossil fuel consumption? Why would EJ and environmental groups call for this?**

Dr. Michael Wara with Stanford University answered, *"It really depends on your view of the future and what is possible. What we're observing in the markets today is a rapid rollout especially of medium-duty vehicles that far exceeds what ARB expected to be possible. I would also emphasize what matters for climate change and for the performance of the program or total use of fossil fuel emissions over the length of the program, not what happens next year or the year after, but cumulatively. We believe that*

it's absolutely possible given the rates of rollout and the growth in the use of EVs to achieve a scenario that is of reasonable cost that doesn't involve greater combustion of fossil fuels. You can certainly make the modeling look as if more fossil fuels will be combusted, but that's really a function of assumptions. Our view is that the assumptions ARB is making are far too conservative and do not really reflect the facts as they are today."

Dr. Murphy added, "A lot of the assumptions that CARB makes really presuppose that any alternative to petroleum is necessarily better than petroleum. We are reasonably confident right now that things like renewable diesel that we're making from wastes and residues, used cooking oil, are better than petroleum. They're not a zero-carbon fuel, but they at least move things in the right direction. We even think that there's a role for a very limited amount of crop based fuels to at least be no worse, maybe marginally better than the petroleum gas bases. The problem is that the market is growing extremely rapidly and all of the modeling that we base these assumptions on was really envisioning a much smaller market than we have today. So our confidence that these things are truly going to continue to be better than petroleum is not based on strong evidence. The kind of market size that we're at today is certainly not at the kind of market size that would result if we continue this rate of growth. I also wanted to confirm that the modeling that we've done here at UC Davis shows that you can freeze the growth of things like renewable diesel at levels we're using in 2022. It is still completely compatible with California's carbon neutrality over the long run and tries to find that middle ground, where you are taking whatever near-term benefits you can get out of bridge fuels like biofuels, but not putting so much investment into them that you miss out on opportunities to invest in the things that give better long term outcomes."

6. Q: The current LCFS provides significant and lavish incentives for many biofuels, yet CARB staff say their proposal will boost ZEVs. Do you agree?

Román Partida-López with The Greenlining Institute responded, "Based on the research analysis that [we've] done here, I think we're gonna fall short in making that transition. Boosting is not what we're going to be accomplishing. We might be supporting, which is [the] language I found in some of the reports and presentations put together, but it will not boost the transition to zero-emission vehicles. We're falling short. The credit structure that we have is not done in a manner that will help accelerate the transition that we desperately need for the air quality and public health benefits that our impacted communities need to see. The budget right now is in a deficit phase, and so we need other structures like the LCFS to step up and [help] this transition. To make the transition, we need to lean in and move away from this conservative approach that CARB generally takes. They talk about wanting to really uplift and center equity in their policies and in their implementation, but then that's not reflected in what we end up seeing in print with the guidelines that are developed."

- 7. Q: It has been mentioned that biomethane makes up about 20% of the credits in the program but only 1% of the transportation fuel. How is that possible and why is that a problem?**

Sasan shared, *"It's true! The reason is biomethane from livestock gets this very unique treatment, where the baseline considers that methane will be vented. In other words, the polluter is free to vent their methane into the atmosphere, and that they would do so BUT FOR the LCFS. That unique treatment, that unique assumption, allows it to receive a negative carbon intensity (CI) score, sometimes very significantly carbon negative CI score. It effectively works as an offset because it's not anywhere in the chain of producing biomethane [that] we're actually removing carbon from the atmosphere. This is not actually carbon negative. It's not actually carbon dioxide removal or direct air capture. It's just based on the fact that the methane pollution is unregulated. The LCFS treats that as absent and because methane is such a severe global warming pollutant, very little methane capture and very little biogas in the transportation sector can equate to very significant credit generation. [It is] no wonder then that the oil companies have become some of the biggest investors in these biogas projects. It allows them to effectively offset a very significant amount of their deficit obligation without very significantly eroding their own market for fossil fuel. If we had to eliminate that equivalent of credits through direct electrification, that would be a much larger amount of fossil fuel that we deal with."*

- 8. Q: The staff of CARB claim significant air quality benefits from the LCFS proposal. What is your response to that?**

Sasan explained, *"The air quality benefits - it's about [\$]5 billion in estimated health benefits from the Low Carbon Fuel Standard. To put that in perspective, CARB could have gotten more significant health savings by passing a slightly stronger forklift rule or a slightly stronger off-road engine rule. These are not very significant health benefits that are being generated from the LCFS. It's even worse when you account for the fact that most of the air quality benefits are attributed to biofuel use. [And] we have very seriously questioned CARB's methodology for attributing that air quality benefits to those biofuels. In many cases, CARB is taking credit for biofuels that are required from the Federal RFS. Even though in 2018, it apportioned only its share of air quality benefits to the state versus the federal program. It's claiming air quality benefits from programs that already are requiring the use of renewable diesel in the off-road sector and so not only are these [\$]5 billion in health benefits likely illusory or overstated, but they're not very much to begin with. The program could be doing significantly more if it reoriented itself toward zero emissions to get much greater NOx [reduction] benefit and much greater PM reduction benefit."*

- 9. Q: How do we balance getting higher credit values, a clean capacity crediting program, and getting quick action to support zero emission medium-duty/heavy-duty with the Fix LCFS coalition?**

Dr. Murphy explained, *“The LCFS is intended to let regulated parties find the lowest cost option and that's what they're doing when there's this glut of cheap biofuels. Really, the only way, absent going to completely an entirely different policy, to bring the credit price back up is to limit the availability of this particular cheap option. By doing something like putting a cap on it or updating the indirect land use change factors, that Sasan mentioned, which I believe are out of date –they're 10 years old– and the model that was used was shown to be quite problematic. As long as the low-cost option is there, the market is going to gravitate towards that. We either have to sort of accept that's the outcome or change the program to cut that off. Within the context of the rulemaking that's open right now at CARB, they could adopt something like a cap on either crop-based biofuels or alternative-based biofuels. There's technical reasons to prefer one or the other. Even if we don't think that might be the optimal long term solution. At the very least, that [cap] can put a pause on things right now and buy some time to develop what might be a better long-term solution. But either way, if you can't restrict the ability of renewable diesel to continue being the low-cost compliance option, the market is going to go there. That's what the program is designed to do.”*

10. Q: If CARB doesn't fix the LCFS what are the worst consequences for communities based on the incentives to accelerate biofuel and biomethane production in California and across the country, since half of all renewable diesel business in the US is already coming to California?

Phoebe answered with, *“I hate to think of the worst case scenario. What we're going to see is continued entrenching of or exacerbating the environmental justice impacts of the trend towards further consolidation and expansion of livestock facilities to encourage, promote, [and] increase the production of methane. On one hand, [there is] the really disastrous... groundwater quality and odor impacts of that. On the other hand, [there] can be increased ability of polluting fuels to greenwash, through an accounting trick called “avoided methane crediting,” which could then extend indefinitely. That kind of use and reliance on polluting fuels also impacts air quality throughout areas much beyond the San Joaquin Valley. Darwin spoke about how the current LCFS, with respect to biomethane, also really puts a thumb on the scale... for the most environmentally polluting practices and discourages reliance on more sustainable farming practices, so seeing more and more disappearance of smaller sustainable farms. Finally, I'm very concerned that it will also further pigeonhole us and keep us from developing an effective and equitable framework both on the livestock side to create a regulatory framework that works for all Californians and the country and a move towards actually clean energy vehicles.”*

a. Q: If you don't want the LCFS to incentivize digesters, are you saying you prefer big dairies to just vent that methane into the atmosphere?

Phoebe responded, *“No. As we discussed earlier, what we look forward to is a multi-stakeholder... open discussion process to develop effective and equitable*

regulations to address the ongoing catastrophe of methane pollution, but also water and air quality pollution from livestock operations.”

Leslie Martinez with Leadership for Justice & Accountability added, “The other thing that’s really important to know is that factory farm gas is still combusting. They’re still pollutants that come from it. And when you are further delaying the part of California that has the worst air in the entire state, it’s like a death wish... They’re still going to be dependent on this contaminant in their community and further put the San Joaquin Valley at the end of the decarb[onization] line instead of really prioritizing the communities that we work with. So no, we don’t want more!”

11. Q: What are the other fuel pathways that folks have concerns about?

Sasan shared, “Unfortunately, we and the EJAC have some really significant concerns as well about the role that carbon capture and direct air capture play in this program. Folks may know the legislature recently passed a law, thanks to a lot of environmental justice advocacy, prohibiting the use of carbon capture for enhanced oil recovery in California. Yet CARB is not going to ban that same practice, from generating credits so long as that enhanced oil recovery occurs out of state. This is a really big problem. The legislature in California has said enhanced oil recovery is not a real climate solution. We don’t want it to happen. We’d like to ban it. Maybe even more concerning than that is the massive and really under-scrutinized role that direct air capture is poised to play under the current proposal. Direct air capture is an offset. In cap-and-trade, it’s an offset. But in the Low Carbon Fuel Standard, unlike in cap-and-trade, there’s actually no limit on how much DAC offsets can be used in the program. What we’ve seen in CARB’s modeling is that when direct air capture comes online, fossil fuel use increases and that it just runs completely counter to our air quality, our climate, and RSF goals. It’s really damag[ing] to the policy discussion that CARB hasn’t talked about this at all. We’ve really only found out about it by digging into the data that we requested six months ago, and that was just released in April. The IPCC and others agree that there’s a need for direct air capture in meeting our climate goals. They’re very clear and they strongly advise against using it as an offset for continued emissions, especially in a sector like on-road transportation, which we know we need to get to zero. CARB needs to do what it’s doing in cap-and-trade at a minimum here. It should prohibit the use of direct capture as a transportation offset in this program, or at the very least set limits on credits through this pathway.”

12. Q: What should be the cap on biofuels? What would the timeline look like for phasing out biofuels?

Dr. Martin shared, “We tried to figure out what’s the kind of reasonable amount of lipid based biofuels in California, you’d probably come up with a number that’s much smaller than the amount that California is already using. Capping it where we are would be a lot better than letting it go another 2%. The tightest cap possible is the best answer. About 2 billion gallons is where we are now. It would be better to not get to 3.5 billion gallons,

which is where we could be headed. Leasing it out is what's described in some of the regulatory proposals. The original vision of LCFS was to limit crop-based fuels in favor of cellulosic and other biofuels. We haven't seen the progress that we'd like there, but frankly, we're never going to see the progress if we tell people who are working in that space, "You're competing against a billion gallon a year existing oil refinery that just orders a tanker of soybean oil from Argentina." They can't compete against that. So to foster innovation and scaling up of preferable alternatives where we're not over taxing the resources, a cap can really help."

13. Q: When the LCFS subsidizes diesel biofuels in California, doesn't that force refineries to phase down production? Where do they export their petroleum diesel?

Dr. Murphy responded, "To some extent, the California refineries are likely and probably are already exporting more diesel to other markets. Some of those might be exporting elsewhere in the US or might be exporting to Latin America or Asia. To some extent, petroleum refineries and biofuel refiners get to control what comes out. A refinery takes big, complex crude oil or vegetable oil molecules and breaks it down into a variety of smaller molecules. They can decide whether they want it to come out as... diesel-type fuels or jet fuels. We're probably going to see some of the California refineries pushing out more jet fuel or more gasoline instead of diesel because the local markets prefer diesel... Over the long run, there's no future in which we meet our climate obligations of cheap carbon neutrality and still refine any massive amount of petroleum in the future. The industry does need to think about what an orderly, just transition and phase-down looks like. Exports to other markets can be a temporary solution here and there, for part of it, to make sure an orderly phase-down [occurs]."

Dr. Martin added, "This renewable diesel boom that's happened in the last three or four years, it wasn't the intended or anticipated strategy. The fact is that we've seen, a number of years ago, we had better substitutes for gasoline; diesel was harder. We might have expected to see gasoline fall faster than diesel and because of this huge surge in renewable diesel, it has gone the other way. In fact, in the last three years, the ratio of gasoline and diesel consumption has really gotten lopsided in California and that does create the need to import lots of feedstock to make renewable diesel. To export the fossil diesel that refineries can't produce creates a lot of extra ports movements... I think it points to the limitation of a kind of hands-off technology-neutral approach, right? This is not a strategy that's working out well in California. It's causing problems in lots of different ways. It makes sense for the regulator to [seek out] a more balanced approach where we have some renewable diesel, but not so much that it upsets global vegetable oil markets and California fuel markets. That would just be a wise strategy that would limit risks in lots of different ways for the state."

14. Q: Can you elaborate on how fixing the LCFS will help make energy more affordable for everyday Californians by shifting resources from out-of-state biofuel producers to investments in state electrification?

Sasan shared, *"This much CARB really agrees with: transportation electrification lowers the costs of transportation. It has that potential because it avoids the very high fuelling and maintenance costs that come from combustion cars. Even CARB acknowledges that LCFS funds transportation electrification, and that will over time lower overall transportation costs. We need to pay attention to the distributional impacts. Right now, mostly affluent people can afford EVs and mostly low-income folks are still required to use combustion vehicles. The LCFS has real passthrough costs on to the cost of fuel at the pump. It's not necessarily currently being leveraged in a way that is progressive. In fact, it's somewhat regressive. However, if you diverted those funds away from things that increase the cost of combustion fuel towards things that actually help us get off of fossil fuel [it can] help get low-income passengers into zero-emission transit or zero-emission vehicles. You would have then in theory a progressive program and the LCFS could do that by amplifying the amount of funding it diverts towards transportation electrification. A big problem right now is that the upfront costs of EV infrastructure and the grid upgrades that are needed to expand that EV infrastructure are still significant. Right now they are actually borne by rates. Now electrification of transportation can lower rates overall because it means we will be utilizing the grid more efficiently; spreading more electricity use over the same amount of grid assets will lower electricity rates, but upfront it does have a pretty significant cost and has an upward rate pressure. If instead we can upgrade the grid, upgrade our distribution system, build out that charging infrastructure with the LCFS, with funding from this program, that would take a lot of pressure off of rates. It would mean that you would basically find this new funding stream for the upfront capital costs, and then help incentivize a shift to the transportation modes that are most cost-saving. So beyond just preventing us from wasting our money basically on out-of-state biofuels and biomethane, the things that don't help with our transportation goals, restricting the bogus credit generation can lift the credit price and the EV subsidy without needing to increase the stringency of the program. You created a way to make the program less expensive, more effective, and offload pressure on rates so you're able to reduce the cost of transportation and reduce the cost of electricity bills, if you reform the program that way."*

15. Q: Wouldn't CARB be in a better place to ask other agencies like EPA and the South Coast to do more if it were willing to model good behavior itself by making tough decisions using the LCFS to drive deeper NOx reductions through zero emissions?

Sasan answered, *"Yes! The South Coast Air Basin has not met [and] it continually fails to meet its Clinton era ozone standards, and now it's on the verge of these federal sanctions. CARB is asking other agencies like EPA to do a bunch more to tackle NOx in the region. It's really unreasonable to say that it's turned every stone that it has available to it when it has this \$4 billion program that sends 80% of its credit value towards combustion fuels. It could be driving much deeper NOx reductions if you set these restrictions on how you generate credits. It would be unleashing a huge new torrent of funding towards things that really slash deeper NOx reductions, if you made the program more intentionally focused on zero emissions."*

The People's Workshop

**Fixing the Low Carbon Fuel Standard
to benefit all Californians.**

May 30, 2024



AGENDA

- **Moderators:**
 - **Dr. Catherine Garoupa**, Central Valley Air Quality Coalition and Environmental Justice Advisory Committee
 - **Andrea Vidaurre**, People's Collective for Environmental Justice
- **Opening Keynote:**
 - **Leslie Martinez**, Leadership Council for Justice and Accountability
- **Panel # 1:** “Harms of the Current LCFS”
- **Panel #2:** “Importance of Funding Electrification”
- **Video Presentation:** “Our Clean Air Vision”
- **Community Comment Period**
- **Q&A Session**
- **Closing Keynote:**
 - **Andrea Vidaurre**, People's Collective for Environmental Justice

Support for our recommendations to fix the LCFS.



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CALIFORNIA'S LOW CARBON FUEL STANDARD IS BROKEN!

GOVERNOR NEWSOM AND CHAIR RANDOLPH CAN FIX IT.

Our leaders can make the transition to zero-emission fuels **more affordable**.

The LCFS shouldn't be sending billions to polluters. Fixing the program so it funds the transition to pollution-free, electric transportation instead should be a **top priority**.

When we cut pollution from **EVERY** mode of transportation, **EVERY** Californian benefits.

Visit www.FixLCFS.com to learn more.



As seen in

San Francisco Chronicle

#FixLCFS
FixLCFS.com

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OUR GOALS

LIMIT POLLUTING BIOFUELS: Putting a limit on renewable diesel derived from vegetable oil and animal waste will get the credit price under control and shift investments toward pollution-free, electric infrastructure.

REGULATE AVIATION FUELS: Cutting methane credits will stem the perverse incentives that entrench and even increase pollution in communities living near factory farms and shift investment toward pollution-free fuels.

ELIMINATE AVOIDED METHANE CREDITS: Eliminating avoided methane credits will stem the perverse incentives that entrench and even increase pollution in communities living near factory farms and shift investment toward pollution-free fuels.

PRIORITIZE INVESTING IN ELECTRIFICATION: Currently, only a fraction of the incentives are going toward zero-emissions fuels. At a time when the state is cutting critical public EV incentives and infrastructure funding (now and projected for years to come), the LCFS could be a lifeline for ZEV investments.

Panel #1: “Harms of the Current LCFS”

- **Phoebe Seaton**, Co-founder and Co-executive Director of the Leadership Counsel for Justice and Accountability
- **Jovan Houston**, member of the Service Employees International Union and works at LAX
- **Amelia Keyes**, Attorney & Legal Fellow at Communities for a Better Environment
- **Dr. Jeremy Martin**, Senior Scientist and Director of Fuels Policy for the Union of Concerned Scientists
- **David Rodriguez**, Defensores del Valle Central para el Aire y Agua Limpio

The Low Carbon Fuel Standard: An unmitigated Environmental Disaster

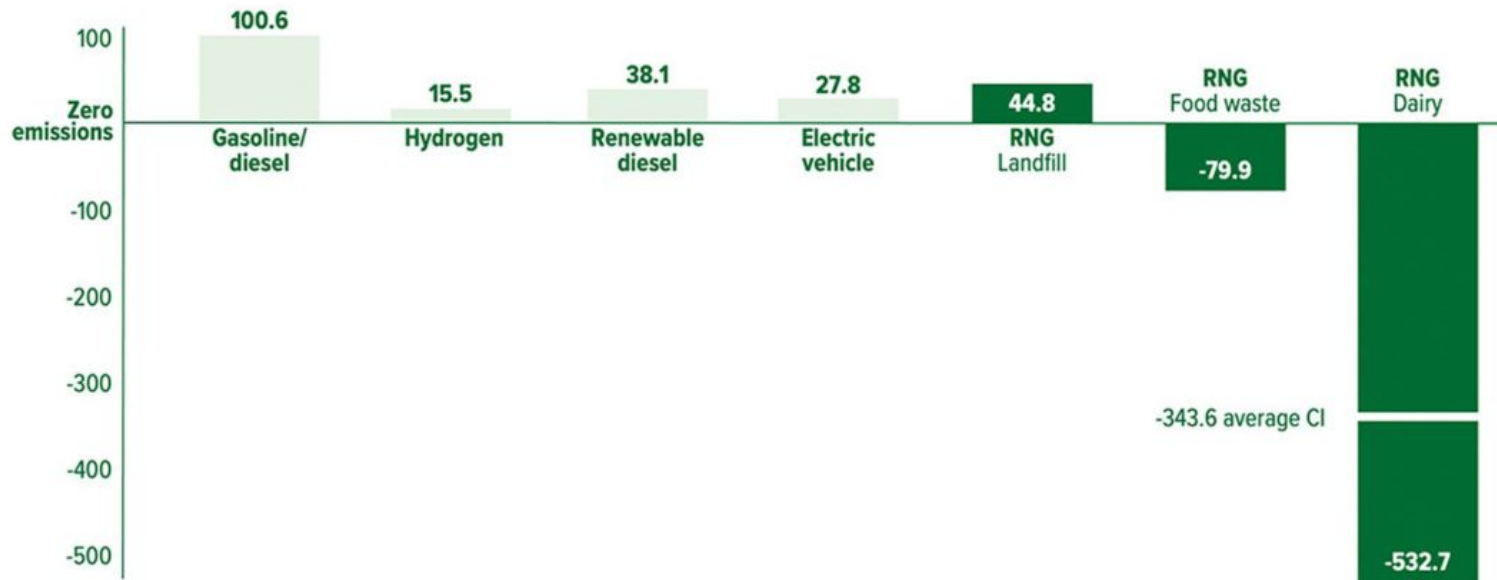
Phoebe Seaton

Co-founder and Co-executive Director of the Leadership
Counsel for Justice and Accountability

RNG is the lowest carbon alternative fuel



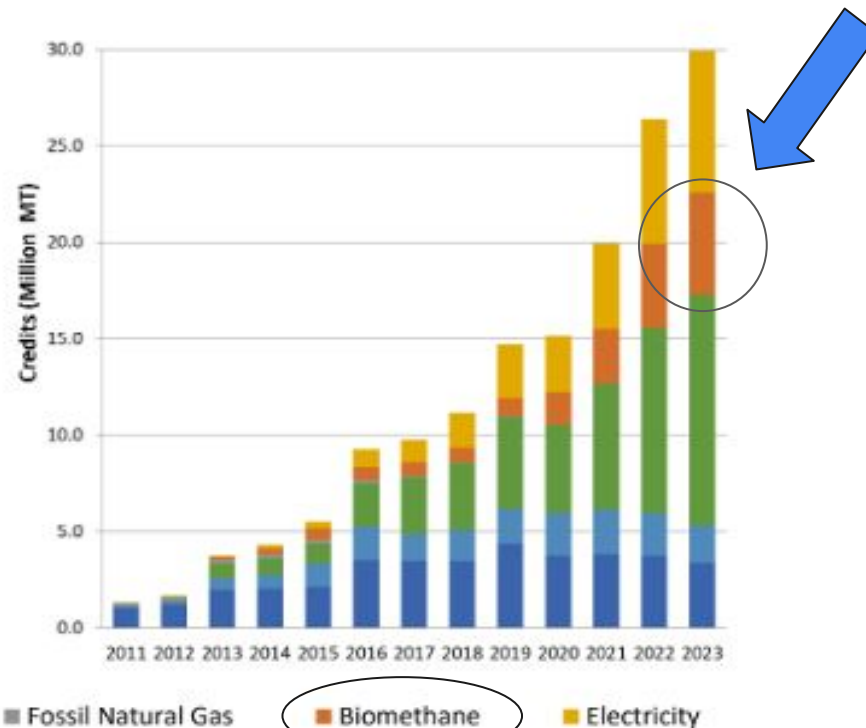
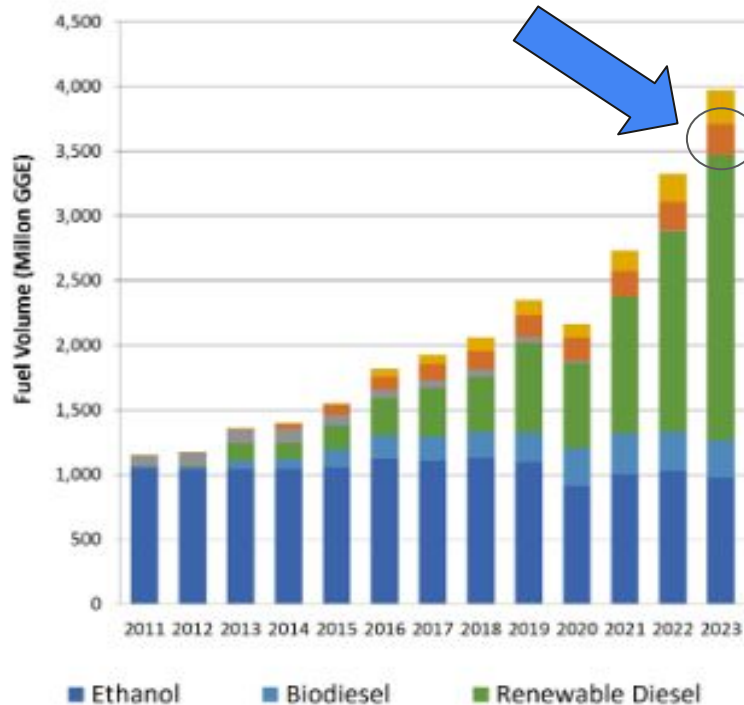
Carbon emission by fuel type (gCO₂e per MJ)



Source: California Air Resources Board, Q4 2021 LCFS data, and certified pathways as of April 19, 2022.

1

Alternative Fuel Volumes and Credit Generation



Last updated 04/30/2024

HOARD'S DAIRYMAN

"The profit generated by manure and energy is a new dynamic... The profits from manure-generated energy could likely exceed the profit from milk. **At that point, milk has become the by-product of manure production.**"

– Michael McCully
Dairy industry consultant

SCCOP

Solutions For The Farmer's Advisor

"[I'm] seeing some of the most innovative dairy producers across the country who are less than two years away from **making more money off the carbon contracts they sell than the dairy products they produce.**"

– Jeff Simmons
Elanco president and CEO

The Guardian

"Once you pay a cattle producer for their manure, you are effectively subsidizing the production of that manure.

You've altered the economics of cattle production."

– Richard Plevin
UC Berkeley researcher

"...**revenue from methane capture alone** could, in some cases, make up **almost 40% of total profits** for mid- and large-sized dairy farms in California... this could end up incentivizing farms to **increase herd sizes to produce more manure.**"

– Kevin Fingerman
California State Polytechnic University, Humboldt

Nitrate pollution in drinking water leads to birth defects, blue baby syndrome, diabetes, bladder & ovarian cancer.

- Most pollution from manure happens from land application of manure to fields; digesters do not improve and may exacerbate nitrate pollution. ***More concentrated manure means more nitrate pollution***

Air pollution from large livestock operation causes severe health harm and even death. Ammonia from livestock kills over 1,000 people a year in the Valley alone.

- Digestion actually ***increases*** ammonia emissions

Odors and flies create severe mental and emotional distress. Researchers found significantly higher rates of stress, tension, and depression large livestock operations

- Residents report ***worse*** odors following the installation of digesters

The LCFS, Consolidation, & the Concentration of Pollution in the SJV (From the 2022 Ag Census)

↑ **26.8%** on dairies w/ > 2,500 cows ; ↓ **52.4%** on dairies w/ < 1,000 cows

Average herd size in CA ↑ **13%** 2012-17; ↑ **43%** from 2017-22

While # cows in California; ↓ **# of cows in the** ↑ **SJV**

The SJV is now home to over **90%** of dairy cows in CA

Average herd size in the SJV grew from about **1,577** to about **2,052** cows

Seven SJV counties have **99.3%** of DDRDP-funded digesters
and **86%** of livestock manure LCFS pathways in CA

Van Der Kooi (Fresno) ↑ **1,800** to **5,000** cows

Borba (Merced) ↑ **1,650** to **6,100** cows animals.



California's renewable diesel boom is not good news for California, global food availability or tropical forests

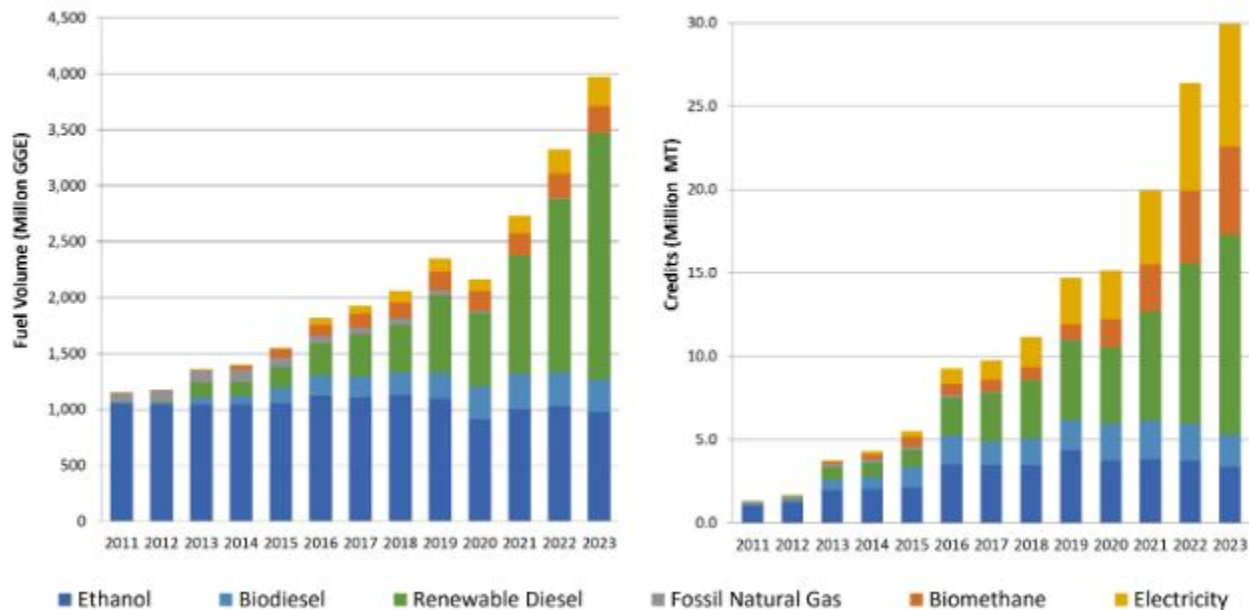
Jeremy Martin - Director of Fuels Policy, Sr. Scientist

Union of Concerned Scientists

May 30, 2024: People's LCFS Workshop

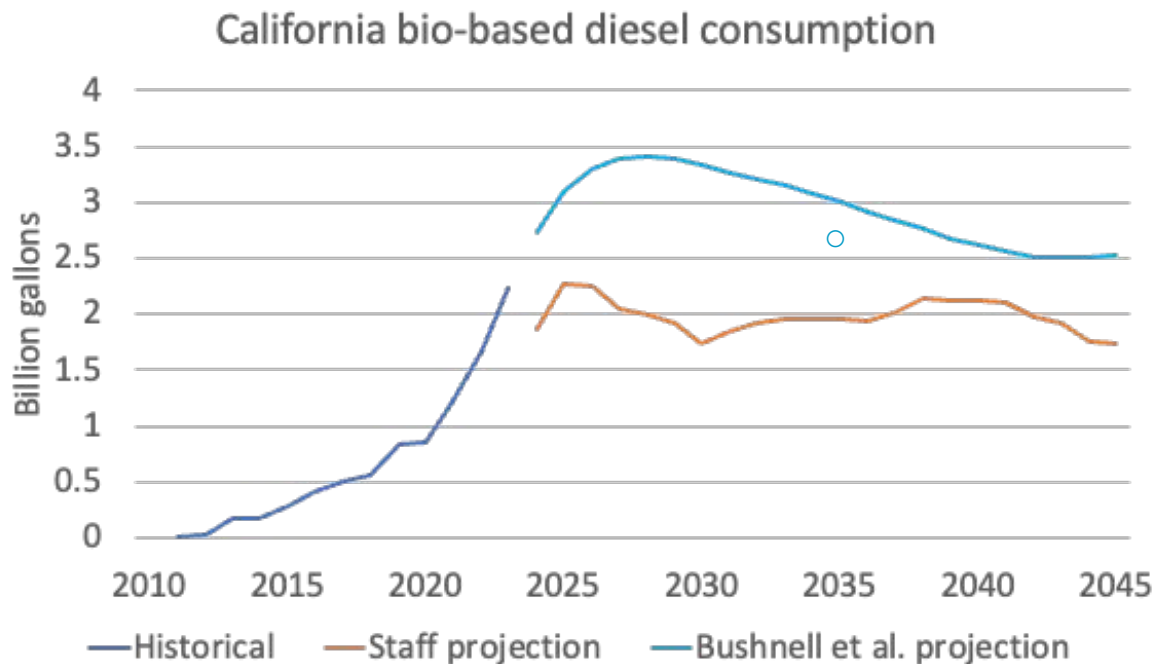
The renewable diesel boom was the primary driver of the LCFS credit market crash

Alternative Fuel Volumes and Credit Generation



Last updated 04/30/2024

Staff analysis assumes the renewable diesel boom will resolve itself. Experts from UC Davis and Berkeley disagree



Vegetable oil consumed for California fuel

2011-2020 < 0.1 MMT

2021 – 0.6 MMT

2022 – 1.0 MMT

2023 – 1.6 MMT

Global trade in soybean oil is ~12 MMT

Existing safeguards have broken down

- Prior to 2020, **disincentives** for crop-based fuels effectively **limited vegetable oil-based fuel** consumed in California
- In 2022, in the middle of a **global food crisis**, California consumed **a million metric tons of vegetable oil** for diesel fuel
- **Soybean oil** diverted from food to fuel gets **replaced in food markets by palm oil**
- Soybean and palm oil are **major drivers of tropical deforestation**

Vegetable oil consumed for California fuel

2011-2020 < 0.1 MMT

2021 – 0.6 MMT

2022 – 1.0 MMT

2023 – 1.6 MMT

Global trade in soybean oil is ~12 MMT

Stronger safeguards are needed

- **Existing safeguards are broken**
 - Expansion of vegetable oil-based fuels by major oil companies is not sustainable or scalable.
- **Sustainability certification won't work**
 - Using certified soybean oil in fuel markets won't address harm from uncertified soybean and palm oil that backfill food markets
- **Sensible safeguards are needed right now to limit unsustainable fuels**
 - Limiting bio-based diesel at the level CARB currently projects is likely will stabilize the LCFS, reduce the risk of food versus fuel conflict and deforestation
 - Limiting pathways is consistent with precedent and should be implemented now

Resources

- [Everything You Wanted to Know About Biodiesel and Renewable Diesel. Charts and Graphs Included](#), January 10, 2024
- [A Cap on Vegetable Oil-Based Fuels Will Stabilize and Strengthen California's Low Carbon Fuel Standard](#), January 30, 2024
- [Something Stinks: California Must End Manure Biomethane Accounting Gimmicks in its Low Carbon Fuel Standard](#), February 15, 2024
- [UCS Comments on LCFS Amendments](#), February 20, 2024
- [Scientists and economists' letter on biofuels](#), February 20, 2024
- [UCS Comments on April 2024 LCFS Workshop.pdf](#), May 10, 2024

Panel #2: “Importance of Funding Electrification”

- **Angie Balderas**, Digital Strategist and Communications coordinator with the People’s Collective for Environmental Justice
- **Román Partida-López**, Senior Legal Counsel for Transportation Equity at the Greenlining Institute
- **Sasan Saadat**, Senior Research and Policy Analyst at Earthjustice
- **Dr. Colin Murphy**, Deputy Director of the UC Davis Policy Institute for Energy
- **Dr. Michael Wara**, Senior Research Scholar with the Stanford Woods Institute for the Environment at Stanford University

2009: The Start of Low Carbon Fuel Standard

California adopted its LCFS in 2009, under then-Governor Schwarzenegger, with the goal of reducing transportation emissions.

In 2009, we believed:

- Biofuels and biogas viewed as main way to lower transportation emissions.
- Cellulosic biofuels “right around the corner.”
- Electric vehicles might play a niche role, only in the far distant future.
- Self-regulated markets responding to a price signal is the most efficient climate policy.

(Also in 2009...SONY sold 12 million floppy disks. TV Show Jersey Shore premieres. Blackberry becomes largest selling phone in U.S.)

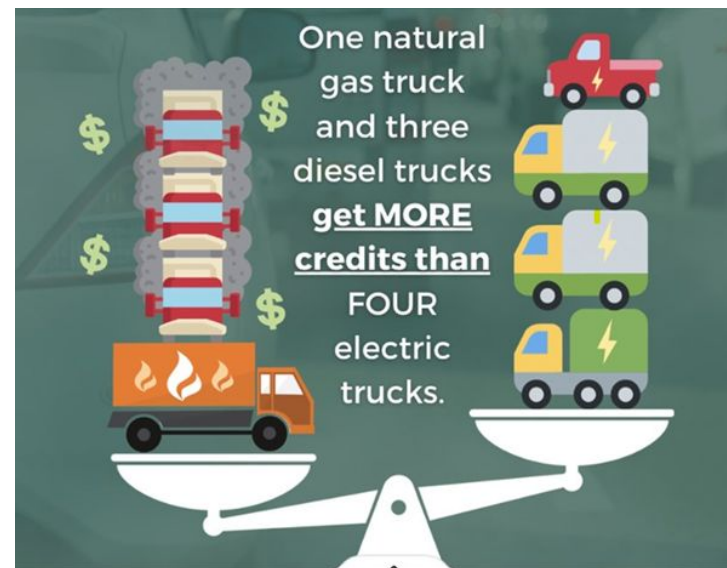
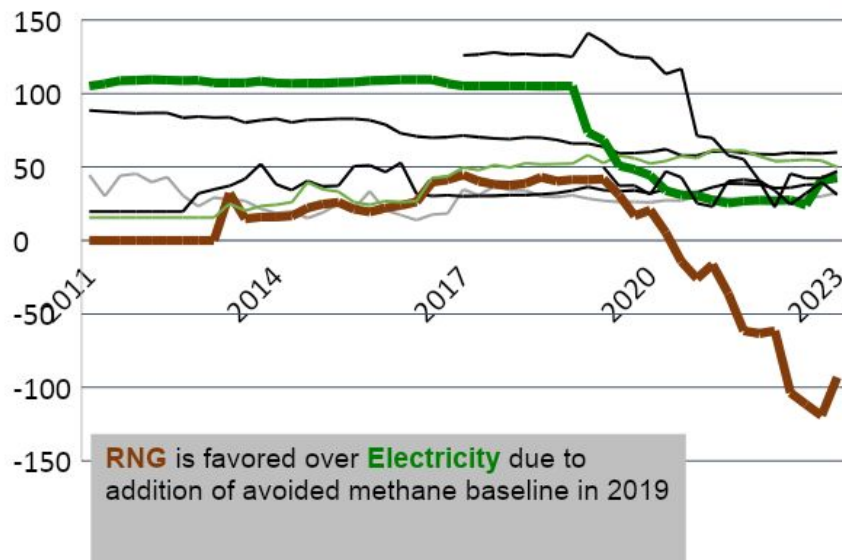
2024: A New Consensus – The Future is Electric!

And California is a leader! Thanks in large part to our leadership, in 2024, the world agrees:

- All major decarbonization scenarios concur on need for rapid, widespread transportation electrification.
- 15 years of experience with biofuels make clear – diverting land to grow crops for fuel is a disaster.
- The best way to meet climate goals is by meeting our public health goals, and vice versa.
- Climate policy requires strong state capacity to guide investments toward the specific industries needed for a full energy transition. Desired outcomes for equity and health must be explicitly encoded into policy design.

The LCFS Favors Polluting CNG Trucks Over ZEV Trucks

CNG generate **more credits** while displacing less **fossil fuel**.



The LCFS Favors Dirty Hydrogen over Green Hydrogen

**Electrolysis in Alameda County,
CA, Powered by Local Solar PV**

Carbon Intensity = **0**

LCFS Credit Calculator: **\$1.40/kg of H₂**



**SMR of Fossil Gas in Wilmington, CA,
Paired with Credits from Dairy in IN.**

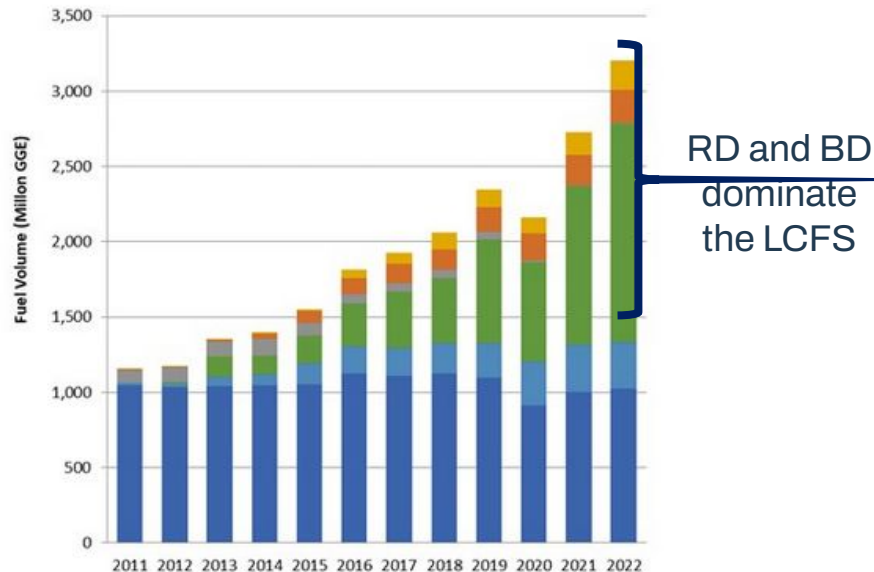
Carbon Intensity = **-287**

LCFS Credit Calculator: **\$3.81/kg of H₂**



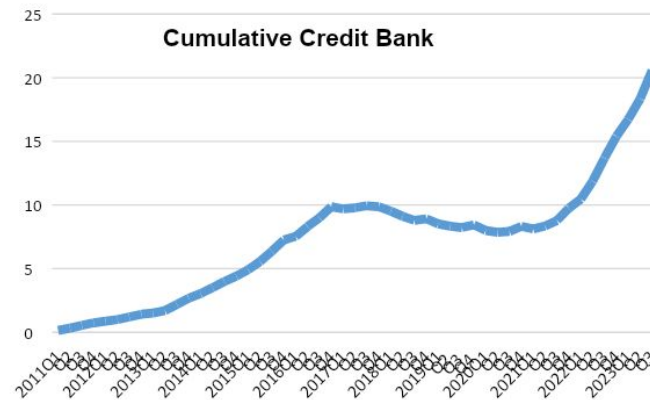
Significant Growth in Biofuels Undermines ZEV Goals

Alternative Fuel Volumes



- Unconstrained biofuel growth has led to a glut of credits and plummeting credit prices.
- Continuing to subsidize all biofuels devalues each credit, including those used to support transportation electrification.

Current policy distorts the market signal for ZEVs.



CARB Must Re-Focus this \$4 Billion Program on ZEVs

- Grim budget make this an urgent time to prudently allocate LCFS credits.
- Restricting bogus credits can lift credit prices without needing to increase stringency (makes the program more effective and less expensive).
- Transit deserves additional crediting opportunity.
- Result is more funding for transportation electrification, which provides real benefits to Californians.



CAPITOL ALERT

Newsom proposes cuts to clean energy, electric vehicles as California faces \$38 billion deficit



The Path Forward

Align LCFS policy with the State's climate, air quality, and equity goals.
Staff's Proposal fails to do this and must be fixed in this rulemaking.

Stop Subsidizing the Bad

**Restrict over-generation of subsidies for
polluting fuels**

Stop avoided methane credits for new pathways.

Align deliverability requirements for all fuels.

Cap lipid biofuels.

Prohibit crediting for Enhanced Oil Recovery activities, consistent with SB 1314.

Enhance Support for the Good

**Increase LCFS support for ZE pathways
with the greatest EJ benefit**

Allow full credit generation for fixed guideway (e.g. light rail) transit.

Support VMT reductions with a transit and school bus credit multiplier.

Unlock billions for transportation electrification without adding costs to consumers.

Our Clean Air Vision

Community Comments

Questions & Answers

Phase out funding combustion fuels. Invest more in zero-emission electric technologies.

LIMIT POLLUTING BIOFUELS: Putting a limit on renewable diesel derived from vegetable oil and animal waste will get the credit price under control and shift investments toward pollution-free, electric infrastructure.

REGULATE AVIATION FUELS: Including jet fuel will drive down pollution from one of the state's dirtiest sectors while supporting the program's overall goal of cleaning up all fuels.

ELIMINATE AVOIDED METHANE CREDITS: Eliminating avoided methane credits will stem the perverse incentives that entrench and even increase pollution in communities living near factory farms and shift investment toward pollution-free fuels.

PRIORITIZE INVESTING IN ELECTRIFICATION: Currently, only a fraction of the incentives are going toward zero-emissions fuels. At a time when the state is cutting critical public EV incentives and infrastructure funding (now and projected for years to come), the LCFS could be a lifeline for ZEV investments.

Thank you!

#FixLCFS

Visit www.FixLCFS.com to learn more.

Summary of the People's Low Carbon Fuel Standard Workshop

May 30, 2024

BACKGROUND

For years, environmental justice, labor union, and environmental advocates have warned of the Low Carbon Fuel Standard's (LCFS) negative impacts on communities across California and the country. Advocates and community members have rung the alarm bells in California Air Resources Board (CARB) workshops, hearings, and written public comments, only to be ignored, drowned out, or dismissed. As Leadership Counsel for Justice and Accountability's (Leadership Counsel) Leslie Martinez shared, ***"workshop after workshop, hearing after hearing, and meeting after meeting, going as far back as the Scoping Plan process, communities raised their experiences that the LCFS program was making conditions worse, not better."***

Researchers from [UC Davis](#), [Stanford University](#), and the [Union of Concerned Scientists](#) also raised fundamental concerns about the program's impacts and provided constructive recommendations for shoring up the credit price while also boosting zero-emissions transportation and creating better health outcomes in frontline communities.

CARB staff's proposed amendments risk worsening these impacts until 2045, prioritizing support for combustion fuels and undermining zero-emissions solutions that are critical to achieving the state's carbon neutrality mandate. According to Leslie, despite community advocates' engagement, the proposal indicated that "CARB did not care to respond to the voices of those who have subsidized the LCFS with their health and their children's future."

CARB's support for combustion industries over communities is apparent in the process as well as the substance of this rulemaking. At the most recent April 10, 2024 workshop, dozens of environmental justice (EJ) community members and leaders as well as scientists and researchers from across the state who had patiently waited for several hours to speak virtually were summarily told by CARB staff that there wasn't enough time to hear from them. Meanwhile, the workshop provided ample time for biofuel industry lobbyists – who could afford to attend in-person in Sacramento – to have a nearly uninterrupted opportunity to provide comments and hold exchanges with CARB staff. In response, the coalition of advocates submitted [a letter to Chair Randolph in April 2024](#) detailing how the consistent process failures by staff left advocates with no choice but to host our own People's LCFS Workshop on May 30, 2024.

SUMMARY OF KEY POINTS DELIVERED AT THE PEOPLE'S LCFS WORKSHOP

The virtual People's LCFS Workshop brought together diverse stakeholders from the refinery communities of Northern and Southern California, to the communities impacted by factory farms in the Central Valley, to the airport workers and residents around Los Angeles International Airport (LAX), San Francisco International Airport (SFO), and San Diego International Airport (SAN), to the Inland Empire communities suffering in dirty diesel death zones from freight transportation, to the farming communities of Missouri, as well as scientific researchers across California to voice their concerns and recommendations. CARB Board members and other policymakers were invited to hear directly from community leaders, researchers, and advocates about how the broken LCFS program exacerbates harm in their communities and to learn about advocates' recommendations for a clean air and clean transportation future.

The LCFS program exacerbates harm in communities surrounding factory farms, refineries, and trucking corridors. CARB staff's current proposal is poised to worsen these disproportionate impacts.

- ***Biofuels subsidized by the LCFS are incentivizing renewed and expanded polluting infrastructure in communities of color.*** Amelia Keyes with Communities for a Better Environment explained that refinery communities have shouldered the pollution burden of the state's addiction to oil and gas for many decades. Now with the pivot to biofuels, these same communities are being forced to live with decades more of pollution from biofuel refining, which "generates similar levels of harmful air pollution and [has] already been proven to be just as dangerous as oil." In the Bay Area, the Martinez Biofuel Refinery has already experienced major accidents that have harmed and endangered both workers and nearby residents. According to Greg Karras, "the Chevron refinery expansion in Richmond, California is another example of how polluters hijack the [LCFS] to greenwash their pollution."
- ***Biofuels pollute EJ communities up and down their supply chains.*** The impact of biofuel refineries does not just stop in Northern California. Nicholas Paúl informed workshop attendees that a new biofuels transfer facility in National City, San Diego, is set to transport millions of gallons of renewable biodiesel by rail into the heart of portside EJ communities, where the fuel will then be transported by heavy-duty trucks to distribute throughout San Diego County. According to Nicholas, such projects will perpetuate PM and ozone pollution "at a time when we should be doubling down on electrification."

- ***Data confirms livestock methane offsets are distorting both the transportation and the livestock industry.*** Phoebe Seaton, co-Executive Director of the Leadership Counsel, explained that the avoided methane crediting has led to excessive carbon negativity and the utilization of livestock gas as a credit generating mechanism rather than as a transportation fuel alternative. Livestock gas makes up about 1% of fuel, but between 15% and 20% of credits in the program.
- ***This has encouraged livestock operators to generate more manure and concentrate more cows in the San Joaquin Valley.*** As David Rodriguez, a founding member of Defensores del Valle Central para el Aire y Agua Limpio (Defensores), shared, the resulting groundwater pollution, air pollution, odor and flies from industrial dairies have plagued the frontline residents near growing factory farms in the Central Valley. Recent USDA Census data confirms that large farms in the Central Valley are growing - and small farms in CA are disappearing - more rapidly than the nation on average.
- ***CARB's all-carrots, no-sticks approach hurts small, family farmers.*** These impacts don't just harm Californians. Darwin Bentlage, fourth-generation family farmer and member of the Missouri Rural Crisis Center, shared that "family farmers and rural communities have been displaced, hollowed out, and depopulated as a result of corporate consolidation and corporate control of our food systems and the US livestock market, specifically by way of corporate industrial livestock operations." The solution to this climate pollution is not supporting methane gas operations and factory farm expansion.
- ***Airlines must pay for their pollution just like every other transportation fuel.*** Airport workers like Jovan Houston, an employee at LAX, are constantly exposed to unhealthy jet fuel exhaust, leading to chronic respiratory illnesses such as COPD and asthma. Jovan was joined by colleague Avril Hirachbein from SFO International Airport, who shared that their coworkers oftentimes "miss work because they can't breathe at work" and experience respiratory issues and chronic illnesses. Airport workers, like Claudia Fuentes at San Diego International Airport, and communities along flight paths are counting on CARB to include all jet fuel that is combusted in California as a deficit generator so that more zero-emission solutions can be invested in today and to encourage airlines to develop less polluting planes.
- ***Frontline freight communities reject subsidies for "bridge fuels."*** In the Inland Empire, residents are exposed to high rates of heavy-duty diesel truck pollution due to the expanding goods movement system. In the summer, hospitals are overcrowded as residents seek medical assistance for respiratory complications that spike during these months. Angie Balderas with the Peoples Collective for Environmental Justice stated, "Our people have been guinea pigs for far too long and we've had to deal with these bridge fuel companies just trying to make money off our lives." A reformed LCFS that

addresses both air pollution and climate pollution more efficiently would help accelerate the shift to zero-emissions vehicles.

CARB needs to phase out funding for combustion fuels and invest instead in zero-emission electric technologies.

- ***LCFS reform can free up billions of dollars for electrification, alleviating demand on the State Budget and electricity rates.*** According to Román Partida-López at The Greenlining Institute, “the bottom line here is that LCFS is a missed opportunity for providing a lifeline for our public electrification investments.” Over the next decade, the LCFS is set to waste over \$27B on polluting fuels instead of investing it into lifesaving electrification solutions.
- ***The renewable diesel boom is not done.*** Dr. Jeremy Martin from the Union of Concerned Scientists showed how the renewable diesel boom is unlikely to abate anytime soon. He explained that using soybean oil for fuel means it gets replaced in food markets by palm oil, and both palm and soybean oil are significant contributors to deforestation. “California climate policy has become a motor of destruction of forests,” said Gary Hughes with Biofuelwatch. This is an unsustainable, irresponsible way for California to produce transportation fuel. It's crucial that the state sets a sensible limit on the amount of vegetable oil used for fuel. Treating CARB's projection as a safeguard—ensuring biomass diesel doesn't exceed projections by 50%—can achieve this without dramatically altering the existing market or increasing fossil diesel usage.
- ***Restricting credits from unaligned pathways creates new opportunities to fund zero-emission transit and medium- and heavy-duty infrastructure.*** Sasan Sadaat with Earthjustice explained that CARB must restrict bogus credit generation, which fails to provide clean air benefits and doesn't help the climate. Lifting the credit price by restricting bogus credits would make the LCFS program both more effective and less expensive. Furthermore, CARB should enhance credit opportunities for solutions that align with the state's climate goals such as electric transit and school buses, which will benefit low-income communities and communities of color.
- ***Unconstrained renewable diesel will keep LCFS prices low.*** Dr. Colin Murphy from UC Davis explained that under CARB's proposal, obligated parties will continue to seek the cheapest compliance option available, which will be renewable diesel until the California market is fully saturated. If there were limits on these fuels entering the market, obligated parties would have to look to other technologies and other options for finding credit. One of those would be electric vehicle charging, which gives better long-term air quality benefits and helps California move itself towards carbon neutrality in the long term.

- ***CARB Staff modeling mischaracterizes EJ asks and draws inaccurate conclusions.*** Dr. Michael Wara at Stanford University emphasized that “the facts do not match the assumptions in [CARB’s] modeling with respect to the lipid biofuels that are currently...60% of the diesel supply in CA and moving upward.” Furthermore, the rollout of EVs into medium- and heavy-duty fleets is growing much faster than reflected in CARB’s modeling assumptions. In their own modeling with updated assumptions, Wara and his team determined that the EJ scenario, including the proposed methane crediting adjustment and crop-based biofuel limits, is not only achievable at reasonable credit prices, but it could also help the state achieve its climate goals while lessening harms in EJ communities. CARB Staff’s run of the EJ Scenario inaccurately represents the coalition’s demands, making them appear more extreme. Wara stated, “We need to create a program that is based on facts rather than outdated assumptions.”

As Andrea Vidaurre, Co-Founder of the People’s Collective for Environmental Justice and 2024 recipient of the Goldman Environmental Prize, summarized, ***“CARB’s job is not to help build up these bridge fuel industries. It’s to clean up the air and protect our public health.”***

This coalition demands that CARB respond to the concerns of scientific researchers and community advocates across California and around the country who know that the LCFS is severely flawed. In this LCFS rulemaking, CARB must limit subsidies for polluting biofuels, regulate aviation fuels, eliminate avoided methane credits for livestock gas, and prioritize investing in electrification.

August 27, 2024

Liane Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: August 2024 Amendments to the LCFS Program

Chair Randolph:

On behalf of the California Transit Association, I write to you today to voice our support for the proposed Low Carbon Fuel Standard (LCFS) amendments package, released by the California Air Resources Board (CARB) on August 12, 2024, and to respectfully request continued consideration of the currently unaddressed priorities of our transit and rail agency members. This letter follows our earlier communications in response to the previously proposed LCFS amendments packaged, released by CARB on December 19, 2023. The Association represents over 200 member organizations from across California's transit industry, which includes 85 transit and rail agencies in the state.

As you know, in early 2024, the Association requested that CARB consider several changes to the previously proposed LCFS amendments package. **These requested changes included addressing the credit generation disparities between pre-2011 and post-2010 fixed guideway systems and addressing administrative and reporting challenges associated with recording fuel service equipment (FSE) electricity usage. As we expressed at the time, in an era of significant financial constraints at the state and local levels, our industry views LCFS as a vital incentive for encouraging transit and rail agencies to take early and expansive actions to further clean their fleets and as an important tool for offsetting the persistently high costs of zero-emission operations. We are pleased to see that the new proposed LCFS amendments package addresses the most significant of these requested changes by proposing to establish parity in the credit generation of pre-2011 and post-2010 fixed guideway systems. This change will help ensure that California's fixed guideway systems, regardless of their construction year, can continue to deliver and expand robust electrified service to the benefit of Californians across the state.**

In thanking CARB for the movement on this top and longstanding priority for the Association and our members, we continue to request that CARB act to further amend the regulation to address our remaining priorities. These priorities and the requested amendments are detailed below.

Administrative Burdens in Reporting

223.2

As highlighted in our previous comment letter, the LCFS program currently requires non-residential EV charging industries and agencies generating credits from grid electricity to report the quantity of electricity (in kWh) from the FSE, or electric charger. This creates an obstacle for our member agencies, as several have designated overhead charging systems to power their battery-electric buses. Some overhead charging systems are designed to maximize bus charging times, allowing 3 buses to charge simultaneously while connected to one charger. Because of this design and the current reporting requirements under LCFS, we reserve our concerns about how data will be reported from this type of design, and the need to register and report from each individual charger (power cabinet) and/or pantograph (dispenser). Currently, to maximize credits using time-of-use energy consumption, our members would need to report from the meter/utility bill or implement a type of charge management system software to charge multiple buses in the most cost effective manner. While useful, this technology is nascent and agencies do not have enough information to determine how this platform will perform when reporting data to CARB. With these issues not being addressed in the most recent set of amendments, the Association maintains, and urges the Board to consider, our concerns about the administrative constraints associated with registering and reporting from each individual FSE.

Loss of Credit Via Line Loss

223.3

Also noted in our previous comment letter, several transit agencies have reported a significant loss of energy (also known as line loss), and these figures differed greatly from those reported at the meters to those reported at the FSEs. Line loss is an unavoidable issue for many agencies and refers to the loss or consumption of energy in kilowatt hours (kWh) during the transmission or distribution of energy from the electric grid to the bus. This is a major concern because, at full deployment, this energy loss can equate to hundreds of thousands of dollars in credit loss per quarter and millions of dollars in credit loss annually. Though not a direct result of FSE reporting, line loss could also be addressed by authorizing agencies to report energy usage from the meter, as this would allow agencies to record the most accurate balance of accessible energy. Even so, reporting with a line loss would not accurately reflect the well-to-wheel GHG analysis for running a battery electric bus in-service.

In closing, we greatly value our partnership with CARB in advancing the deployment of zero-emission vehicle technologies. We thank you for your consideration of our requested changes to the LCFS program.

Should you or your staff wish to discuss further our interests for the LCFS, please feel free to contact me at (916) 446-4656 or alchemy@caltransit.org.

Sincerely,



Alchemy Graham
Legislative & Regulatory Advocate

August 27, 2024

Rajinder Sahota, Deputy Executive Officer
California Air Resources Board
1001 "I" Street
Sacramento, CA 95814

RE: PG&E Comments on Proposed Modifications to the Low Carbon Fuel Standard Amendments

224.1 Pacific Gas and Electric Company (PG&E) appreciates this opportunity to comment in response to the California Air Resources Board's (CARB) release on August 12, 2024, of additional proposed modifications to the Low Carbon Fuel Standard (LCFS) regulation for a 15-day public comment period (15-Day Draft). While PG&E supports several of the changes in the 15-Day Draft, there are a number of critical updates to electricity-related provisions that were not included which should be prioritized for a second round of 15-day modifications. PG&E's comments below summarize these missing, largely technical fixes, from our prior comment letters while also raising concerns related to new provisions introduced in the 15-Day Draft

Summary of Comments:

- 224.2 • PG&E supports program stringency, FCI, and holdback program administration spend modifications, with additional changes.
- 224.3 • Modifications are still necessary for enabling maximum benefits from LCFS-funded utility transportation electrification programs.
- 224.4 • Potential diversion of utility LCFS credits to EV manufacturers needs additional clarification and guardrails.
- 224.5 • Modifications to deliverability requirements for book-and-claim biomethane accounting further undermine LCFS' fuel-neutral principle.
- 224.6 • Development of an alternative incentive program to support the transition of biomethane and low-carbon hydrogen to non-transportation sectors is necessary to align with the 2022 Scoping Plan.
- 224.7 • Restricting qualified forest biomass feedstock to "non-industrial forestlands" could hinder development of biofuels projects that support wildfire risk mitigation.
- 224.8 • The LCFS Program should continue to support, not hinder, the near-term development of a hydrogen ecosystem on the path toward deep decarbonization.

PG&E Supports Program Stringency, FCI, and Holdback Program Administration Spend Modifications, with Additional Changes

224.9 PG&E supports the proposed increased stringency, including 30% in 2030 and 90% in 2045 and a 9% step-down in the first year. However, PG&E believes that CARB should allow for
224.10 activation of the Auto Acceleration Mechanism (AAM) as soon as 2026, and at an average quarterly deficit ratio of 2.0, rather than 3.0 for the reasons outlined in our May 10 letter.¹

224.11 PG&E also appreciates the proposed changes to the Fast Charging Infrastructure (FCI) program, in particular increasing the medium/heavy-duty (MHD) geographic restriction from one mile to five miles from a major highway corridor, as this is important to avoid potential adverse impacts on the grid, and not delay deployments or increase overall costs.

224.12 Additionally, PG&E supports the cap on administrative costs for utility holdback programs to 7%. However, if CARB does not intend to expand the definition of administrative costs to include program-specific costs aligned with how utilities report for other regulators, and clarify that this excludes start-up costs and marketing, education, and outreach (ME&O) costs, it is critical that this cap increase to 10%, for the reasons detailed in our February 20th letter² and in the CalETC Board letter being submitted concurrently. Administrative cost caps are a complex issue and vary significantly depending on definitions of what is and is not included, and with increasing requirements to focus on harder-to-reach customers, flexibility is critical to ensure programs are effectively run and equity goals are attained.

Modifications are Still Necessary for Enabling Maximum Benefits from LCFS-Funded Utility Transportation Electrification Programs

PG&E's February 20 comments detailed a list of largely technical changes and fixes to the 45-day regulatory draft that, while potentially appearing minor, are in fact critically important to our ability to effectively propose, administer and run LCFS-funded programs and projects for our customers that best serve their needs and the needs of the grid. PG&E is disappointed to see that none of these non-controversial requests were acted upon. At a high level, these necessary modifications include:

- 224.14 • Merging the proposed two separate holdback project lists into a single project list and clarifying that certain project types are considered equity regardless of their geographic location;
 - Explanation: The separate equity and non-equity project lists in the 45-Day Draft create ambiguity and confusion as written and could lead to delays in approval from the CPUC, which also has jurisdiction over the investor-owned utilities'

¹ PG&E Comments on April 2024 LCFS Comments, May 10, 2024, p. 2. Available at https://ww2.arb.ca.gov/approved-comments?entity_id=35921&page=3

² PG&E Comments on 45-Day LCFS Amendments, February 20, 2024, p. 7-8. Available at <https://www.arb.ca.gov/lists/com-attach/7082-lcfs2024-BmpRNFUyUnIEXQM3.pdf>

224.14
cont.

(IOUs) programs. The proposed edits will allow for more diversity in equity projects for low-income individuals and those who meet the equity definition, and faster deployment of LCFS funds to customers.

224.15

- Aligning CARB's increased equity requirement of 75% for large IOUs with the CPUC requirements for all aspects of the requirement, not just the reporting percentage;
 - Explanation: CARB and the CPUC currently track different metrics (proceeds vs. spend accounting) which could lead to compliance challenges to the extent that PG&E could end up unable to comply with both CARB and the CPUC, forcing a choice between which agency's requirements to meet. CARB should switch to spend-based accounting, which would eliminate this risk and provide all the benefits detailed in our February 20 comments.

224.16

- Ensuring that grid-side investments that support both light-duty and MHD EV charging be eligible for equity spending requirements, if serving projects in an equity community;
 - Explanation: Limiting equity-eligible investments to MHD would unnecessarily complicate grid planning, program development and the ability to scale such a program. It also ignores that light-duty fast charging is critical for EV equity for those who cannot charge at home.

224.17

- Making key edits to the proposed third-party verification requirements for electricity pathways such as: 1) Exempting residential and non-residential on-road electricity pathways from Fueling Supply Equipment (FSE) site visits except in cases where there is a reasonable concern about accuracy, and 2) Exempting very small credit generators.
 - Explanation: Commercial and residential EV charging stations are largely standardized pieces of equipment subject to existing accuracy regulations.^{3,4,5} Additional verification would be duplicative, unnecessary in most cases, and costly, potentially wiping out the proceeds for very small LCFS credit generators.

224.19

Further detailed explanations of these important and necessary changes are provided in our February 20 comments, and in the CalETC Board comment letter on the 15-Day Draft, which includes proposed redline edits to implement these needed changes.⁶ Incorporation of these critical modifications in a second round of 15-Day changes is essential for effective operation of utility LCFS programs, and we appreciate Staff's attention and support in this regard.

³ Utility meters are certified to ANSI C12 standards by Nationally Recognized Testing Labs (NRTLs)

⁴ California Department of Food and Agriculture's Division of Measurement Standards (DMS) regulates EV chargers for metering accuracy: https://www.cdfa.ca.gov/dms/pdfs/regulations/EVSE-OAL_EndorsedLetter-and-FinalText.pdf

⁵ Each California county's Department of Weights and Measures conducts inspections to enforce the DMS requirements, paid for through county device registration fees: https://www.cdfa.ca.gov/dms/docs/publications/2023/2023_Combined_BPC.pdf

⁶ CalETC Comment Letter on LCFS 15-Day Draft, August 27, 2024. Available at: <https://www.arb.ca.gov/lists/com-attach/7433-lcfs2024-UzBUMwZrVGIHdVc0.pdf>

Potential Diversion of Utility LCFS Credits to EV Manufacturers Needs Additional Clarification and Guardrails

224.20 The 15-Day Draft includes a new provision that would give CARB’s Executive Officer (EO) the option to divert up to 45% of utility base residential credits to EV Original Equipment Manufacturers (OEMs) if the share of new light-duty ZEV sales for model year 2024 is less than 30%. Overall, PG&E raises concern that this provision was added with no prior public process, notification or workshop, and that providing LCFS credits to entities that are not fuel suppliers represents a significant and novel deviation from a core, underlying principle of the LCFS program to date. Should the provision stand, the proposed language should be clarified to minimize negative potential impacts to the programs these credits currently fund.

PG&E recommends the following changes:

- 224.21
 - Confirm and clearly articulate that OEMs could only receive credits from the pool that would otherwise have been deposited by a utility to support the state-wide rebate program (California Clean Fuel Reward, CCFR).
 - Explanation: The percentage of credits that a utility must contribute towards the CCFR program differs depending on utility size and absent this clarification, could mean a reduction in the credits that utilities can “holdback” for their territory-specific TE programs.
- 224.22
 - Include a deadline of March 15, 2025 by which the EO must decide whether to divert credits to OEMs in order to provide certainty and allow utilities to plan for and expend resources to launch a newly re-focused MHD CCFR program without having those funds diverted mid-stream.
 - Explanation: Requiring the Executive Officer’s assessment by March 15 will ensure that the EDUs have certainty on whether to move forward with the MHD CCFR program as well as provide enough time to initiate a timely transfer of credit proceeds to the CFR program by the contribution deadlines, if needed.
- 224.23
 - Ensure Board oversight of the Executive Officer’s discretion to reallocate base credits to the OEMs.
 - Explanation: The decision to divert credits to OEMs – who are not subject to equity spending requirements or the additional regulatory oversight by the CPUC/local governing boards – is a departure from the premise of the LCFS program and should be subject to Board oversight. The final order should require the Executive Officer to review the implementation of any OEM program and present a report to the Board annually, beginning January 1, 2027.
- 224.24 Please refer to the California Joint Utilities letter being submitted concurrently for further details and proposed redlines to effectuate these important regulatory clarifications.⁷

⁷ California Joint Utilities Comment Letter on LCFS 15-Day Changes, August 27, 2024. Available at <https://www.arb.ca.gov/lists/com-attach/7439-lcfs2024-BWRVJgFnACZVIAB0.pdf>

Modifications to Deliverability Requirements for Book-and-Claim Biomethane Accounting Further Undermine LCFS' Fuel-Neutral Principle

224.25 The 15-Day Draft includes a new deliverability requirement for biomethane book-and-claim accounting which adds a condition that if the Executive Officer approves a gas system map identifying interstate pipelines and their majority directional flow based on specified flow data by July 1, 2026, pathways for bio compressed natural gas (CNG), bio-liquified natural gas (LNG), and bio-L-CNG combustion in vehicles would need to demonstrate physical flow to California after December 31, 2037. Biomethane is not the only fuel eligible for book-and-claim accounting in the LCFS program but is being uniquely targeted by this condition in a manner that would limit biomethane supply eligible for LCFS credits based solely on geography, rather than carbon intensity. This runs counter to the fuel-neutral principle underpinning the LCFS program's original design, setting a troubling precedent for other jurisdictions looking to model programs based on California. Greenhouse gases are a global, not local issue, which a physical deliverability requirement ignores.

224.26 Further, PG&E notes that should the EO approve a gas system map, it would only reflect that snapshot in time when it was developed. Major changes to the natural gas market (such as state and local bans on fracking, or a decline in fossil natural gas demand) could change these flows. Even with an updated map, proving physical flow through evidence such as purchase of transmission rights would be difficult, time-consuming, and provide a considerable barrier, especially for small-volume biomethane fuel providers such as a municipal CNG station.

Development of an Alternative Incentive Program to Support the Transition of Biomethane and Low-Carbon Hydrogen to Non-Transportation Sectors is Necessary to Align with the 2022 Scoping Plan

224.27 As noted in PG&E's prior comments, CARB should ensure that the phase-out of avoided methane crediting in the LCFS program does not stymie methane capture investments. While the end-date is not until 2040, the regulatory signal from the phase-out could have a chilling effect on the financing prospects of near-term projects, running counter to the State's goals. The 2022 Scoping Plan identifies a long-term role for biomethane in decarbonizing California's energy use for the production of hydrogen and for use in non-transportation sectors. As the Board considers changes to LCFS that would tighten the credits available for biofuels in the transportation sector, it is important to start a parallel conversation focused on establishing a similar support structure for non-transportation sectors to facilitate continued investment in clean fuel projects. Therefore, PG&E encourages CARB to move swiftly in developing an industrial clean fuels standard or an alternative incentive mechanism that can provide needed support for biofuels and hydrogen to help reduce industrial emissions.

224.29

Restricting Qualified Forest Biomass Feedstock to “Non-Industrial Forestlands” Could Hinder Development of Biofuels Projects that Support Wildfire Risk Mitigation

PG&E has taken a stand that catastrophic wildfires shall stop in California. In addition to PG&E’s own mitigation activities and innovations, partnership with other stakeholders (including private landowners and state, federal, and local governments) will be necessary to achieve this stand. Removal of forest biomass is a critical tool in reducing the risk of wildfires and the LCFS program can help incentivize beneficial use of this biomass. PG&E is concerned that the amendments proposed in the 15-Day Draft⁸ could undermine this incentive by limiting the forestlands from which woody biomass could be considered as a specified source feedstock (and thus eligible for a reduced carbon intensity score that reflects lower emissions or credit for use of a waste, residue or by-product). Eliminating waste from “industrial forestlands” from eligibility would limit the ability of biofuel producers to secure long-term fuel contracts from dedicated sources, a critical element for project financing. Removal and utilization of non-merchantable forest biomass is critical for wildfire risk reduction on both industrial and non-industrial lands. Denying all forest biomass from non-industrial forestlands, including non-merchantable biomass, from being a qualifying feedstock could hinder the development of biofuel projects seeking to support the health of California’s forests and lands. PG&E therefore urges CARB to further discuss these provisions with relevant stakeholders and remove or modify this restriction.

The LCFS Program Should Continue to Support, Not Hinder, the Near-Term Development of a Hydrogen Ecosystem on the Path Toward Deep Decarbonization

224.30

The 15-Day Draft introduces several changes that were not previously presented in workshops or otherwise discussed with stakeholders which could have negative impacts on the development of the hydrogen ecosystem. PG&E’s comments concerning hydrogen include:

- Removal of LCFS credit generation eligibility for hydrogen produced using fossil gas as a feedstock, effective January 1, 2031.
- Book-and-claim accounting changes that restrict the use of book-and-claim for hydrogen, limiting the crediting flexibility for hydrogen producers.

In the 15-Day Draft CARB proposes to remove LCFS credit generation eligibility for hydrogen produced using fossil gas as a feedstock, effective January 1, 2031.⁹ Staff is proposing to remove LCFS crediting eligibility for hydrogen produced from fossil fuels at the end of 2030 to align with the current operational timeline for projects funded under the hydrogen hubs (ARCHES) grants, which will ideally expand the supply of renewable hydrogen in California. However,

⁸ LCFS 15-Day Draft, Attachment A-1, page 152. Section 95488.8(g)(1)(A)(3)
⁹ Ibid. Page 37. Section 95482(h)

there are numerous development challenges which could impact the operational readiness and production capacity of these projects. A diversity of production methods, especially in the near-term, may be critical for supporting expansion of the hydrogen market.

224.30
cont.

In particular, hydrogen production from fossil fuels using certain methods, such as methane pyrolysis or steam-methane reforming with carbon capture, can achieve a carbon intensity comparable to that of electrolytic hydrogen produced from renewable electricity. These production methods produce low-carbon hydrogen at an affordable price, which could help California with meeting its incremental climate goals more quickly, in conjunction with renewable hydrogen. These production methods can replace fossil fuels with RNG over time as more clean fuels become available, resulting in net-negative CI scores. CARB should carefully consider the implications of prematurely cutting off these production methods from the LCFS program while the hydrogen ecosystem is still developing. The SB 1075 Report on Hydrogen Development, Deployment and Use, as well as the Hydrogen Market Development Strategy are still pending and could provide important insight on the role LCFS should play across various timelines and production types.

224.31

Another concern is that the proposed 15-Day Draft changes to book-and-claim accounting for hydrogen could limit the crediting flexibility for hydrogen producers and significantly limit the market potential for hydrogen in California. With these changes, production of electrolytic hydrogen essentially requires co-location of renewable energy and hydrogen production to qualify, which severely limits electrolytic hydrogen production as the electric grid becomes cleaner and could be used to produce low-carbon hydrogen.

These proposals as well as other provisions discussed in the comments filed by the California Hydrogen Business Council, highlight factors which could slow the development of hydrogen infrastructure and hinder California's broader clean energy goals. PG&E urges additional discussion with stakeholders and consideration of the potential impacts of these modifications to ensure the LCFS regulation is better aligned with renewable energy policies and the hydrogen strategies at both the State and Federal level.

Conclusion

224.32

PG&E urges additional opportunities for discussion of the new provisions released in the 15-Day Draft and looks forward to continuing collaboration with CARB staff and public stakeholders on potential amendments to the Program that will best support the State's climate goals in a timely, and effective manner.

Sincerely,

/s/

Fariya Ali
Air & Climate Policy Manager

Comment Log Display

Here is the comment you selected to display.

Comment 225 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Patricia
Last Name	Seffens
Email Address	Seffe5@att.net
Affiliation	
Subject	Low Carbon Fuel Standard

Comment

The proposed draft continues to provide credits for industrial dairy "biogas." This financial support continues to incentivize the expansion of large-scale factory dairy farms, causing serious harm to the health of surrounding communities, increasing the greenhouse gases and pollution generated by the production of feed for cows confined to barns; concentrated methane emitted by pools of waste; the inevitable leakage of methane during storage and transportation; and greenhouse gas emissions produced by combustion of the product. We urge CARB to phase out support for biomethane as rapidly as possible.

Attachment**Original File Name**

**Date and Time Comment Was
Submitted**

2024-08-27 19:44:47

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

August 27, 2024

RE: Comments on the 15-Day Changes to the Low Carbon Fuel Standard (LCFS)

Submitted electronically: <https://ww2.arb.ca.gov/lispub/comm/bclist.php>

California Air Resources Board,

Western Iowa Energy, LLC (WIE) appreciates the opportunity to provide comments on the 15-Day Changes to the Low Carbon Fuel Standard (LCFS). WIE has been a long-time supporter of, and participant/registered producer in, California's climate and air quality improvement goals. Along with our membership in the California Advanced Biofuels Alliance (CABA) and Clean Fuels Alliance America (CFAA), WIE has consistently collaborated with CARB staff to advance these objectives.

We do commend the staff's efforts throughout this rulemaking process, including holding workshops, attending meetings, and updating technical analyses based on our feedback. These efforts have been crucial in finding the right balance of feasibility, flexibility, and certainty needed for the LCFS to continue its success. WIE has invested considerable time working with CABA in educating staff on the intricacies of our industry, providing valuable insights into how staff's proposals may impact WIE and our sector.

Yes, WIE is headquartered in Wall Lake, IA and our inputs are sourced in the Midwest and delivered to our production facility in Wall lake, IA. WIE's ownership structure is made up of farmers and business people that are interested in growth for agriculture advancements and to bring more value to the farmers' bottom line, however, WIE owns and operates a transloading/blending terminal in Watsonville, CA, so we also understand the need to provide cleaner air to breathe through emissions reduction and help reduce the number of asthma cases and many more positive aspects throughout our country. Soybean Oil and Canola Oil do just as good of job achieving both goals as a lower CI or waste oils & greases would. There is so much of it available that it too would be a waste product (as it once was prior to biofuels), if this short sightedness was adopted everywhere throughout the country. And, if these row crop ag derived products are limited on the percentages of the total that can be used for LCFS credits by each producing company it will arbitrarily send that product elsewhere, because those products will still be used for fuel in other areas of the country, if similar policies aren't adopted. Also, a main concern of WIE's is that this type of action could greatly increase the cost of the waste oils & greases, distiller's corn oil & used cooking oil because there is a considerable volume disparity of these types of products compared to the availability of volume of product from soybean & canola Oil. This would make it difficult for biodiesel producing companies to compete for procurement of the lower ci feedstocks, completely due to this proposed cap of 20%. Vegetable oils are effectively "capped" already in the LCFS, not by explicit regulatory limits, but by the increasing CI targets and the lack of updated modeling in the Global Trade Analysis Project (GTAP). These factors naturally constrain the use of vegetable oils in biofuel production, as the higher CI targets push the industry towards lower-carbon alternatives. Without updated modeling in GTAP to reflect current market realities and advancements in agricultural practices, imposing further caps may be redundant and could stifle innovation. Instead, focusing on improving the accuracy of the models and encouraging sustainable practices through targeted incentives might provide a more effective balance between environmental protection, food security,

226.1
cont.

and the promotion of renewable energy. The proposed 20% cap on BMBD is contrary to AB32, which mandates that CARB's regulatory activities should not interfere with efforts to achieve and maintain federal and state ambient air quality standards and to reduce toxic air contaminant emissions. The limit could drive increased use of fossil fuels, which may have less favorable air quality impacts compared to renewable fuels. CARB's modeling in the ISOR for the Proposed Changes projected fewer GHG emissions reductions and worse health outcomes due to increased PM2.5 levels from the use of fossil diesel instead of renewable diesel. The 20% cap, therefore, seems inconsistent with CARB's mandate to protect air quality while achieving cost-effective GHG reductions.

226.2

WIE strongly supports the near-term increase in stringency to a 9% carbon intensity (CI) reduction from the 5% year-to-year increase included in the Initial Statement of Reasons (ISOR) proposal. The 9% step-down scenario provides the most certainty to rebalance the LCFS credit bank in the short term, as intended within this rulemaking.

226.3

WIE recommends that CARB convene a working group, including agricultural feedstock providers, feedstock processors, and biofuels producers, to develop workable sustainability guardrail provisions by the second quarter of 2025. This approach would facilitate meaningful public engagement consistent with the California APA.

226.4

The scope and magnitude of the proposed changes in this package leaves little time for proper analysis and to understand its long-term impact - comments are due by August 27th. The tardiness of this release also leaves little time to provide additional information to CARB before the Board votes to adopt these amendments at its November 8, 2024 meeting. The discussions over potential changes to LCFS have been going on for years yet these substantial changes are just now being proposed with only 3 months left in the process.

226.5

WIE urges CARB to reconsider the proposed caps on vegetable oils in the LCFS. These caps could inadvertently destabilize the carbon market in California by limiting the availability of a key feedstock for renewable fuel production at a time when consistent supply is crucial to meet the state's ambitious carbon reduction goals. By removing or revising these caps, CARB can help ensure that the rules governing the LCFS are both practical and conducive to market stability, thereby encouraging continued investment in clean energy technologies.

226.6

Lastly, WIE encourages CARB to finalize rules in a timely manner that support a balanced and steady market and allow the industry to innovate and adapt, driving further reductions in greenhouse gas emissions while maintaining the economic viability of renewable fuels in California. This approach will ensure that the state's carbon market remains robust, supporting both environmental and economic objectives.

WIE appreciates the CARB staff for their continued efforts to strengthen the LCFS and provide the vision for the program to meet California's carbon neutrality goals. Thank you for your consideration of these comments and hope for collaboration to advance California's climate and air quality goals.

Sincerely,

Bradley D. Wilson
Western Iowa Energy, LLC - President

Comment Log Display

Here is the comment you selected to display.

Comment 227 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Ben
Last Name	Brint
Email Address	policy@swtchenenergy.com
Affiliation	SWTCH
Subject	SWTCH Comments on Proposed 15-Day Amendments to the LCFS Regulation - EV Charging at MFRs
Comment	<div>Please find attached SWTCH's comments on the proposed 15-Day Amendments to the LCFS Regulation. SWTCH's comments focus on D3: Sections 95483(c)(1) and 95483(c)(2). Fuel Reporting Entities for Residential Electrical Vehicle Charging.</div>
Attachment	www.arb.ca.gov/lists/com-attach/7563-lcfs2024-W2ISZF1uVjEELFVI.pdf

Original File Name	2024.08.27 SWITCH Comments_CARB 15-Day Proposed Amendments to the Low Carbon Fuel Standard Regulation.pdf
Date and Time Comment Was Submitted	2024-08-27 19:57:26

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

August 27, 2024

Honorable Chair Liane Randolph and Board Members
Low Carbon Fuel Standard Program
California Air Resources Board
1001 I St., Sacramento, CA 95814

Re: Proposed 15-Day Amendments to the Low Carbon Fuel Standard Regulation -
EV Charging at Multifamily Residences

Dear Chair Randolph and Members of the Board:

227.1 SWTCH respectfully submits these comments on the proposed 15-day amendments to the Low Carbon Fuel Standard (“LCFS”) Regulations. LCFS has long-been one of California’s most effective decarbonization tools. SWTCH appreciates the opportunity to comment in support of expanding the non-residential LCFS credit to include multifamily properties, and recommends two modifications to the current proposal below. SWTCH offers corresponding language amendments in the Appendix.

- 227.2 1. Expand LCFS credit generation to all multifamily residences, regardless of parking arrangement; and
- 227.3 2. Allow for a desktop review process to streamline credit verification.

227.4 These minor but meaningful modifications to the current proposed LCFS rules will increase and accelerate equitable access to electric vehicle (“EV”) charging, further decarbonizing California’s transportation fuels.

About SWTCH

SWTCH is a leading provider of EV charging and energy management solutions for multifamily, commercial, and workplace properties in California and across North America. SWTCH’s end-to-end solution optimizes EV charging usage and manages load to benefit drivers, property owners, and the grid. With the support of U.S. state and Canadian clean fuel standards, SWTCH has deployed more than 15,000 chargers across North America, with a strong focus on equitable access. SWTCH’s charging management platform is built upon a foundation of open communication standards and interoperability to prevent stranded assets and to ensure future flexibility, scalability, and innovation.

Comments

1. Support: Non-residential LCFS credits for chargers at multifamily properties.

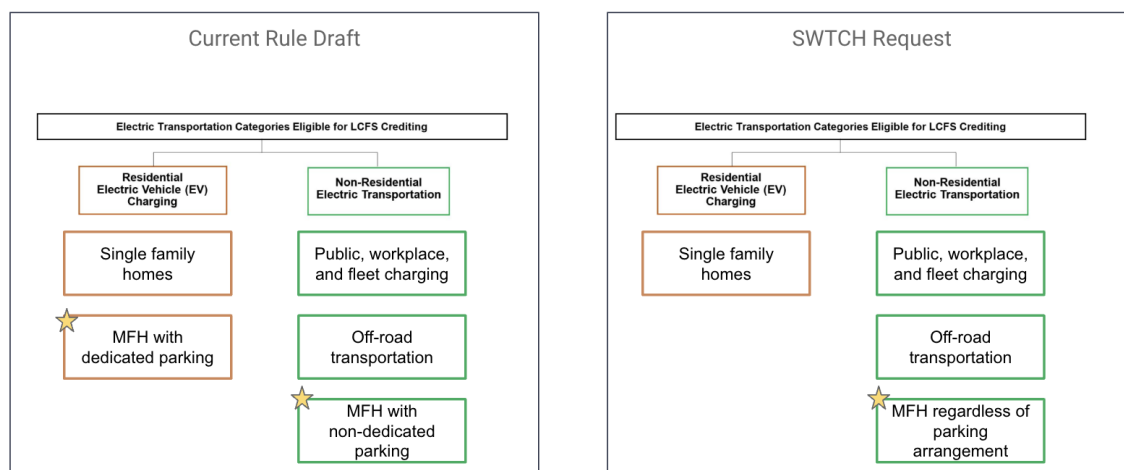
227.5 SWTCH supports the amendment proposal to categorize shared multifamily residential (“MFR”) charging stations as non-residential for LCFS credits. This change will enable electric vehicle supply equipment (“EVSE”) owners and developers to claim

227.5
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credits. This, in turn, will encourage more multifamily properties to deploy chargers and create new financing opportunities that reduce the cost of charger deployment for property owners. This proposal presents a powerful new tool to offer the convenience of home charging for residents of multifamily housing and address the gap in charger access for these residents compared to Californians living in single-family homes.

227.6

Recommendation: SWITCH recommends categorizing all multifamily chargers as non-residential for generating LCFS credits, regardless of whether EV chargers are shared or reserved.



Proposed changes from CARB's Current Rule Draft (as of January 2, 2024) in the box on the left, and SWITCH's recommendation on the right.

SWTCH appreciates the Current Rule Draft's proposed expansion of multifamily residences to be eligible to claim LCFS credits. SWITCH respectfully encourages CARB to consider not only shared chargers as non-residential, as is proposed in the current draft, but also include chargers serving reserved or dedicated parking spaces. As SWITCH details below, when it comes to station ownership, shared infrastructure, and split decision-making authority, multifamily residences with reserved parking face similar barriers to charger deployment as shared MFR and other non-residential properties. Indeed, when considered through these lenses, reserved MFR parking has little in common with the type of charging one generally considers to be "residential," i.e. a charger installed in a garage or driveway of a detached single-family house.

- Station ownership. Even when charging equipment serves reserved spaces, it is often purchased, installed, and maintained by the property owner or by a third-party owner-operator charging network, as a service for residents. Therefore, when the station owner and the station user are not the same

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entity, LCFS credits should be allowed to be claimed by the station owner-operator to defray the costs of managing and maintaining the investment.

- Shared infrastructure. Residents of multifamily housing commonly struggle to install their own reserved chargers due to the shared nature of electrical infrastructure. It is often infeasible for a single reserved space in a separated parking area to install a charger without significant construction and electrical work, which may include adding new electrical service, conduit, trenching, and upgrading a panel. This raises costs beyond what a single resident may be willing to pay and creates a need for an entity - the property owner or third-party owner-operator charging network - to make the investment to own and operate stations on behalf of residents, justifying broader eligibility for LCFS.
- Split decision-making authority. Regardless of the parking arrangement, the shared nature of electric service upgrades for multifamily residences splits decision-making responsibilities across many stakeholders. Expanding LCFS eligibility to include reserved chargers would enable more streamlined and holistic decision making process that flows from a single entity making investment decisions. This will more effectively encourage and incentivize investment in stations on behalf of residents despite the challenges.

SWTCH perspective on Staff Rationale:

In its Rationale for the proposed amendments, CARB Staff offers compelling reasons why expanding non-residential credits to include MFR chargers will be beneficial:¹

227.7

1. *“Because the current regulatory text broadly designates all crediting for residential charging to the EDUs [Electrical Distribution Utilities], or to the entities who can register individual vehicle identification numbers, rather than to EV supply equipment owners, the latter may not have as strong and direct an incentive to develop more EV supply equipment at MFRs [Multifamily Residences] as could be most optimal and impactful.”*

SWTCH concurs with Staff’s first reason that allowing all EV supply equipment [EVSE] owners at MFRs to generate non-residential credits, regardless of parking arrangement, will immediately create a strong incentive to finance and deploy EV chargers at multifamily properties. For non-residential crediting, EVSE owners at MFRs can and often do designate credits to third-party charging networks to help finance projects.

¹ California Air Resources Board. “Appendix E Purpose and Rationale for Low Carbon Fuel Standard Amendments.” Proposed Amendments to the Low Carbon Fuel Standard Regulation, 2 January 2024, Page 16, https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/lcfs_appe.pdf.

227.7
cont.

Oregon and Washington’s clean fuel standards are structured such that non-residential credits are generated for multifamily housing (greater than four units) and the charging station owner can designate another entity to generate credits on their behalf such as a charging network operator. This arrangement also allows charging network operators to leverage charging data to seamlessly participate in LCFS credit tracking, reporting, and verification relative to utilities or other entities.

2. *“Enabling further charging infrastructure at multifamily residences allows for development in mixed-use zoning and eliminates confusion on charger eligibility.”*

SWTCH concurs with Staff’s second reason that mixed-use multifamily residences will benefit from the draft rules. As EV charging expands into mixed-use multifamily residences with commercial and retail spaces, LCFS crediting will accelerate EV charging offerings at these locations. However, SWTCH is concerned that restricting credits based on parking arrangements would pose challenges to data collection, tracking, verification, and reporting based on the current proposed amendment. SWTCH disagrees with the premise that the proposed amendment “eliminates confusion on charger eligibility”. Parking space allocations can frequently change from reserved to shared or vice versa based on property management or even tenant preference. Bifurcating shared vs. reserved chargers will unnecessarily add administrative complexity and uncertainty that will pose challenges both for CARB and for those generating the credits.

3. *“More strongly supporting the development of chargers at multifamily residences also encourages car sharing and harmonizes current utility rate and incentive programs.”*

227.8

In response to Staff’s third reason, SWTCH notes that parking arrangements are not factored into current multifamily EV charging utility rates and incentives. For example, Pacific Gas and Electric recommends multifamily buildings with EV chargers enroll in an Business EV Rate Plan based on electricity demand (kilowatts); there is no mention of whether parking arrangement determines whether a customer will be on a Residential or Business EV rate.² Southern California Edison offers two rebates for multifamily EV chargers - a New Construction Rebate and Small Site Rebate - that don’t define eligibility based on reserved or non-reserved parking space

² Pacific Gas and Electric. “Electric Vehicles (EV) rate plans.” <https://www.pge.com/en/account/rate-plans/find-your-best-rate-plan/electric-vehicles.html#evBizRates>.

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status.³ These are just a few of the rates and incentive programs that major California investor-owned utilities offer to EV drivers at different types of multifamily buildings regardless of parking arrangement.

SWTCH shares Staff's perspective about the benefits of treating MFR chargers as non-residential. However, despite acknowledging these benefits, the proposed amendment excludes reserved chargers from being considered as non-residential, for reasons that are unclear. Perhaps it is simply assumed to be self-evident that *"Chargers at reserved parking spaces are reserved for residences and therefore would still be considered 'residential' charging."* Upon deeper analysis, as discussed above, the characteristics of reserved MFR chargers are much more similar to shared non-residential chargers than to actual residential chargers.

2. Recommend: Allow for a desktop review process to streamline credit verification.

227.9

To help streamline the verification process, SWTCH recommends that CARB allow for a desktop review process in lieu of requiring in-person site visits for annual verification services. The large and growing amount of charging infrastructure spread across the state makes in-person site visits infeasible from a personnel resource and budgeting standpoint. Indeed, in-person verification is largely unnecessary. Allowing for flexibility through a desktop review process both provides a more effective way to assess the risks of misreporting and enable CARB to focus on the integrity of the data that is transmitted electronically. This would allow a focus on ensuring data integrity through matching reported data from charging networks.

In Closing

227.10

SWTCH supports the proposed amendment to treat shared multifamily residential chargers as non-residential. This is a partial but incomplete step forward. SWTCH respectfully urges CARB to treat all MFR chargers as non-residential, regardless of whether the parking arrangement is shared or reserved. Making this change will more effectively incentivize further deployment of MFR chargers. It will also have the added benefit of being administratively simpler and more uniform to implement. Additionally,

227.11

SWTCH respectfully urges CARB to allow for remote desktop credit verification. This is a less costly and more efficient approach than requiring in-person site visits.

SWTCH applauds Chair Randolph, Members of the Board and CARB staff's commitment to reforming and improving the LCFS program. We appreciate the opportunity to comment on these matters and look forward to working with CARB and other stakeholders on these important topics. If you have questions or if I can provide more information on our responses, please contact me at ben.brint@swtchenergy.com or 415.535.8444.

³ Southern California Edison. "Charge Ready." <https://www.sce.com/evbusiness/chargeready>.

Respectfully,

A handwritten signature in black ink that reads "Ben Brint". The signature is written in a cursive, slightly slanted style.

Ben Brint
Policy Manager, Western U.S.
SWTCH

Appendix - Proposed Language Changes

Tracking page and documents:

https://ww2.arb.ca.gov/rulemaking/2024/lcfs2024?utm_medium=email&utm_source=govdelivery

Additions are underlined. Deletions are ~~struck~~.

Section/Page	Comment Category	Change Type	Language
Pg. 38 95483 (c)(1)	MFH credit generation	Deletion	95483(c)(1) Residential EV Charging. For on-road transportation fuel supplied for electric vehicle (EV) charging in a single-family residence, or at dedicated or reserved parking at a multifamily residence , the following entities are the credit generators:
pg. 48 95483 (c)(2)(A)	MFH credit generation	Deletion	95483(c)(2)(A) For electricity supplied for non-residential EV charging, including chargers at multifamily residences that are not limited to serving dedicated or reserved parking spaces , the owner of the FSE is eligible to generate the credits.
Pg. 243 95491.1 (c)(1) (F) and 95491.1 (c)(1)(J)	Verification	Additions	<p>95491.1 (c)(1) The monitoring plan must contain the following general items and associated references to more detailed information:</p> <p>...</p> <p>(F) Clear identification of all measurement devices supplying data necessary for reporting pursuant to this subarticle, including identification of low flow cutoffs as applicable, with descriptions of how data from measurement devices are incorporated into the submitted report; <u>this provision does not apply to data reported in the LRT-CBTS for generating credits for EV charging;</u></p> <p>...</p> <p>(J) The dates of measurement device calibration or inspection, and the dates of the next required calibration or inspection, <u>if applicable;</u></p>
Pg. 251 95500 (c)(1)	Verification	Addition	95500 (c)(1) Applicability. Entities submitting Quarterly Fuel Transactions Reports under this subarticle that include the following transaction types must obtain

			<p>the services of a verification body accredited by the Executive Officer for purposes of conducting verification services, including required site visit(s) <u>if applicable</u>. The scope of verification services would be limited to the following transaction types, including associated corrections submitted in annual reports under this subarticle...</p> <p>...(E) For the following electricity-based transaction types:</p> <ol style="list-style-type: none"> 1. EV Charging except as specified under 95491(d)(3)(A) <u>and</u> 95491(d)(3)(B).
Pg. 252 95500 (c)(2)(A)	Verification	Comment	<p>95500(c)(2) (A) Annual Verification. The entity required to contract for verification of Quarterly Fuel Transactions Reports must ensure a transactions verification statement is submitted annually by August 31, beginning in 2021 for 2020 data, to the Executive Officer for the prior calendar year of data unless specified otherwise in sections 95500(c)(2)(B) or 95500(c)(2)(C).</p> <p>Comment: This section establishes the verification schedule starting in 2021 for 2020 data. There is no start date for verification proposed for entities newly subject to verification. It is unclear whether this schedule is intended to apply to new entities subject to verification, which would be highly challenging, if not impossible, to implement. We recommend language that clarifies a verification schedule starting in 2027 for 2026 data.</p>
Pg. 257 95501 (b)(1)(A)	Verification	Addition	<p>95501(b)(1)(A) Information from the fuel pathway applicant, pathway holder, or reporting entity. Such information must include all the following:</p> <p>...</p> <ol style="list-style-type: none"> 3. Description of the specific methodologies used to quantify and report data, as required in this subarticle, which are needed to develop the validation or verification plan, including but not limited

			<p>to calibration procedures and logs for measurement devices capturing site-specific data, <u>if applicable</u>;</p> <p>...</p> <p>5. Information about the entities in the supply chain upstream and downstream of the fuel producer that contribute to site-specific CI data, including a list of feedstock suppliers and contact names with physical addresses, <u>if applicable</u>;</p>
Pg. 258 95501 (b)(1)(B)(2)	Verification	Addition	<p>95501(b)(1)(B) Timing of verification services. Such information must include:</p> <ol style="list-style-type: none"> 1. Dates of proposed meetings and interviews with personnel of the entity required to contract for verification services; 2. Dates of proposed site visits, <u>if applicable</u>; 3. Types of proposed document and data reviews and, if applicable, how quarterly review is planned in the context of an annual verification requirement; 4. Expected date for completing validation or verification services.
Pg. 258 95501 (b)(2)	Verification	Addition	<p>95501(b)(2) Planning Meetings with the Entity Required to contract for Verification Services. The verification team must discuss with the entity contracting for verification services the scope of the verification services and request any information and documents needed for the verification services.</p> <p>The verification team must create a draft sampling plan and verification plan prior to the site visit <u>if applicable</u>. The verification team must also review the documents provided, and plan and conduct a review of original documents and supporting data for the verification services specified in section 95501.</p>
Pg. 259 95501 (b)(3)	Verification	Addition	<p><i>95501(b)(3) Site Visits.</i> At least one lead LCFS verifier accredited by the Executive Officer on the verification team must, in addition to one visit to validate an application, annually visit each facility; and, if different from the fuel production</p>

			<p>facility, the central records location for which the records supporting an application or report subject to verification are submitted. Site visits, included voluntarily as part of a quarterly review, may not substitute for the required site visit for annual verification services, which must occur after all LCFS data for the prior calendar year has been submitted to the Executive Officer and attested to.</p> <p><u>For electricity-based transaction types as identified in 95500 (c)(1)(E), site visits are not required for verification of electricity reported in Quarterly Fuel Transaction Reports if such electricity can be demonstrated to have been provided by devices possessing certification under the California Type Evaluation Program (CTEP), National Type Evaluation Program (NTEP), a similar standard for certifying charging meter accuracy at a lower or equivalent error tolerance, or devices that the California Department of Food and Agriculture Division of Measurement Standards has determined shall be required to possess CTEP certification at a future date pursuant to CCR Title 4, §4001 and §4002.11.</u></p>
Pg. 259 95501 (b)(3)(A)	Verification	Additions	<p>95501(b)(3)(A) During site visits <u>or via virtual means, if applicable</u>, the verification team member(s) must carry out tasks that, in the professional judgment of the team, are necessary, including the following:</p> <ol style="list-style-type: none"> 1. Review supporting evidence used to develop reports listed in section 95500 submitted to the Executive Officer; 2. Interview key personnel, such as process engineers, metering experts, accounting personnel, and project operators, as well as staff involved in compiling data and preparing the LCFS reports; 3. Review and understand the data management systems and accounting practices used by the entity to acquire, process, track, and report LCFS data. The verification team member(s) must evaluate

			<p>the uncertainty and effectiveness of these systems;</p> <p>4. Directly observe production equipment, <u>if applicable</u>, confirming diagrams for processes, piping, and instrumentation; measurement system equipment; and accounting systems for data types determined in the sampling plan to be high risk;</p> <p>5. Assess conformance with measurement accuracy requirements specified in this subarticle for measurement devices that do not meet criteria for financial transactions meters <u>or do not possess certification by a body described in 95501 (b)(1)(B)(3)</u>, assess the reasonableness of temporary measurement methods, assess conformance with the monitoring plan, and assess conformance with data capture requirements specified in this subarticle, if applicable.</p> <p>6. Review financial transactions to confirm complete and accurate reporting.</p>
Pg. 263 95501 (b)(5)(D)(5)	Verification	Addition	<p>95501(b)(5)(D)(5) Reviewing meter and analytical instrumentation measurement accuracy and calibration for consistency with the requirements of this subarticle; <u>this provision does not apply to data reported in the LRT-CBTS for generating credits for EV charging that demonstrates device certification under 95501 (b)(3).</u></p>

August 27, 2024

VIA ELECTRONIC FILING

Ms. Rajinder Sahota
Deputy Executive Officer - Climate Change & Research
California Air Resources Board
1001 I Street
Sacramento, Ca 95814

Re: Neste Comments on Proposed Low Carbon Fuel Standard (LCFS) Regulation Published on August 12, 2024

Dear Ms. Sahota:

228.1 Neste appreciates the opportunity to provide these comments to the California Air Resources Board (CARB) regarding the proposed LCFS regulation 15-day package published on August 12, 2024. These comments are in addition to the comments submitted by Neste for the 45-day regulatory package on February 20, 2024¹ and the April 10, 2024 LCFS Workshop². All of our recommendations should be considered as part of this LCFS rulemaking. Neste also supports comments from the Low Carbon Fuels Coalition (LCFC) and ICF on this rulemaking.

Neste is disappointed by the lack of public discussion on the substantial changes proposed in this 15-day package that go well beyond what would be expected in a 15-day package. Many are not connected to the 45-day package.³

228.2 Neste is a long-time, public supporter of California's LCFS program. As such, it is unfortunate to see that the new proposed package contains risky policy experiments that undermine the proven policy frameworks of one of California's longest running and most successful climate programs. The proposal raises serious concerns about unintended consequences, implementation feasibility, and program reliability. Industries consider all of these factors in decisions about long-term capital investments and job creation related to both road and aviation fuels, as well as for agriculture production and practices. These cost implications may lead to higher costs for consumers and fuel supply instabilities without delivering significant environmental improvements as compared to CARB's proposals in the 45-day regulatory package. We encourage CARB to reconsider the changes made in this 15-day package and focus on sending the right market signals that drive investments in production of renewable energy.

228.3 Neste emphasizes the significant negative impact that the proposed changes in this 15-day package will have on renewable energy in California and throughout the U.S. With this rulemaking, CARB has an opportunity to implement Governor Newsom's July 2022 directive to accelerate refinery transitions away from petroleum to the production of clean fuels and to incentivize use of SAF. The 45-day package published in December, 2023, was on track to achieve that goal. However, the unintended consequences of this 15-day package reverse that trajectory⁴.

Virtually all SAF consumed in California is produced in HEFA plants that also produce RD; therefore, RD and SAF production are directly connected. Renewable diesel production subsidizes SAF production in many ways and no large scale production plants currently operate only to produce SAF. In fact, federal incentives

¹ <https://www.arb.ca.gov/lists/com-attach/6974-lcfs2024-B2IUN1YkACcLaARb.pdf>

² <https://ww2.arb.ca.gov/form/public-comments/submissions/11066>

³ https://oal.ca.gov/rulemaking_participation/#six

⁴ <https://www.gov.ca.gov/wp-content/uploads/2022/07/07.22.2022-Governors-Letter-to-CARB.pdf>

- 228.3 cont. under the federal Inflation Reduction Act (IRA) will drive lower CI feedstocks to SAF production. This raises the question of whether there will be enough non-soy/canola feedstocks to meet California's demand for RD. Neste urges CARB to reject the proposals to cap feedstocks and, instead, maintain the technology neutrality that has been a hallmark of the LCFS program. This proposed 15-day package adds to the costs of feedstocks used to produce RD/SAF, the costs of producing the RD/SAF at plants, and could force producers to pass on these costs to the truck drivers and airlines that use renewable energy.
- 228.4
- 228.5 Therefore, Neste makes the following recommends related to the proposed 15-day package in order to protect consumer fuel prices, to continue incentivizing investments in SAF, and to be more aligned with the 45-day package published in December 2023:
1. We urge CARB to issue another 15-day package to respond to feedback and correct problems created by this 15-day package;
 - 228.6 2. Ensure that regulatory updates go into effect in January, 2025, to avoid further unrealized emissions reductions due to current overperformance of the credit market;
 - 228.7 3. Return to CARB's policy goals stated in its April 10, 2024 public workshop;
 - 228.8 4. Revise proposals after analyzing the impacts on fuel supply, consumer costs, and for aviation (SAF) in particular;
 - 228.9 5. Reject the proposal to give CARB discretion to stop accepting new renewable diesel pathway applications. Continue the current, successful policy of technology neutrality (95488(d));
 - 228.10 6. Adopt an immediate CI step-down of 12% (instead of the proposed 9%) in 2025 to adequately address the large credit bank and more quickly stabilize the credit prices;
 - 228.11 7. Adopt a proposed CI Automatic Acceleration Mechanism (AAM) but apply it in 2026 (using 2025 data) and not 2027 in order to address overperformance in the LCFS credit market;
 - 228.12 8. Remove the additional requirements proposed in (95488.9(g)) that fail to incentivize feedstock innovation and could increase costs;
 - 228.13 9. Revise proposed LUC factors (95488.3(d)) to incentivize improvements in farming practices; and
 - 228.14 10. Maintain technology neutrality and reject the proposed 20% caps on soybean and canola oil used to produce RD and SAF (95482(i)). Such a cap is likely to increase use of fossil diesel and jet fuel as stated by CARB at the April 10th workshop⁵, and lead to avoidable RD and SAF price increases.

Detailed comments and analysis follow below.

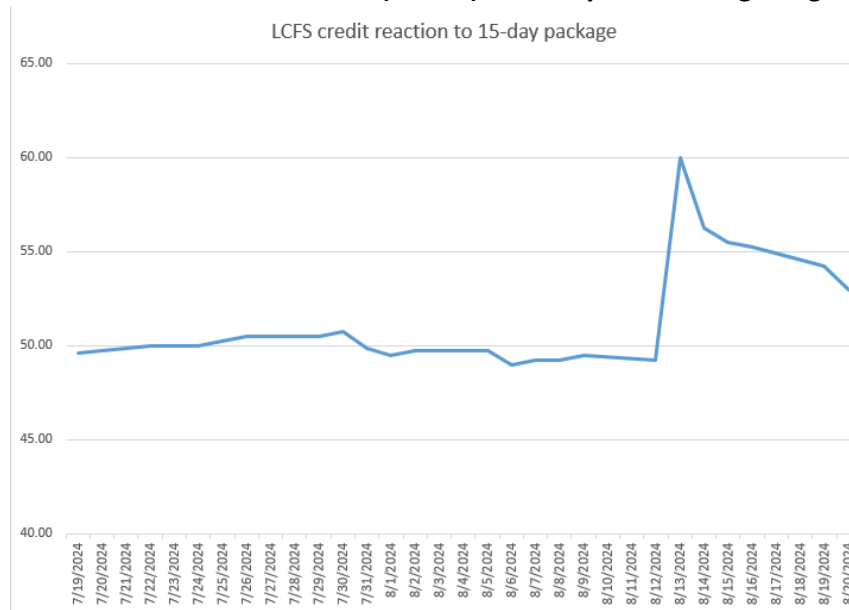
Detailed Comments and Analysis on Proposed LCFS Regulation Published on August 12, 2024

Ensure that regulatory updates go into effect in January, 2025, to avoid further unrealized emissions reductions due to current overperformance of the credit market.

- 228.15 Neste continues to believe that finalizing this rulemaking by January, 2025, is the highest priority and that CARB must pursue more aggressive CI reductions. Figure 1 below shows that the market remains unconvinced that the proposed 15-day package changes will be sufficient to balance the ongoing growth in the credit bank. While 2025 may show signs of a modest draw in the bank, the smaller annual compliance target changes from year to year will quickly shift the balance back toward credit bank growth by 2026. Prices are likely to continue hovering in the same range without stronger targets. We urge CARB to prioritize this rulemaking and ensure the amended regulation is in effect in January, 2025.

⁵ <https://ww2.arb.ca.gov/sites/default/files/2024-04/LCFS%20April%20Workshop%20Slides.pdf>, slide 21

Figure 1: LCFS Credit Prices Trends (in USD) from July 2024 through August 2024



Reaffirm CARB's policy goals stated in its April 10, 2024 public workshop.

228.16

CARB has discussed the policy priorities and assumptions for this rulemaking. and acknowledged the negative implications of limiting RD production.. Below is an overview of the issues with limiting RD and the priorities of this rulemaking presented by CARB in its April 10th LCFS Workshop⁶:

- **Soybean oil today has a higher CI compared to other biomass-based diesel and will naturally be phased out by the lowering of the diesel CI standard (slide 40)**
 - It is uncertain if substantial increases in virgin oil fuel use in California will occur over long-term (slide 57)
- **Any limits on RD will be backfilled by fossil diesel (slide 21)**
 - The EJAC Scenario that proposed limits on RD resulted in 386 MMT CO2 increase and \$85 net cost increase in costs (slide 31)
 - Near and long-term air quality benefits are a priority for this rulemaking (slide 18)
- **60% of fossil diesel has been displaced by biomass-based diesel in 2023, resulting in PM and NOx benefits (slide 12)**
 - In 2022-2023, waste-based feedstocks volumes rose much more quickly than virgin oilseed feedstocks such as soybean and canola oil (slide 53)
 - CI incentives working to prioritize waste-based feedstocks (slide 57)
- **Transportation costs are a priority for this rulemaking (slide 18)**
- **Attracting federal incentives that encourage renewable energy use is a priority for this rulemaking (slide 18)**
- **Incentivize more production of clean fuels needed in the future is a priority for this rulemaking (slide 17)**
 - Price-signals for investment in new production must continue (slide 18)

228.17

Neste agrees with all these public statements made by CARB in the April 10th LCFS workshop. However, the new proposed 15-day package is counter to most of these statements. Such an about-face so late in the rulemaking process raises questions about the reliability of the LCFS program. Ultimately the biggest loss in this 15-day package is SAF production and the feedstocks needed to decarbonize the aviation sector.

⁶ <https://ww2.arb.ca.gov/sites/default/files/2024-04/LCFS%20April%20Workshop%20Slides.pdf>

228.18 **Revise proposals after analyzing the impacts on fuel supply, consumer costs, and for aviation (SAF) in particular.**

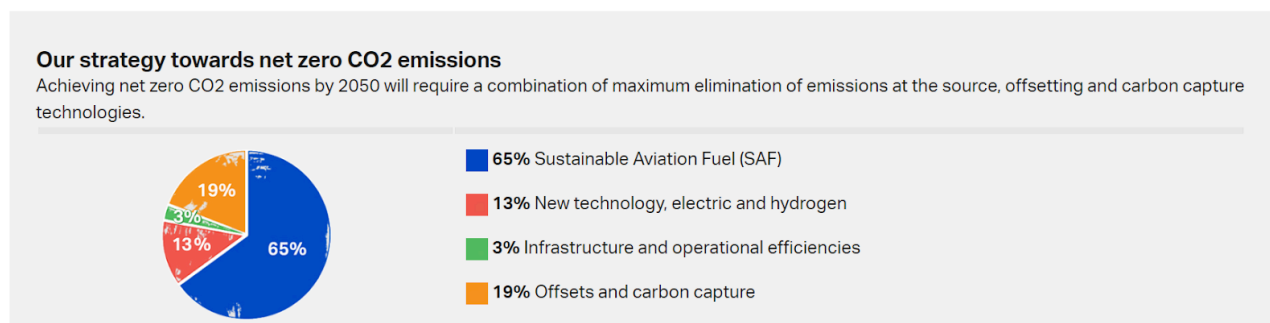
As part of the federal SAF Grand Challenge,⁷ the U.S. government will be providing \$4.3 billion in funding to reach the goal of 3 billion gallons of annual production of SAF by 2030. Martinez Renewables, a joint venture (JV) between Neste and Marathon, applied for such funding and was recently awarded \$50 million towards the construction of a facility to produce 150-350 million gallons annually of SAF.⁸ In fact, multiple California facilities received a total of 9 large grants, out of 36 grants awarded, reflecting California's dominance of the SAF market in the U.S. A study conducted by Third Way estimates that SAF production is expected to increase the California GDP by \$3.2 billion and create 4,500 jobs through 2050⁹. Companies would not have used the feedstock and production limitations in this new proposal for their applications. Therefore, any limits on renewable diesel affect the economics of RD/SAF plants precisely when companies are evaluating billions in investments for SAF production.

SAF production in the US and abroad is strongly linked to RD production when using HEFA technology. Unfortunately, most HEFA SAF plants cannot be designed to only produce SAF. The 15-day package changes the economics of RD/SAF plants.

Per the International Air Transport Association (IATA) that represents airlines globally, the aviation sector has a goal to achieve net zero carbon emissions by 2050 as part of their Fly Net Zero campaign¹⁰. As shown below in Figure 2, IATA projects that SAF will represent at least 65% of the carbon emissions reductions in the aviation sector.

Figure 2: IATA Strategy for Reaching Carbon Neutrality by 2050

How we plan to achieve Fly Net Zero



The reason SAF represents such a large part of the aviation sector's decarbonization strategy is because there is no technology besides SAF that can decarbonize flights in the medium to long-haul categories. As shown below in Figure 3, the Waypoint 2050 study estimates that medium to long-haul flights represent ~73% of the aviation sector's emissions, and that SAF is the only viable decarbonization technology for such

⁷<https://www.whitehouse.gov/briefing-room/statements-releases/2021/09/09/fact-sheet-biden-administration-advances-the-future-of-sustainable-fuels-in-american-aviation/>

⁸ <https://www.faa.gov/general/fueling-aviations-sustainable-transition-fast-grants>

⁹ <https://thirdway.imgix.net/pdfs/override/Soaring-to-New-Heights.pdf>

¹⁰ <https://www.iata.org/en/programs/sustainability/flynetzero/>

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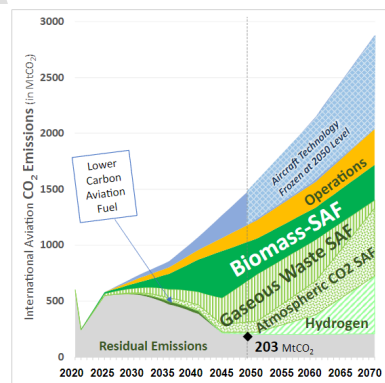
flights (see page 48 of report)¹¹. Therefore it is essential that agencies such as CARB prioritize policies that incentivize the production and use of SAF so that necessary SAF investments can be made.

Figure 3: Waypoint 2050 Available Aviation Decarbonization Technologies for Each Flight Distance Type

	2020	2025	2030	2035	2040	2045	2050
Commuter » 9-50 seats » < 60 minute flights » <1% of industry CO ₂	SAF	Electric and/or SAF	Electric and/or SAF	Electric and/or SAF	Electric and/or SAF	Electric and/or SAF	Electric and/or SAF
Regional » 50-100 seats » 30-90 minute flights » ~3% of industry CO ₂	SAF	SAF	Electric or Hydrogen fuel cell and/or SAF	Electric or Hydrogen fuel cell and/or SAF	Electric or Hydrogen fuel cell and/or SAF	Electric or Hydrogen fuel cell and/or SAF	Electric or Hydrogen fuel cell and/or SAF
Short haul » 100-150 seats » 45-120 minute flights » ~24% of industry CO ₂	SAF	SAF	SAF	SAF	Electric or Hydrogen combustion and/or SAF	Electric or Hydrogen combustion and/or SAF	Electric or Hydrogen combustion and/or SAF
Medium haul » 100-250 seats » 60-150 minute flights » ~43% of industry CO ₂	SAF	SAF	SAF	SAF	SAF	SAF	SAF potentially some Hydrogen
Long haul » 250+ seats » 150 minute + flights » ~30% of industry CO ₂	SAF	SAF	SAF	SAF	SAF	SAF	SAF

In fact, the International Civil Aviation Organization (ICAO) Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) will start mandating reductions effective in 2027, and the industry is counting on SAF production for compliance. Figure 4 below shows the importance of SAF, specifically biomass-based SAF (in green), in meeting the decarbonization goals of CORSIA¹².

Figure 4: ICAO's CORSIA Carbon Emission Reduction Technology Projections



¹¹ https://aviationbenefits.org/media/167187/w2050_full.pdf

¹² <https://www.icao.int/environmental-protection/pages/SAF.aspx>

To meet the decarbonization goals of the aviation sector, IATA has outlined the following four policy measures needed to boost SAF production.¹³

228.18
cont.

- Diversify feedstocks
- Co-processing
- Incentives to improve the output mix at renewable fuel facilities
- Incentives to boost investments in renewable fuel production

This proposed 15-day package is counter to all four of IATA's recommendations for SAF policy measures because CARB is proposing to limit feedstocks, complicate investments in new SAF production such as co-processing, impact economic incentives for SAF and RD production and perhaps yield overall reductions in renewable fuel production. CARB could also cause California, and the U.S. as whole, to forgo the huge economic potential of domestic SAF production as outlined in a recent study¹⁴. It is estimated that SAF expenditures could total nearly \$1.5 trillion between 2025 and 2050, and create an estimated 400,000 new jobs in the U.S. The combination of eliminating the proposal to remove the intrastate jet fuel exemption, limiting RD production, and limiting feedstocks that can be used to produce RD/SAF, CARB is creating uncertainty and unnecessary cost increases for those evaluating SAF production investments. Instead, incentivizing development of new, more sustainable feedstocks, new production technologies and overall investments in new production will better help California to meet the goals of the 2022 Scoping Plan.

228.19

Reject the proposal to give CARB discretion to stop accepting new renewal diesel pathway applications. Continue the current, successful policy of technology neutrality (95488(d))

228.20

As part of this rulemaking, CARB is proposing to stop accepting new pathway applications for biomass-based diesel starting in 2031 if certain ZEV mandates are met in 2029 (95488(d)). Neste strongly objects to this arbitrary proposal that has never been discussed in prior rulemaking documents, and is too significant a change for a 15-day package¹⁵. This proposal was not part of the 45-day package, and creates a lot of uncertainty for RD and SAF producers.

The proposal to grant the Executive Director discretion to cease accepting renewable diesel pathway applications based upon exceeding a threshold number of registered ZEVs and NZEVs is contrary to law because it has not been adequately justified and bears no rational relationship to the statutory text or goals of the LCFS program's goal of reducing emissions. In fact, the proposed action may have the opposite effect of increasing emissions by freezing out new, innovative forms of renewable diesel from entering the market. AB 32 gives CARB a clear mandate to establish regulations designed to achieve the statewide greenhouse gas emissions limit but such regulations must be designed according to several other factors including minimizing costs and diversification of energy sources. The benchmark CI scores are what ensure the LCFS program operates in furtherance of the statewide greenhouse gas emissions limit and the new automatic acceleration mechanism ensures that where market signals outside of the LCFS program result in greater progress, the benchmark CI can be adjusted to remove excess production of less effective low carbon fuels.

The LCFS itself may not be used to artificially restrict low carbon fuels beyond the benchmark CI where doing so ignores the statutory mandates to minimize cost and preserve diversified energy sources. But that is exactly what CARB's proposal does. CARB is proposing to artificially restrict renewable diesel sources and in doing so is placing its thumb on the scale and reducing competition that would otherwise benefit consumers through lower prices and greater choice. Further, by locking in existing production methods,

¹³ <https://www.iata.org/en/pressroom/2024-releases/2024-06-02-03/>

¹⁴ <https://thirdway.imgix.net/pdfs/override/Soaring-to-New-Heights.pdf>

¹⁵ https://oal.ca.gov/rulemaking_participation/#six

CARB may even be acting against the primary purpose of the statute to lower carbon emissions by preventing the introduction of new innovations into the renewable diesel supply chain.

228.20
cont.

While CARB has arbitrarily not explained the basis of its proposed action, one must assume it is concerned that the benchmark CI and automatic acceleration mechanism have not been adequately designed to achieve their purposes of incentivizing the desired supply of low carbon fuels. For the following reasons, this action also raises constitutional issues. When markets are frozen to benefit incumbents at the expense of innovative new entrants, such restrictions must be rationally related to the desired effect. Here, where the desired effect is reduction of emissions and supplies of low carbon fuels in line with the desired benchmark, regulations that protect existing participants from new competition but do not regulate the volume they are able to supply achieves neither goal.

Neste strongly believes that this proposal, among several meant to limit liquid renewable fuels, is likely to lead to higher consumption of fossil diesel, as noted by CARB in the April 10th LCFS workshop¹⁶ (see slide 21). However, the modeling CARB presented as part of this 15-day package does not reflect that, making Neste question the accuracy of the environmental analysis for this 15-day package. Figure 5 below shows how fossil diesel fared in this 15-day package, and Neste would expect the April 9th Proposed Scenario (pulled from 45-day package) shown in blue below to be identical to the August 12th Baseline Scenario shown in green below. That is not the case, and there is no explanation for the decrease in fossil diesel use shown from 2023 through 2025 under the August 12th Proposed Scenario shown in black.

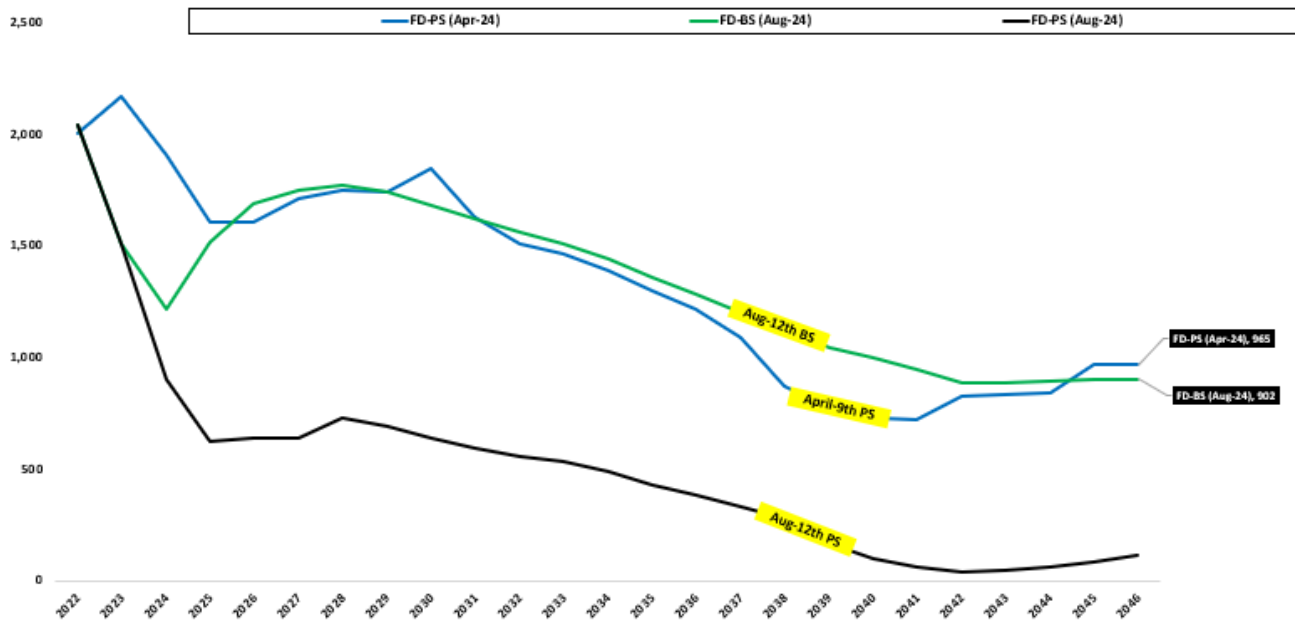
228.21
cont.

Under the August 12th Proposed Scenario (black line) CARB is showing three different things that cannot occur at the same time: 1) fossil diesel use to drop to 0.5 billion gallons consumed in 2025, 2) 0.5 billion gallons of fossil diesel, would mean RD use would be close to 3 billion gallons and/or significant electrification of heavy-duty trucks, and 3) credit price at \$150-220/tonne. First, if the annual fossil diesel use dropped to 0.5 billion gallons, and rest of the diesel needed would be replaced by RD or ZEVs, the credit market would be far from balanced in 2025 and the price far from \$150-220. Secondly, CARB is heavily underestimating overall diesel demand. With the current trajectory until 2025, Neste estimates liquid diesel demand to be 3.5 - 3.8 billion gallons. This means that in the 0.5 billion gallon fossil diesel scenario, RD usage should be ~3 billion gallons, which could theoretically happen, however it is very unlikely at current low credit prices. If overall liquid diesel demand dropped to 3 billion gallons as modeled by CARB, then there should be 10x more heavy duty ZEVs on the roads in 2025. This scenario is even less likely than RD usage of 3 billion gallons. CARB's modeling simply does not make sense and the implications are risky negative impacts to the diesel market and other unintended consequences from this 15-day package.

¹⁶ <https://ww2.arb.ca.gov/sites/default/files/2024-04/LCFS%20April%20Workshop%20Slides.pdf>

Figure 5: Fossil Diesel Volumes Under 15-day and 45-day Package Scenarios

Fossil Diesel Volumes in CA through 2046
New August 12th Scenario's



228.22 This proposal also introduced the concept of “new” pathways. It is unclear in what category a pathway
 228.23 renewal will fall , creating uncertainty for pathway holders. This policy could also disincentivize investment
 228.24 in new innovative feedstocks for RD/SAF production using Climate Smart Ag (CSA). Instead of creating
 uncertainty for those investing in new RD/SAF production technologies, Neste recommends eliminating
 these provisions and maintaining the technology neutrality that has made the LCFS program so successful
 in reducing emissions from the transportation sector. To tackle climate change, California will need all the
 possible solutions and CARB should not eliminate climate solutions.

Adopt an immediate CI step-down of 12% (instead of the proposed 9%) in 2025 to adequately address the large credit bank and more quickly stabilize the credit prices.

228.25 Neste continues to view a step down in the CI in 2025 as integral to quickly addressing the overperformance of the LCFS program and the depressed credit prices. The 9% step down is definitely an improvement appreciated by Neste, however the credit market continues to indicate that proposed targets are not aggressive enough in this rulemaking, as shown by the continued drop in credit prices even after the 9% step down was proposed by CARB in this 15-day package. The market indicates that more needs to be done to address the credit bank in the short term. This is why Neste continues to support a step-down of 12% considering that ICF has modeled that a 20.25% step down is needed to ensure that the credit bank does not build¹⁷. The 9% step down may be enough to balance the credit market in 2025, but it is likely to be oversupplied again in 2026 and 2027. Neste estimates the Automatic Acceleration Mechanism (AAM) to be triggered in 2027 and having an impact in 2028. However, since the annual CI target increases after 2025 are only 1.45% per year, Neste estimates the market will be significantly oversupplied in 2029 again, triggering the AAM in 2030 and impacting 2031. Moreover, a balanced credit market in 2025 depends heavily on the operational level of new RD refineries and the speed of electrification. If all the RD plants in California and the U.S. Gulf Coast are fully operational, we are likely to see an imbalanced market again.

¹⁷ <https://www.arb.ca.gov/lists/com-attach/7078-lcfs2024-VDVcNFIyVGsLdFQu.pdf>

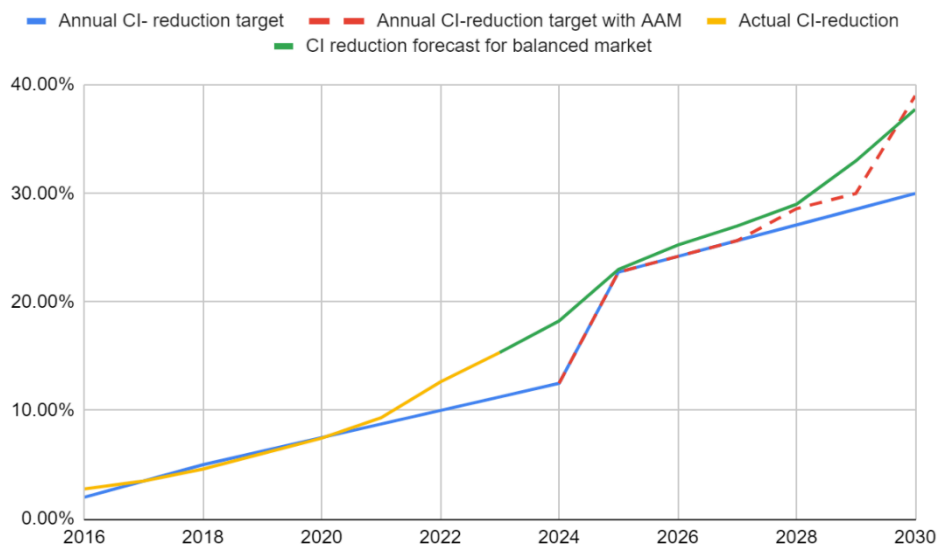
228.25 cont. This CI step down will also speed up investment in lower CI feedstocks, making the various proposals to limit RD in this 15-day package unnecessary. These proposed limits on RD could affect innovation and lead to higher costs for consumers. CARB should therefore not proceed with the phaseout of RD pathways (95488(d)), the additional sustainability requirements (95488.9(g)), and the cap on soybean/canola oil (95482(i)). By lowering the CI, CARB signals to the market that it favors lower CI and lower LUC fuels.

228.26 ICF also found that CARB did not correctly calculate the fossil diesel baseline as part of the 45-day package. ICF determined that CARB should only add CH₄ and N₂O tailpipe emissions and not CO₂ because they are biogenic. The diesel baseline should therefore be 103.19 g/MJ and not 105.76g/MJ. This further changes the CATS modeling results because the diesel baseline shifts credit/deficit generation for diesel. To truly balance the LCFS credit market, a 12% CI step down must be made in 2025. This step down is needed before the AAM can be effectively implemented, otherwise the AAM could be triggered excessively and overperformance will persist.

Adopt a proposed CI Automatic Acceleration Mechanism (AAM) but apply it in 2026 (using 2025 data) and not 2027 in order to address overperformance in the LCFS credit market.

228.27 Neste continues to support the need for the AAM and continues to believe that it should be available in **2026** (using 2025 data) and not wait until 2027. It is essential that CARB have this mechanism in place should overperformance persist even after the CI step down, and to balance out the credit market more quickly so that renewable fuel producers can feel more confident investing in new SAF production. Figure 6 below shows the actual reported CI reduction under the LCFS program and our forecast going forward.

Figure 6: Neste's Projected CI Reduction Under the Proposed LCFS Amendments

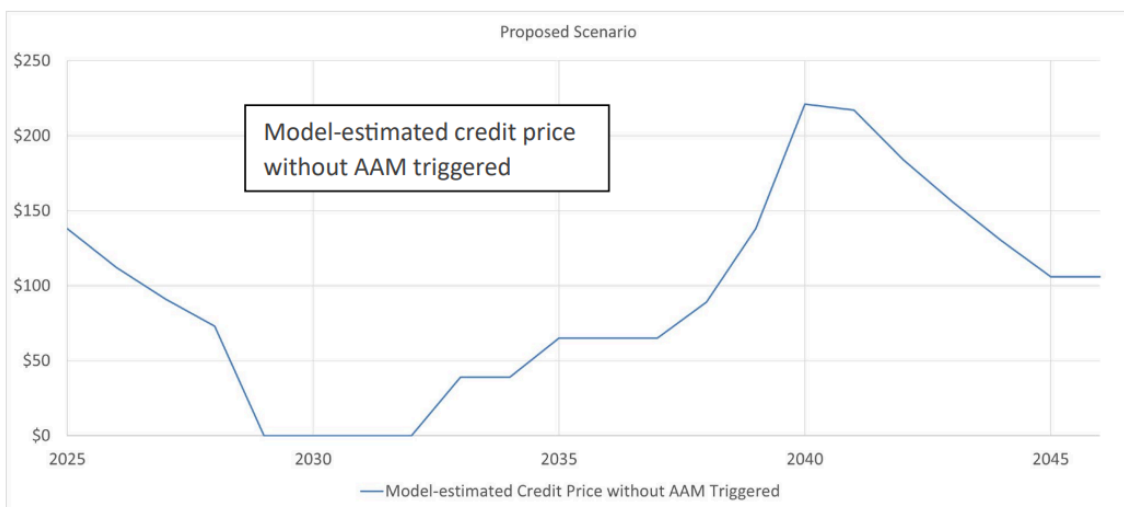


As shown above, the step down is not enough to draw down the credit bank in 2025, and the annual CI reduction targets are not enough to prevent overperformance of the program even with AAM. However, if the AAM were triggered earlier there are more possibilities of the credit market being balanced, attracting more low carbon fuels to the road/aviation sectors and accelerating electrification.

228.27 cont. Neste reiterates support for ICF's recommendation that the AAM triggers be reevaluated to ensure a smoother reduction of the credit bank. By lowering the "Credit Bank to Average Quarterly Deficit Ratio" AAM trigger from 3 to 2.5, CARB can provide an even more predictable credit market.

228.28 The substantial changes made in this 15-day package should also be rejected because they are projected by CARB to crash the LCFS credit market from 2029 through 2032, resulting in credit prices at \$0/tonne (see the Figure 7 below)¹⁸. If credit prices decline to \$0/tonne, as CARB staff modeled in a scenario without the auto-acceleration mechanism triggered, the effects on California's carbon emission goals could be devastating. It would raise uncertainty for low-carbon investments. Even after credit prices rise in later years, it could take time for low carbon infrastructure to be rebuilt and market confidence in long-term price signals will have been damaged. California could also slide from being a market leader in low carbon fuels and technologies as the \$0 credit value would show that the lowest cost fuel would satisfy compliance requirements for the foreseeable future. This could stifle innovation in new pathways and technologies that could further lower emissions.

Figure 7: CARB Modeling of LCFS Credit Prices Under the August 12, 2024 15-day Package



228.29 **Remove the additional requirements proposed in (95488.9(g)) that fail to incentivize feedstock innovation and could increase costs.**

As part of the 15-day package, CARB made several substantial changes to the new Sustainability Requirements (95488.9(g)), including:

- Requirement to apply low-GHG farming practices as soon as 2028;
- Feedstock attestation requirements that could apply as soon as 2025;
- Additional requirements for the previously proposed Sustainability Certification;
- The concept of "existing" and "new" fuel pathway applications

Taken together these requirements will shrink the pool of feedstocks available in California due to farmers choosing not to engage with these complex administrative burdens that do nothing to improve sustainability, could increase costs in California due to this smaller pool of feedstocks, and increase administrative burdens that themselves could create additional costs. They could also create a lot of confusion and uncertainty, especially for those wishing to bring new lower CI feedstocks to California. Neste

¹⁸ https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_attc.pdf

228.30 supports previously proposed sustainability certification and that in itself will lead to higher costs for feedstock producers. The new requirement in this 15-day package to certify per EU-RED is likely to add to the certification costs, making the sustainability certification cost prohibitive. In addition, the proposed changes in 95488.9(g) contain a lot of errors, including references to sections that do not exist, making it impossible to understand compliance obligations. As a result, Neste does not support ANY of the changes made to the sustainability requirements in 95488.9(g) as part of this 15-day package, and requests that CARB reconsider them.

228.31

228.32 Specific to the requirement to apply low-GHG farming practices (also called Climate Smart Ag (CSA)), Neste is generally supportive of applying these practices. However they could potentially increase total value chain costs by anywhere from \$80 to \$150 per metric ton of feedstock, especially in the early adoption stage. To incentivize adoption, it is crucial that these practices are recognized and incentivized through reduced CI scores. For example, implementing reduced tillage and cover cropping could potentially lower CI scores by 20-30% for soybean oil, making it a more competitive and desirable feedstock for low carbon fuel solutions. This proposal not only has the potential to effectively phase out higher CI vegetable oils but also contribute to improved soil health, increased biodiversity, and reduced reliance on synthetic fertilizers, creating a more resilient and sustainable agricultural system in the long run. By aligning these practices with CARB's goal of reducing greenhouse gas emissions and promoting sustainable fuels, we can create a positive loop that benefits farmers, consumers, and the environment.

While Neste supports CSA practices like reduced tillage and cover cropping, we strongly oppose a blanket approach that bundles these practices together. Such an approach ignores the unique needs of different regions and crops, with some practices being more feasible than others. For example, cover cropping is not feasible across all growing regions due to factors such as climate, workforce availability, and commodity prices. A bundled approach would also unfairly penalize farmers who are already implementing some but not all CSA practices. CARB should instead take a nuanced approach that recognizes the diverse feasibility of CSA practices. This would ensure that farmers are incentivized to adopt practices that are appropriate for their specific context, ultimately leading to greater adoption of sustainable practices and a more effective low carbon fuel program.

228.33 Implementing a separate specified feedstock attestation letter seems redundant or unpurposeful, especially if the language in the letter needs to be as specific as currently proposed. The different entities upstream of the fuel producer will not know under which pathway the fuel producer will eventually claim the feedstock batch, or how could they realistically state something about a pathway they know nothing about in an attestation letter. Some of the key points in the proposed attestation letter could perhaps be incorporated into a specified source feedstock transfer document; after which the attestation letter would not really serve any purpose. The points included on the feedstock transfer document could include the fact that the feedstock has not been intentionally modified to be a waste or residue and that the biomass has not been mixed with any other type of material. For certain feedstocks it could further indicate what type of treatment it has undergone after the point of origin. A practical solution would be that the LCFS accepts RFS separated food waste statements and ISCC or similar feedstock self declaration and would not require a separate LCFS document with a very specific wording. Separate feedstock attestation would only increase feedstock suppliers' and fuel producers' administrative burden and not the actual sustainability of the feedstocks that would flow to the LCFS program. Meaning that feedstock suppliers would likely choose not to sell feedstocks as LCFS compliant only due to the fact that a separate and very specific LCFS attestation or feedstock transfer document is required.

228.34 Lastly, CARB added new requirements to the sustainability certification that seem to dictate the contents of the sustainability certification. Sustainability certifications should stand alone and we request that CARB not impose any new requirements on how the certifications should be performed. Please remove any requirements proposed on the actual certifications because they appear in conflict with already approved

certification schemes and will interfere with the ability to procure a certifier who is willing to take on California specific requirements.

Below are some additional comments on the sustainability requirements:

- 228.35 • The frequency of the new attestation requirement is not clear. Will a one-time attestation suffice?
- 228.36 • Forest coordinates for forest residues will be a challenge to collect and report
- 228.37 • The rollout times for sustainability, attestation and CSA practices requirement are unrealistic and could lead to supply disruptions and price spikes
- 228.38 • CARB should clarify the ESG criteria that will meet the requirements of an approved sustainability certification system.

Revise proposed LUC factors (95488.3(d)) to incentivize improvements in farming practices.

- 228.39 Neste believes that the proposal to calculate only more conservative Land Use Change (LUC) factors in 95488.3(d) will be detrimental to those working to develop lower CI feedstocks, and will setback the development of new feedstocks that are key to decarbonizing the road and aviation sectors. Neste supports CARB's concept of establishing empirical methods to evaluate LUC of feedstocks, however CARB must ensure fairness across feedstocks and recognize those feedstocks that have LUC lower than the factors in Table 6. Neste requests that CARB work with liquid renewable fuel producers to define this proposal and to establish guidelines for this new process to ensure consistency/fairness in these new LUC evaluations. We also believe that these new LUC evaluations should be applied not only to new feedstocks but also to those that CARB already analyzed in 2015 (corn, soybean, canola). By doing so, the market will have the incentive to develop more sustainable feedstocks while maintaining empirical justification of their reduced LUC.

An example of this is winter canola. Despite primarily being produced in the Northern Great Plains (Montana, North Dakota, Minnesota, etc.) with spring varieties, growing winter canola in rotation with wheat reduces disease risk and offers farmers additional markets in the US great plains. Growing winter canola in fallow periods can lower risk of displacing food production in parts of the Midwest and Southeast US farmlands. Moreover, some studies suggest that winter canola can increase yields of subsequent wheat¹⁹, break wheat pest cycles and improve soil health thanks to soil coverage increase and crop rotation diversification. This combined with the production of canola meal (around 60% of grain production) to the food industry can considerably reduce the ILUC risk and even bring additionality. The LUC evaluation process proposed in this 15-day package could end investment in winter canola and other lower CI feedstocks that will ultimately impact the ability to reach the states carbon reduction goals.

Maintain technology neutrality and eliminate the proposed 20% caps on soybean and canola oil used to produce RD and SAF (95482(i)).

- 228.40 Neste opposes the proposal to cap soybean oil and canola oil to 20% of production at the company level (95482(i)). It is unclear how it will apply and could lead to cost increases for consumers while not achieving much environmental benefit. There is currently much work being done to reduce the CI and LUC of soybean and canola. This proposal could jeopardize the ability to meet future renewable fuel demands. Technology neutrality will ensure that consumers receive fuels at the lowest cost possible while still allowing the state to keep reducing the CI of fuels.

As noted by CARB in the April 10th workshop²⁰ (see slide 40), the LCFS is already designed to phase out feedstocks with higher LUC risk and strongly prioritizes waste and residues. As shown below in Figure 8,

¹⁹ <https://acsess.onlinelibrary.wiley.com/doi/10.2134/agronj2011.0244>

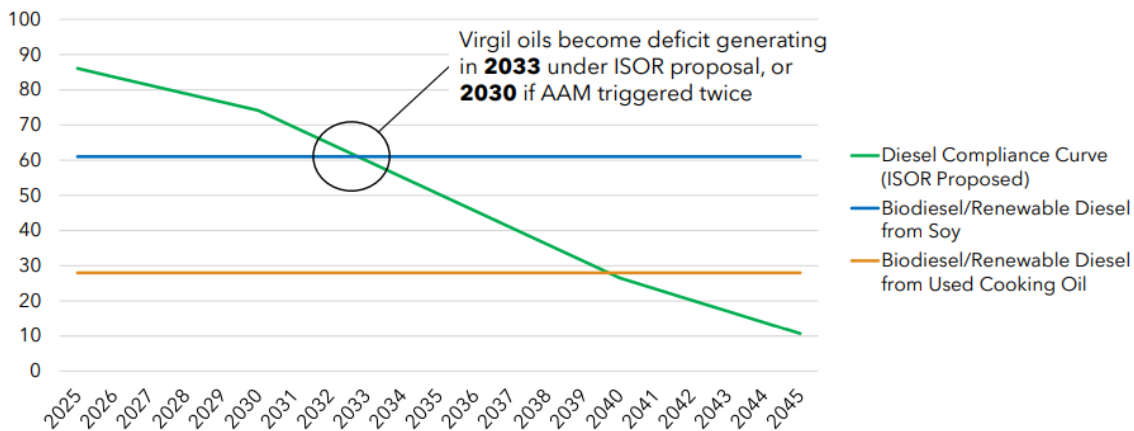
²⁰ <https://ww2.arb.ca.gov/sites/default/files/2024-04/LCFS%20April%20Workshop%20Slides.pdf>

biomass-based diesel produced from soybean oil today is currently on track to be phased out as soon as 2030.

Figure 8: CARB's Graph Showing CI of Soybean and UCO Biodiesel/Renewable Diesel

Credit Generation for Virgin Oil Feedstocks Naturally Phases Out

Biomass-based Diesel Carbon Intensities and Diesel Compliance Targets (ISOR)



228.40
cont.

The market is planning for this by investing in lower CI feedstocks, and planning the necessary operational logistical changes to achieve this phase out. CARB's proposal is not only redundant, but it will immediately disturb operations at facilities that could cause RD/SAF price increases and supply disturbances. The cap does not adequately account for the complexity of how soybean and canola oil are currently used, and this blanket cap could have uneven impacts across the industry and many unintended consequences. This policy will also lead to higher fossil diesel consumption, as noted by CARB in the April 10th workshop (see slide 21)²¹.

It is also unclear how the cap will be applied, especially at companies that operate joint ventures and subsidiaries. The proposal also punishes those below the 20% cap and makes them subject to the cap immediately. The cap should apply to all entities in 2028 to ensure fairness and clarity on when the cap applies.

If CARB insists on implementing the cap, Neste recommends that it only apply to higher LUC feedstocks such as conventional soybean. The proposed cap should not discourage CSA and the development of lower CI feedstocks. Winter canola or regenerative soybeans should not be capped as they are crop-based feedstocks that are more sustainably grown and will be key to meeting decarbonization goals in California and throughout the world.

Low-CI Hydrogen Recommendations:

228.41

Neste reiterates appreciation for CARB's proposals to create greater incentives for the production and use of low-CI hydrogen, especially as noted in sections 95488.8 (i)(2) "Book-and-Claim Accounting for Pipeline-Injected Biomethane Used as a Transportation Fuel or to Produce Hydrogen" and 95488.8 (i)(3) "Book-and-Claim Accounting for Pipeline-Injected low-CI Hydrogen Used in FCV and Alternative Fuel Production." Neste recommends that all renewable facilities that use low-CI hydrogen be allowed to generate CI benefits from using low-CI hydrogen and not just facilities connected to a North American carrier pipeline (95488.8 (i)(2)) or California hydrogen pipeline (95488.8 (i)(3)). Globally, Neste is investing

²¹ <https://ww2.arb.ca.gov/sites/default/files/2024-04/LCFS%20April%20Workshop%20Slides.pdf>

228.41 millions in the development of low-CI hydrogen to produce even lower CI versions of drop-in fuels like cont. renewable diesel and SAF²². We hope to eventually expand the use of low-CI hydrogen at all our facilities and to have the option to bring those lower CI fuels to California. The hydrogen pipeline requirements create unnecessary barriers and should be rejected.

228.42 In Section 95488.8 (i)(3), Neste also recommends the elimination of the December 31, 2022 facility startup date for facilities to be eligible for the low-CI hydrogen CI benefits. As the lone renewable fuel company with a production footprint on 3 continents, allowing low-CI hydrogen from any of our facilities could help increase supply of lower CI fuels to California.

Purpose of Carbon Intensity Benchmark for Fossil Jet Fuel (Table 3) Unclear:

228.43 If CARB is not proceeding with the exemption for intrastate jet fuel, it is unclear what the purpose is of Table 3 of the 15-day package. Will it be used to calculate credit for SAF? It also appears that Table 3 does not include the proposed step down. Is this intentional?

Clarification Needed in the new Tier 1 Calculator for “Hydroprocessed Ester and Fatty Acid Fuels”:

228.44 Neste appreciates the creation of the new Tier 1 Calculator for “Hydroprocessed Ester and Fatty Acid Fuels” and we would like to request clarification on the following two items:

- There was an increase from 0.76 to 3.497 gCO₂e/MJ in the tailpipe emissions factor, but nothing to explain this large increase. Is this an error?
- As part of 95488.8 (i)(1) “Book-and-Claim Accounting for Low-CI Electricity Supplied as a Transportation Fuel, Direct Air Capture projects, or Used to Produce Hydrogen as a transportation fuel”, we would like to ensure that low-CI electricity used towards hydrogen production that is ultimately used to produce RD/SAF is accounted for in the Tier 1 calculator. We would appreciate it if CARB makes this clear in the Tier 1 calculator.

Conclusion:

228.45 In summary, as a long-time, public supporter of California’s LCFS program, Neste urges CARB to reject proposed risky policy experiments outside of the 45-day package that undermine the proven policy frameworks of one of California’s longest running and most successful climate programs. We urge CARB to re-evaluate and propose an additional 15-day package that avoids the unintended consequences, implementation feasibility, and program reliability issues raised in this package. Consideration of these issues for industry decisions about long term capital investments for both road and aviation fuels, as well as for agriculture production and practices can also lead to higher costs for consumers. The impacts on aviation fuels in particular requires attention.

Neste appreciates your consideration. Our planet and our children are counting on your leadership. Please feel free to contact me for additional information or questions regarding this submission.

Sincerely,

Donna Warndorf
Head of Public and Regulatory Affairs, Americas
Neste US, Inc.

²² <https://www.neste.com/en-us/news/neste-moves-forward-in-its-renewable-hydrogen-project-in-porvoo-finland>

Comment Log Display

Here is the comment you selected to display.

Comment 229 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Gary
Last Name	Grimes
Email Address	ggrimes@worldenergy.net
Affiliation	World Energy
Subject	Tier 1 Hydroprocessed Ester and Fatty Acids Fuel Calculator

Comment

Attached are comments from World Energy on the Tier 1 HEFA Calculator. Thank you for developing these calculators to standardize and simplify reporting and CO2e calculations.

Please feel free to call to discuss our comments further.

Best regards,
Gary Grimes

Attachment

www.arb.ca.gov/lists/com-attach/7565-lcfs2024-Wi4GMVQKAjkKaQJk.docx

Original File Name

T1 HEFA Calculator Comments.docx

Date and Time Comment Was Submitted

2024-08-27 19:21:46

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

World Energy Comments on the 2024 LCFS T1 Calculator for HEFA

229.1 The new T1 Calculator for HEFA is a great step forward in the calculation of CI results for the increasing number of options for additional feedstock pathways. We like its transparency of data and calculations.

However, there are two model elements that we want to provide comments.

Tailpipe Emissions - Non-CO2 Emissions

229.2 This element is seen in the Pathway Summary worksheet where all the carbon intensity (CI) elements for each feedstock pathway are displayed and summed together to become the CI for each of the feedstock pathways. In the category of Tailpipe Emissions (Row 37), Non CO2 emissions, the value for every pathway in a test calculation (using our 2021-2022 World Energy historical operating data) is 3.497 (cell E37), which is sourced from the CA-GREET4.0 tab in cell E38, labeled Tailpipe Emissions as well.

This number is consistent with the provided document “Technical Support Documentation for Lookup Table Pathways” where on page 13 it describes Tailpipe Emissions as “The tailpipe emissions are based on CARB’s EMFAC2021 (v1.0.2) model7 for Methane (CH4) and Nitrous Oxide (N2O). For CO2, it is calculated based on Carbon in Diesel. The results are shown in Table B.3:”

Table B.3. ULSD Tailpipe Emissions

GHG	Tailpipe GHG Emissions from Diesel-fueled Vehicles (g/MMBtu)	gCO ₂ e/MJ
CH ₄	0.27	0.006
N ₂ O	12.36	3.49
CO ₂	80,333.94	76.14
Total	80,346.57	79.64

The sum of the two non-CO2 GHG gases (CH4 and N2O) is **3.496** gCO₂e/MJ (very close to the T1 calculator value)

However, in this same document on page 16, there is a description of Tailpipe Emissions for Jet Fuel that says “The tailpipe emissions are taken from CA-GREET4.0 for Methane (CH4) and Nitrous Oxide (N2O). For CO2, it is calculated based on Carbon in Conventional Jet Fuel. The results are shown in Table C.2:”

Table CF.2. Tailpipe Emissions

GHG	Tailpipe GHG Emissions (g/MMBtu)	gCO ₂ e/MJ
CH ₄	0.09	0.002
N ₂ O	0.17	0.049
CO ₂	77,191.42	73.16
Total	77,191.68	73.21

In this case the sum of the two non-CO₂ gases (CH₄ and N₂O) is **.0051gCO₂e/MJ**, which is **3.492 gCO₂e/MJ less** than the value that is displayed for Tailpipe Emissions in the T1 calculator for each pathway.

Similarly on page 7 of the same document is a discussion of Tailpipe Emissions for CARBOB, which is the category of fuel component that would include renewable naphtha from HEFA.

It states “Since CARBOB is a blendstock and not a final finished fuel, vehicle tailpipe emissions represent the portion of California Reformulated Gasoline (CaRFG) emissions allocated to CARBOB. The tailpipe emissions are based on CARB’s EMFAC2021 (v1.0.2) model for Methane (CH₄) and Nitrous Oxide (N₂O). For CO₂, it is calculated based on Carbon in CARBOB. The results are shown in Table A.4:”

Table A.4. Tailpipe Emissions from CARBOB

GHG	Tailpipe GHG from gasoline vehicles, g/MMBtu	gCO ₂ e/MJ
CH ₄	3.89	0.09
N ₂ O	2.89	0.82
CO ₂	76,925	72.91
Total	77,882	73.82

In the case of renewable naphtha, the non CO₂ GHG emissions (CH₄ and N₂O) totals **.91 gCO₂e/MJ**, which again is overstated in the T1 HEFA calculator by **2.587 gCO₂e/MJ**.

Because of the significant differences in the Tailpipe Emissions for different fuel products, we believe it is necessary to insert additional columns for each fuel pathway (by feedstock and product) to properly account for the differences in the non CO₂ components of GHG emissions by product.

Hydrogen Emission Factor

The hydrogen CO₂ emissions component emission factor 13,588 gCO₂e/kg shown in the Pathway Summary worksheet cell F27 and sourced in the CA-GREET4.0 tab cell E25 (labeled Default SMR to

229.2
cont.

229.3

229.3
cont.

G.H2). This represents a 14% increase in CO₂e emissions per kg above our current Tier 2 pathway hydrogen CO₂e emissions. We suspect this may be the result of an overly high pressure hydrogen gas stream that would be suitable for vehicle transportation (maybe 700 bar - 10,000 psi?), but is not the pressure we use for pipeline distribution from the SMR to the HEFA facility, which is 120 psi.

If there is a higher compression energy and associated CO₂ emissions, it should be adjusted downward for a HEFA pipeline hydrogen supply.

Thank you for developing these useful tools to simplify reporting and CI calculations.

You can reach us for further discussion at the numbers below:

Gary Grimes 949-903-4112 (PDT in CA)

Greg Buczynski 905-541-3664 (EDT in Ontario, CA)

August 27, 2024

The Honorable Liane Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Proposed Amendments to the Low Carbon Fuel Standards – 15 Day Public Notice

Dear Chair Randolph,

I submit these comments as a scientist and as a project developer on behalf of my company, Mote, on the Proposed Low Carbon Fuel Standard Amendments of 2024. I urge that you adjust the definition of biomass wastes and residues to ensure carbon-negative biofuels projects in California, like Mote's, are commercially viable. Our specific recommendations are detailed below.

Biomass carbon removal and storage (BiCRS) projects, especially the gasification of biomass waste to make hydrogen and capture CO₂ for underground storage, are the lowest-cost and most scalable approach to remove CO₂ from the air, a necessary part of the State's goal of achieving net-zero emissions by 2045. I first understood this when working on the landmark report, *Getting to Neutral: Options for Negative Carbon Emissions in California*. I founded Mote to implement that finding. We are developing large scale projects that convert waste biomass into clean hydrogen and remove CO₂ from the air for underground storage. Our first such project, in Kern County, is a key hydrogen production project in the ARCHES hydrogen hub. LCFS credits are essential to starting this important industry and developing the needed technology.

For its projects, Mote plans to use forest management residues, agricultural residues, and urban greenwaste from California, all materials that for which beneficial uses are badly needed. However, the proposed definitions could severely restrict our feedstock options. Much of the waste and residue from fire prevention could be construed to include a portion of merchantable residues, for example. Additionally, for project startup, material from "industrial forest lands" is all that is currently available on the market. To penalize or make using residues from managed forests more burdensome could prevent any project from getting off the ground, even these materials will be less important in the long run. Appropriate wastes and residues, even from industrial forest lands, should be a "specified source" feedstock.

230.1

230.1
cont.



In addition, Mote recommends the following changes, which are in line with the recommendations of the Bioenergy Association of California.

(1) Modify the definition of Forest Biomass Waste as follows (edits in red):

230.2

“Forest Biomass Waste” means **residues that are 1) removed for wildfire mitigation, forest restoration projects, or the protection of public safety, or 2)** small-diameter, non-merchantable residues, limited to forest understory vegetation, ladder fuels, limbs, branches, and logs that do not meet regional minimum marketable standards for processing into wood products.”

(2) Make the following corrections to Section 95488.9(g):

230.3

(g) Sustainability Requirements for **Biomass Purpose Grown Crops**.

(A) **Biomass Purpose Grown Crops** used in fuel pathways must only be sourced on land that was cleared or cultivated prior to January 1, 2008 and actively managed or fallow, and non-forested since January 1, 2008. **Biomass Purpose Grown Crops** may not be sourced from land that is covered under international or national law or by the relevant competent authority for nature protection purposes.

(B) **Biomass Purpose Grown Crops** must be produced according to best environmental management practices that reduce GHG emissions or increase GHG sequestration, including but not limited to:

Thank you for your efforts to promote air quality and climate sustainability in California.

Sincerely,

Dr. Joshua Stolaroff
Chief Executive Officer
Mote, Inc.
700 South Flower St., STE 1000
Los Angeles, CA 90017
josh@motehydrogen.com

August 27, 2024

California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Sevana Bioenergy Comments on the 15-Day Amendments to the Low Carbon Fuel Standard

Thank you for the opportunity to submit comments on the 15-Day Amendments to the Low Carbon Fuel Standard.

Sevana Bioenergy develops RNG projects through design, construction, and operations, with strong partnerships and contributions to the local communities we serve. Our mission is to accelerate the production of RNG from anaerobic digestion facilities and contribute significantly to worldwide greenhouse gas reduction with net carbon-negative projects. Sevana Bioenergy is developing projects both inside and outside California, with both carbon negative electricity and RNG pathways, so we are familiar with and not biased toward any specific fuel type or geography. Furthermore, RNG can be used to generate hydrogen and other emerging low carbon fuels. The science-based, technology-neutral and inter-state commerce compliant framework of the LCFS make it a strong and tested policy. Unfortunately, we have seen decarbonization projects being cancelled or shut down from depressed LCFS credit prices and look forward to this rulemaking to return the program to balance.

231.1

We continue to support the proposal to adopt more stringent carbon reduction targets, and the step down of 9% is improved but could be even larger. However, we observed several proposed changes that will work against the target of GHG emissions reductions. Methane is one of the most powerful greenhouse gases with a potency nearly 30 times that of carbon dioxide. RNG projects capture methane including from livestock and organic waste that would otherwise be released to the atmosphere and thus reduce greenhouse gas emissions and improve air quality. California should employ all options available and use reality-based counterfactuals to help mitigate methane emissions as rapidly and for as long as practical.

231.2

231.3

Definition of food scraps to include organic wastes that are currently landfilled

The updated definition of food scraps is overly restrictive and excludes organic wastes that are currently being landfilled and contribute to the emission of landfill gases. These organic wastes could be diverted from landfill and converted into RNG. We therefore propose to include organic wastes from commercial establishments, distribution centers, manufacturing facilities, and grocery stores and to only exclude liquids that have other beneficial uses such as FOG. A proposed definition would be as follows:

231.4

“Food Scraps” is the portion of municipal solid waste (MSW) that consists of inedible or post-consumer food collected from residences, hospitality facilities, institutions, commercial establishments, distribution centers, manufacturing facilities, and grocery stores. This definition excludes fats, oils, or greases (FOG).

Align baseline for methane to be consistent with the latest studies on landfill capture rates and site specifics

231.5a EPA and CA satellite studies show actual landfill methane capture rates are not as high as currently included in the Tier 1 Organic Waste GREET calculator, some studies showed only 36% of landfill methane is captured, and Canadian Clean Fuel Program adopted a 36% rate. Adapting landfill capture rates of methane changing the current 75% to the latest scientific understanding would properly value and appropriately incentivize organic waste diversion into beneficial RNG.

231.5b We further recommend using site specific data for dairy and swine manure lagoon cleanouts as is currently implemented, rather than the proposed transition to an inaccurate and overly optimistic default baseline that assumes lagoons are fully cleaned annually when in fact in most cases they are not. It is especially important to avoid stranding capital not to implement such a new default cleanout baseline, which our modelling shows misses 30-70 CI points versus actual cleanouts for projects that were already in construction prior to this change.

Maintain avoided methane and deliverability mechanics

231.6a We recommend CARB avoid opening a pandora's box involved in the proposed pipeline directional mapping in the 15-Day Changes for eligibility of deliverability. The current tracking mechanisms are supported by science and aligned with programs such as the RFS and other state low carbon fuel regulations. This will avoid tremendous risk of legal challenges, fuel shortages, higher emissions through workarounds such as trucking rather than pipeline deliveries, and perpetuating the sustained usage of fossil fuels by arbitrarily hindering low carbon fuels.

231.6b Avoiding/capturing methane emissions is one of the most consequential actions that can be taken to reduce GHG emissions and is recognized widely by the scientific community, so hamstringing CARB's ability to reduce such emissions within the LCFS after only 20 years doesn't make sense. Limiting avoided methane crediting to a maximum of two 10 year periods will likely result in shutting down impactful GHG reducing projects built to support the goals of the LCFS. It is important to clarify that any change to avoided methane crediting only apply to new projects to avoid stranding capital invested already in such projects.

True up and 4:1 penalty

231.7 We support clarification made for true ups to actual verified CI versus the temporary pathway CIs or when no temporary pathway is offered. We also highly recommend removing the newly proposed 4:1 penalty on actual

231.8 versus temporary or provisional CI, which may be due to factors outside the registrant's control.

Thank you for taking our comments into consideration. We look forward to an expedient conclusion of the final rulemaking.

Sincerely,



Steve Compton
President & COO
Sevana Bioenergy

Comment Log Display

Here is the comment you selected to display.

Comment 232 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Ruben
Last Name	Zaragoza
Email Address	Ruben.zaragoza@wnco.com
Affiliation	Southwest Airlines
Subject	Support for California Air Resources Board Proposal to Retain Jet Fuel Exemption in LCFS

Comment

Clerks' Office
California Air Resources Board
1001 I Street
Sacramento, California 95814

Re: Support for California Air Resources Board Proposal to Retain
Jet Fuel Exemption in Low Carbon Fuel Standard Program

In response to the revised Proposed Low Carbon Fuel Standard Amendments posted on August 12th, 2024, we are writing to share our support for the recent California Air Resources Board (CARB) proposal to retain the jet fuel exemption under its Low Carb Fuel Standard (LCFS) Program. Southwest Airlines supports the withdrawal of the proposal to eliminate the jet fuel exemption and retain the existing opt-in approach for SAF under the CARB LCFS Program.

232.1

Southwest Airlines is taking action towards addressing its carbon emissions and achieving its goal of net zero carbon emissions by 2050, and transitioning to SAF is core to these efforts. We have long recognized that scaling up the supply of SAF and achieving net-zero carbon emissions by 2050 can only happen by working collaboratively with governments and other stakeholders across sectors. Achieving this ambition for SAF will require new and additional policy incentives, streamlined permitting processes, and close collaboration among governments, the aviation industry, the fuels industry, environmental organizations and others.

In its April 10th, 2024, workshop, CARB re-stated that a principle objective of its regulatory proposal is to "Increase the use of

232.1
cont.

alternative jet fuel in the State". We share that objective as reflected in our company goal to replace 10% of total jet fuel consumption with SAF by 2030 and our US airline industry support for the US government SAF Grand Challenge. Southwest Airlines and our fellow airlines have clearly demonstrated a strong, enduring market signal for affordable SAF. The challenge remains supply of affordable SAF, not the absence of a market signal by airlines. We strongly believe that maintaining the existing exemption for jet fuel along with the opt-in model for SAF provides a strong foundation to achieve our mutual objectives.

Our mutual interest is to increase SAF production, availability, and use, and the most effective way to accomplish this is to continue the positive, collaborative approach represented by the existing "opt-in" mechanism developed by CARB and the aviation community. We support CARB's decision to withdraw the proposal to remove the exemption for jet fuel for intrastate flights, preserve the existing opt-in approach for SAF. We look forward to the opportunity to work with CARB and other stakeholders across the SAF ecosystem to explore solutions which build on the existing opt-in model of the LCFS Program. We recommend that CARB establish a joint CARB-industry working group with stakeholders across the emerging SAF ecosystem to explore alternative policy and voluntary proposals to rapidly increase SAF production, availability and use in California. We look forward to working with CARB on such measures to accelerate SAF deployment.

Sincerely,

Ruben Zaragoza

State & Local Affairs Director
Southwest Airlines

Attachment

Original File Name	Southwest Airlines letter on Revised CARB LCFS proposal 08-27-2024.pdf
Date and Time Comment Was Submitted	2024-08-27 20:07:51

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

Comment to LCFS

Name: Tadashi Ogitsu

Affiliation: Lawrence Livermore National Laboratory

Title: Staff scientist, PhD in Materials Science

Disclaimer

Opinions expressed in this document are entirely my own and nothing to do my employer. This study was conducted exclusively during my personal time.

Summary

Hydrogen LCFS strategy must carefully consider constraining factor, without which it is guaranteed to fail in supporting the liftoff. Solar and wind have seasonal fluctuation therefore solar/wind based green hydrogen generation have seasonal fluctuation. Without developing seasonal storage, forcing only green hydrogen will face massive curtailment therefore there will not be any business cases. CARB must coordinate the effort with the utility to make sure that green hydrogen could be produced without wasting it, which requires seasonal storage capacity corresponding to about 15% of yearly hydrogen consumption. Note: electrify everything will face exactly the same challenge since the root cause is seasonal fluctuation of solar and wind.

1. Comments to hydrogen LCFS

Regarding current requirement of green hydrogen mix time frame, I would like to remind CARB staff members that major renewable sources in California are solar and wind which have seasonal fluctuation. Accordingly, if we are to accept only green hydrogen produced from solar and wind, the green hydrogen production will naturally have seasonal fluctuation.

Consequence: without having seasonal hydrogen storage, there will be significant fluctuation in output, which according to market principles, will lead to huge fluctuation in price.

CARB staffs must be reminded that we have at least two analogous problems.

1. Curtailment of CO₂ free electricity in California, which shows clear seasonal fluctuation reflecting fluctuation in solar and wind output (see next page).
2. Why we have 15% of natural gas storage capacity to yearly consumption in the US? Seasonal fluctuation of demand. People use heater when it is cold.

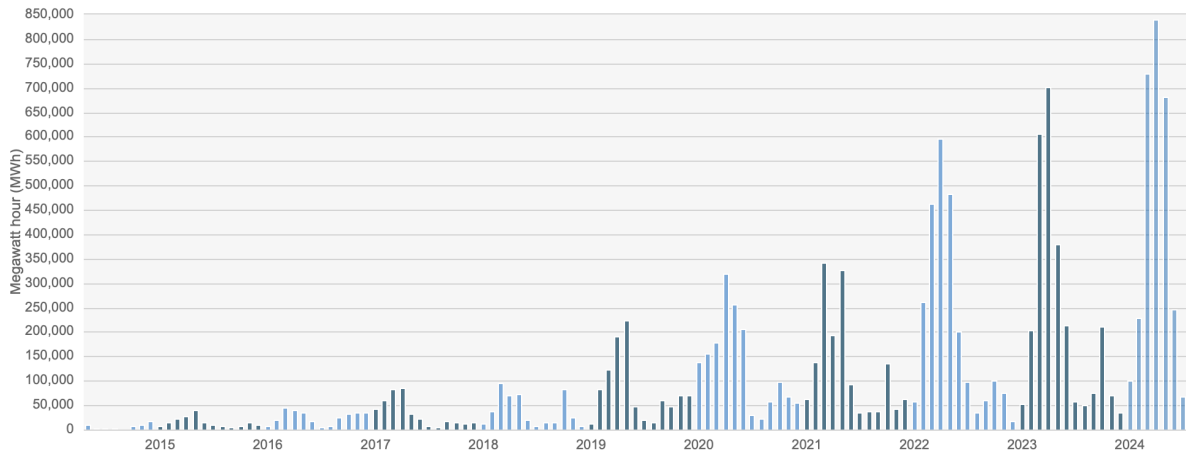
Curtailment from the California grid

Attached below is the curtailment data published by California Independent System Operator (CAISO: the grid operator of California) found at <https://www.caiso.com/about/our-business/managing-the-evolving-grid>

Wind and solar curtailment totals by month

Download ▾

View ▾



Updated as of 8/6/2024

As one can see, curtailment increase from January to June then decrease from July to December. Maximum output of solar takes place in June (summer solstice) and minimum output takes place in December (winter solstice). On the other hand, atmospheric temperature warm up and cool down with delay. As one should be aware of, hot summer days rather take place in July, August and sometime continues to September. We use AC when it is hot and use heater when it is cold. Naturally, supply-demand will reflect the seasons. **This can be addressed only if we have seasonal storage, which we don't.** I encourage CARB staffs to look up these values. Generally speaking, stationary battery way more than \$100/kWh. Tesla Powerwall is sold about \$10k for 13.5kWh, which translates to \$740/kWh. Hydrogen underground storage costs about a few dollar/kWh. Note: one must take the device lifetime into consideration. Lifetime of battery is usually less than 10 years. Gas storage could last a few decades. One can divide these costs by the number of households in California (~13M), which will give you how much a household need to pay in order to build and maintain the storage to address seasonal fluctuation of solar and wind. Please be reminded that curtailment means solar and wind station operators do not have profit out of curtailed electricity. **One can store it and sell it when supply is below demand, however, only if the storage solution is affordable for majority.**

Table here

Now, why this is relevant (critical in my opinion) for LCFS strategy?

1. Without having seasonal storage, we cannot fully decarbonize power sources, then it does not matter how many BEV or FCEV people bought them. Either electricity or hydrogen need to be on-demand sources which is unfortunately fossil based (natural gas). **Please remember solar and wind are NOT on-demand power supplies.**

Solution: build hydrogen underground storage, H₂ pipeline and facilitate H₂ market expansion

233.2

With the hydrogen underground storage as affordable seasonal storage, we can introduce sufficient amount of solar and wind. Keep in mind that for the large scale energy transfer, pipeline offers close to 10x lower cost compared to HVDC line (this is also related to surface to volume ratio) enabling us to connect solar and wind generated at geographically separated. The relevance of this is following: generally speaking wind power output in high latitude peaks rather in winter, which is opposite of solar output. Therefore, there will be averaging effect, which will reduce the required amount of storage size.

As the analogous scale of infrastructure, let us look at natural gas pipeline. As you may be aware of, California import significant amount of natural gas from Wyoming via the natural gas pipeline owned by Berkshire Energy (<https://www.brkenenergy.com/our-businesses/kern-river-gas-transmission-company>). Very interestingly, Wyoming is known to have significant amount of wind power generation capacity. If we retrofit their natural gas pipeline to H₂ pipeline, we are going to have huge amount of renewable power supplies connected each other: solar in south west and wind in north west.

Note: H₂ pipeline technology already exist. See <https://www.energy.gov/eere/fuelcells/hydrogen-pipelines>

I point out that ***there is a large scale underground hydrogen storage project in Delta Utah***, which is co-developed by Chevron and Mitsubishi Heavy Industry (<https://aces-delta.com>). Delta Utah is very close to the Kern River Pipeline so it seem conceivable that such large scale hydrogen storage and distribution infrastructure can be built some time in near future.

Relation to LCFS: timeline is crucial

233.3 Forcing hydrogen industry to switch to 100% green makes sense ***only if such a large scale hydrogen storage and pipeline are already in place***. If not, there will be significant amount of curtailment (waste) and the entire energy transition effort is going to fail.

Message to CARB

233.4 Instead of specifying the specific year without explaining why 2030, please use more reasonable language (ex. when the necessary infrastructure is complete).

233.5 Let me ask the CARB staffs: is it hydrogen producers' responsibility to develop such a massive infrastructure? I suppose the public institutions roles should include facilitating coordination of effects in different industry sectors: energy production, storage and distribution, and various users including transportation sector.



August 27, 2024

VIA ELECTRONIC FILING

Matthew Botill
Branch Chief, Industrial Strategies Division
California Air Resources Board
1001 I Street
Sacramento, California 95814

**RE: Comments on the August 12, 2024 Proposed 2024 Low Carbon Fuel Standard Amendments
(15 day comments)**

Dear Mr. Botill

Monarch Bioenergy LLC (Monarch) operates and develops Renewable Natural Gas (RNG) facilities throughout the country and has participated in CARB's Low Carbon Fuel Standard (LCFS) program since its inception. Monarch respectfully submits these comments to the LCFS Proposed Amendments posted on August 12, 2024.

234.1

Monarch applauds CARB for increasing the overall program ambition and short term 2025 targets that are critical for continued methane reductions and expanded demand in all low carbon fuels. We believe even stronger ambition is achievable and can be achieved cost-effectively as stated by the numerous analysis submitted by the Coalition for Renewable Natural Gas (RNGC).

234.2

Monarch also appreciates the work CARB outlined in the August 22, 2024, Dairy Workshop where CARB supported analysis showed California's statewide dairy manure cow populations may be declining more quickly than previously understood. Livestock projects in California and across the country are a vital methane emission mitigation tool that should continue to be supported under the LCFS program. In particular, it is important to stakeholders that CARB recognized there is no evidence of farm sizes increasing due to LCFS credits to RNG projects.

234.3

Monarch has several suggested improvements to the August 12th draft. First, the proposed Deliverability Language remains problematic. The current draft suggests a RNG deliverability map will be developed with the assumption future regulations could be based on this map. Any restrictions based on mapping gas flows could arbitrarily penalize existing and in-development out-of-state projects. Past experiences with California's Renewable Portfolio Standard (RPS) have shown that vaguely written regulatory guidance on deliverability have created a barrier to imports, hindered facility development, and were ultimately, unsuccessful in creating a well-functioning California-only electric grid. We encourage CARB to learn from the RPS example when developing the proposed map.

234.4

Monarch is also concerned with the new language in the August 12th draft that reduces the avoided methane crediting from three to two crediting periods. The arbitrary phase-out of avoided methane

crediting without a detailed plan for developing a supporting replacement policy creates significant project uncertainty and increases the potential for stranded assets. We request CARB allow 3 crediting periods for avoided methane projects.

Monarch Bioenergy LLC is grateful for the opportunity to contribute to the ongoing dialogue on these crucial topics.

Sincerely,

s/Sean Lock

Sean Lock

President

Monarch Bioenergy LLC



MONTANA RENEWABLES™

Montana Renewables, LLC
1807 3rd St NW, Great Falls, MT 59404
<https://montana-renewables.com/>

August 27, 2024

Via electronic submission to: <https://ww2.arb.ca.gov/lispub/comm/bclist.php>

Dr. Steven Cliff
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Comments of Montana Renewables, LLC on Proposed Modifications (15-Day Changes) to Proposed Low Carbon Fuel Standard Amendments

Dear Dr. Cliff,

235.1 Montana Renewables, LLC ("MRL" or "the Company") hereby provides comments on proposed
235.2 modifications (15-day changes) to the California Low Carbon Fuel Standard amendments (hereafter
235.3 referred to as the "15-Day Changes").¹ As a leading producer of sustainable aviation fuel ("SAF"),
renewable diesel and renewable naphtha, we are encouraged by the California Air Resources Board's
CARB's proposal to set ambitious carbon intensity ("CI") targets through 2030, especially the 9% "step-
down" in carbon intensity standards set to become effective in 2025. However, we have serious concerns
regarding CARB's newly proposed 20% cap on the eligibility of biomass-based diesel from soy and canola.
We are also disappointed that CARB has not followed through on previously proposed obligations for fossil
jet fuel that would have supported SAF use in California, and suggest certain alternative measures that
CARB can and should consider as additional modifications to the proposed amendments. These and other
matters introduced, modified or supplemented by the 15-Day Changes are detailed further below.

The 20% Cap on Credit-Eligible Soy and Canola is Unnecessary, Arbitrary and Capricious

235.4 CARB'S proposal to redefine eligibility for biomass-based diesel derived from soy or canola² is an 11th hour
change of direction that will have monumental impacts on feedstock markets and fuel producers.

Most alarming to us is that these caps were neither included in the December 2023 proposed amendments
(which received a more fulsome 45-day comment period) nor presented by staff during CARB's April 2024
public workshop on the amendments. Stakeholders cannot possibly have sufficient time for public
discourse and input on this issue during the mere 15-day comment period offered for the 15-Day Changes,
especially with the Board hearing on this rulemaking already scheduled for early November. Finalizing the
proposed caps would be arbitrary and capricious, in contravention of the requirements of the California
Administrative Procedures Act. On procedural grounds alone, CARB must remove the proposed caps and
more thoughtfully consider the potential risks and benefits as part of a future LCFS rulemaking.

¹ MRL previously provided comments on the proposed Low Carbon Fuel Standard ("LCFS") amendments by letter dated February 20, 2024 (<https://www.arb.ca.gov/lists/com-attach/6934-lcfs2024-WjcHbgBvV3ADZF18.pdf>), and on the California Air Resources Board's ("CARB") related public workshop letter dated May 10, 2024 (see <https://ww2.arb.ca.gov/form/public-comments/submissions/11501>)

² See proposed amendments to Section 95482(i) of the LCFS regulation.

Beyond the clear and inarguable procedural defects with this proposal, CARB should recognize that capping credit generation simply is not good policy. CARB's 15-day notice offers two rationales for the imposition of the 20% cap:

235.4
cont.

1. "[T]he State must ensure that other regions are able to also access increasing volumes of low-carbon alternative fuels"; and,
2. "The proposed addition ... avoids sending a long-term signal for virgin soy or canola oil to serve California demand".

Respectfully, the first rationale is not compelling enough to override the primary objective of the LCFS program, which is to reduce the carbon intensity of the California transportation fuel pool. Furthermore, programs in such other regions generally trail California in CI benchmark stringency or otherwise provide more favorable treatment for soy and/or canola, meaning that the structural signals within the control of such programs already offer greater incentivize for soy- and canola-based biomass-based diesel than California does.

235.5

With respect to the second rationale, both existing and new measures introduced in the amendments render the proposed caps unnecessary. First and foremost, the very design of the LCFS program, with its declining annual CI standards, sends a very clear message that soy and canola are not able to participate in the long term. The proposed revised standards will result in the majority of soy and canola biomass-based diesel pathways becoming minimal credit generators (if not in fact deficit generators) within a five-to-six year timeframe. Meanwhile, soy and canola remain saddled with indirect land use change ("ILUC") factors that are amongst the highest compared to other similar low carbon fuel incentive programs. CARB has refused calls to reevaluate these now nearly 10 year old factors, despite ample scientific evidence supporting significantly lowering them. CARB's soy and canola ILUC factors can reasonably be characterized as punitive, disadvantaging them relative to other feedstocks without technical support and, again, signaling that these feedstocks are unwelcome in the state.

235.6

The only predictable outcome that the 20% cap will produce is a wealth transfer to waste feedstocks, for which CARB should view some sources skeptically. U.S. and Canadian feedstocks participate in sophisticated commodity markets. Even with the LCFS program's existing and new signals discouraging their use, canola and especially soy provide important price discovery and market making functions against which other, more attractive (from a CI standpoint), feedstocks are pegged. The natural reaction to an arbitrary limit on eligibility under the LCFS will be the disruption of soy and canola's price-setting function and a rise in the commodity price of "uncapped" feedstocks like animal fats and used cooking oil ("UCO"). Basic economics assumes that rising prices should encourage greater supply; however, the fundamental flaw in this assumption in this context is that U.S. and Canadian animal fat and UCO collection programs are already mature. The price signal cannot "create" more legitimate wastes for collection, since their availability is driven by the supply-demand requirements of their primary products (beef, pork and cooked foods). Thus, the price for waste feedstocks will rise and remain high, thereby raising the cost of producing low CI fuels. Higher price signals may in turn provide motive for fraudulent suppliers on the margins, particularly from foreign markets. As CARB is aware, the EU and the EPA are investigating UCO imported from Asia, given potential concerns as to veracity.

235.7

Pushing stakeholders into alternatives to soy and canola at an accelerated pace in response to eligibility caps presents a high threat of unintended consequences that should be fully vetted through a stakeholder process. The LCFS program generally does not work when it arbitrarily picks winners and losers. Current, up-to-date emissions modeling and science should dictate the direction for future feedstocks and products serving the California market. CARB should allow the proposed CI standards to work as intended to incentivize legitimate, best-performing feedstocks.

235.8

For all of these reasons, we urge CARB to withdraw the proposed caps on soy- and canola-based biomass-based diesel eligibility. However, if CARB proceeds with these arbitrary caps, the agency should at a minimum extend the proposed grace period for existing biomass-based diesel pathways from three years to five years in the final rule, and allow for consideration of longer grace periods as part of a future rulemaking that is vetted in a public process. CARB has rationalized the three-year grace period as sufficient to “provide time to adjust feedstock supply contracts as needed”; however, the record supporting this position is inconclusive at best. We would contend that a three year deferral substantially underestimates the role of feedstock flexibility in fuel producers’ long-term investments and commercial and operational planning. A minimum five year deferral (through 2030) would mitigate some of the risk of disrupting the market and supply-demand balances.³

235.9

CARB Should be Sending Stronger, Not Weaker, Signals in Support of SAF

MRL was among many commenters who supported the elimination of the LCFS exemption for fossil jet used in intrastate flights, as proposed by CARB in December 2023. While we had our concerns that such proposal only indirectly incentivized SAF, it was at least a step towards concrete obligations to support this emerging fuel sector. We are thus disappointed that CARB has walked back even this modest commitment in the 15-Day Changes and offered only an unspecified commitment “to finding effective ways to reduce emissions from the aviation sector through the production and use of cleaner aviation fuels and other low-carbon alternatives”.⁴ We believe that CARB can still enact meaningful measures in the present rulemaking to support SAF deployment in California.

235.10

One small step that CARB could take now would be to remove the applicability of the Auto Acceleration Mechanism (AAM)⁵ to the table of annual jet fuel CI benchmarks.⁶ When applied to the gasoline and diesel benchmarks⁷, the AAM functions as a control on the size of the LCFS credit bank by both reducing credit generation for alternative fuels and increasing the deficits for fossil fuels. When applied to the jet fuel benchmark – which now lacks a corresponding deficit obligation for fossil jet fuel – the AAM would only

³ CARB has also proposed to condition eligibility for the grace period on a producer’s use of soy or canola to produce at least 20% of biodiesel or renewable diesel, as reported in 2023. While MRL believes it would qualify under this proposal, the prerequisite LCFS report is unspecified and qualifying year (2023) seems random – hallmarks of a hastily prepared addition that, again, has failed to be sufficiently vetted in a public process.

⁴ We do appreciate that CARB’s proposal at least continues the harmonization of the annual diesel and jet fuel benchmarks first established in CARB’s 2018 LCFS rulemaking. As noted in our comment letter submitted May 10, 2024, some of the supporting materials in the current rulemaking docket appeared to suggest that CARB intended to apply the annual percentage reductions against a conventional jet fuel CI of 89.31 gCO₂e/MJ in the revised jet CI benchmarks, which would have led to severe discrepancies in credit generation opportunities between renewable diesel and SAF from HEFA processes since each product is generally assigned the same CI score.

⁵ See proposed amendments to Section 95484(b) of the LCFS regulation.

⁶ See Table 3, Section 95484 of the LCFS regulation.

⁷ See Tables 1 and 2, Section 95484 of the LCFS regulation.

235.10
cont. serve to reduce credit generation opportunities for SAF. This, in turn, exacerbates the economic gap that favors renewable diesel production over SAF. Given that SAF will contribute only a very small portion of the total LCFS credit pool for the foreseeable future, reducing its credit opportunities via the AAM would serve only to undercut support for it without creating any corresponding demand.

235.11 CARB could send an even stronger signal in support of SAF by restoring the jet fuel CI benchmarks to their pre-amendment levels (i.e., a 20% CI reduction by 2030). With intrastate jet fuel obligations seemingly off the board, the jet fuel benchmarks serve only to establish the size of the credit generation opportunity for SAF. With SAF projected to comprise only a very small portion of the California fuel market through 2030, its contributions to the burgeoning LCFS credit bank – the primary motivator for the current rulemaking– do not necessitate subjecting SAF to the same revised benchmarks (i.e., 30% by 2030) as other more prevalent fuels that have benefited from years of higher standards and credit generation opportunities since the inception of the LCFS program. Setting a 20% emission reduction target in 2030 for jet fuel would give the SAF sector a leg up at a critical moment in its development, while still ensuring progress in reducing emissions over time. Notably, British Columbia has adopted a similar approach under their recent LCFS amendments, providing both a higher benchmark and a less aggressive compliance curve for aviation fuels. We respectfully ask CARB to consider taking these steps in this rulemaking or in future near-term engagement with stakeholders to ensure that California remains a policy leader and attractive destination for SAF.

Credit True Up Opportunities Should Be Implemented Immediately

235.12 MRL strongly supports the 15-Day Changes’ expansion of the proposed credit true up opportunity in Section 95488.10(b) of the LCFS regulations to include temporary pathways. We believe this justifiably rewards producers whose validated/verified CI scores outperform their previously registered CI scores, including temporary pathway CIs, with credits corresponding with actual emission reductions for fuels delivered to California.

We understand that part of the rationale for authorizing credit true-ups is that fuel producers are also now subject to a punitive four times (4x) credit retirement obligation in the event that their verified operational CIs are greater than the previously registered CIs. This signals that producers should conservatively set margins of safety in their registered fuel pathways to avoid over-generation; the credit true-up opportunity, therefore, avoids penalizing producers for acting conservatively.

Based on our reading of the proposal, the 4x credit retirement obligation would become effective the same year as the proposed amendments – if correct, it would mean such obligation would be applicable to producers’ 2024 Annual Fuel Pathway Reports (covering 2023 and 2024 operational data) verified in August 2025. In contrast, the credit true-up opportunity described in proposed Section 95488.10(b) would not occur until the 2025 Annual Fuel Pathway Report (covering 2024 and 2025 operational data) is verified in August 2026. We see no reason for producers to be immediately at risk of penalty but to have to continue to wait another year for the return of credits reflecting actual emission reductions. Put simply, California should not get another year of “free” emission reduction; we urge CARB to align the penalty and true-up provisions by making the true up opportunity effective immediately and assessed following pathway validations or verifications completed in calendar 2025.

CARB Should Provide More Time and Clarity for Feedstock Supply Chains to Implement Sustainability

235.13

In the 15-Day Changes, CARB has expanded upon the general framework of new biomass feedstock sustainability certifications first outlined in the December 2023 proposed amendments. As an ISCC-certified producer of SAF, MRL remains generally supportive of CARB's inclusion of sustainability requirements in the LCFS program. We wish to stress, however, that the agricultural supply chain certification requirements articulated in the 15-Day Changes will necessitate a massive engagement with farmers, grain and seed collectors, and distributors. Alternative fuel producers typically are not in direct contractual privity with these parties, which will complicate and prolong the negotiation of new commitments. To this end, MRL urges CARB to proceed at a reasonable pace and extend by at least one (1) year the proposed phase in periods applicable to existing certified biomass pathways (including soy and canola); meaning:

- The requirements related to biomass attestations and farm spatial data in proposed Section 95488.9(g)(1) and (g)(2)(A) should take effect in the 2027 data year rather than 2026;
- The requirements related to third party certification described in proposed Section 95488.9(g)(3)(A) should take effect in the 2029 data year rather than 2028; and,
- The requirements related to best environmental practices described in proposed Section 95488.9(g)(1)(B) and (g)(4)(A) should take effect in the 2032 data year rather than 2031.

This extension would provide critical time for communication, outreach and engagement with stakeholders and other representatives of complex feedstock supply chains. It will also offer CARB additional time to review feedback and clarify ambiguous requirements. For example, the proposed "best environmental management practices" requirements of Section 95488.9(g)(1)(B) are at this time only generic obligations that lack both specificity and applicability to different agronomic circumstances; their implementation will depend greatly on further direction from CARB, which should be informed and vetted in a public process with stakeholder input.

CARB Should Clarify/Streamline the Proposed Cut-Off for New Biomass-Based Diesel Pathways

235.14

The 15-Day Changes authorize the Executive Officer to "choose not to accept new fuel pathway applications for biomass-based diesel" beginning January 1, 2031, if certain thresholds for Class 3-8 ZEVs reported or registered in California have been met. We share the same concerns with this provision as we do with the 20% caps on soy and canola use – i.e., that sufficient stakeholder engagement must be conducted prior to adoption or implementation, and that CARB should avoid picking winners and losers arbitrarily.

Furthermore, we believe that clarification is urgently needed to confirm that the proposed cut-off (1) does not apply to SAF, even if produced by a biomass-based diesel producer; and (2) does not prevent routine modifications of existing biomass-based diesel pathways (including but not limited to new inputs; CI scoring changes following an operational CI verification; or changes resulting from the adoption of a new version of the CA-GREET or alternative emissions model).

CARB Should Withdraw and Revise Proposed Changes to LCFS Credit Generation for Hydrogen

235.15

The 15-Day Changes include new amendments to Section 95482, adding section (h) which renders "hydrogen produced using fossil gas as feedstock [as] ineligible for LCFS credit generation unless biomethane attributes are matched to the hydrogen production". This addition, as with several others previously noted above, has not undergone sufficient vetting in a public process with stakeholder input. As drafted, the provision raises questions regarding its impact on hydrogen produced in steam methane

235.15
cont.

reformers (SMR) at HEFA facilities. MRL, for example, produces hydrogen in onsite SMRs from renewable offgases (LPGs) that are byproducts of the HEFA process. While the amount of renewable offgas produced and captured internally is sufficient to meet hydrogen demand, system balancing requirements with our co-located refinery may necessitate periodically making hydrogen from natural gas. We believe the proposed language should apply only to the portion of hydrogen produced using fossil gas, and further should not apply to hydrogen produced in systems where renewable LPGs are directly delivered to an onsite SMR in monthly or quarterly quantities sufficient to meet demand. These clarifications and other finer points would undoubtedly benefit from further stakeholder input on this provision; as such, we respectfully request that CARB withdraw this proposed change and take it up again in a future rulemaking.

CARB Should Expand the Geographic ILUC Region for Soy

235.16

CARB has proposed changes to Table 6 – Land Use Change Values for Use in CI Determination, to clarify the applicability of existing ILUC scores to the feedstock growing region(s) that they cover and provide a process for assigning or developing ILUC scores for other regions. While MRL generally is satisfied with these clarifications, we believe it would be appropriate for CARB to recognize the growing region covered by the ILUC for soy as “North America” rather than the “United States”. This modest change is both conservatively representative and may help avoid potential supply disruptions in soy feedstock markets.

* * *

Thank you for considering these comments. We look forward to engaging further with CARB staff on this rulemaking and in the future. Please do not hesitate to contact us with any questions.

Regards,



Greg Staiti
Compliance Director, MRL



August 27, 2024

Rajinder Sahota Deputy Executive Officer –
Climate Change and Research
California Air Resources Board
1001 I Street Sacramento, CA 95814
Via electronic submission

RE: 15-Day Changes to CARB’s LCFS Proposed Amendment

Ms Sahota:

I am writing on behalf of Nuseed, Americas and our general support of the Air Resources Board’s 15 day amendment package to the LCFS published August 12th.

Nuseed is a global agriculture innovator enabling the transformation of select crops into renewable and traceable sources of lower-carbon energy, and plant-based nutrition. Nuseed’s proprietary solutions like our Omega-3 canola and our Carinata product contribute to solving global challenges like food security, human nutrition, and climate change. Nuseed empowers growers and end-use customers to rapidly scale today to meet current and emerging demand for generations to come.

Established in 2006, Nuseed, with more than 400 employees, and sales in more than 30 countries, has multiple locations across North America, including regional offices in California and Alberta, as well as offices worldwide in South America, Europe and Australia. Nuseed is the seed technologies platform of Nufarm Limited (ASX:NUF).

Modifications to Section 95482

236.1 We note the elimination of aviation fuel as a deficit generator and applaud its continuation as an opt-in fuel. The Sustainable Aviation Fuel (SAF) market is still nascent and needs time to develop both supply chains and distribution chains. Allowing airlines operating within California to leverage the LCFS system will reward their climate mitigation efforts while continuing to minimize societal cost associated with achieving program goals.

236.2 We would recommend that ARB – in conjunction with other relevant state agencies – review the state of the SAF marketplace and issue a report of its findings prior to the next scoping plan update so that the scoping plan process will best reflect and include the emission reduction opportunities available in this critical area.

Modifications to Section 95483

236.3 The inclusion of a proposed cap on lipid-based crops is controversial and a dramatic change from what was proposed within the 45 day package of amendments; it has caused significant controversy and is likely to lead to litigation. We are concerned that its inclusion may ultimately delay Board consideration, thus causing further interruption in adoption of the LCFS amendment package.

Above all, Nuseed supports CARB’s efforts to develop and enact regulation that leverages market forces to incentivize (and disincentivize) technologies and practices based on their merits and the application of sound science and hard data. CARB should steer clear of picking winners or losers based on crop

236.3
cont. designation or species, but rather should focus on clearly measurable and demonstrable attributes that reflect performance with respect to carbon intensity. Only in this way can we ensure that all technologies and feedstocks have the opportunity to compete with one another on a level playing field, with their respective agronomic and sustainability performance forming the basis of their relative positions in the LCFS market. In addition to ensuring a fair market, such an approach also supports and stimulates innovation in plant genetics as well as in new cropping systems that are climate-friendly and food & feed positive.

236.4 It should also be considered that to call out and limit specific crop types from participation in the California market can have unintended consequences that may not yet be fully understood. For example, an artificial regulatory mandate (i.e., not market-driven) that impacts the soybean price matrix could have implications on animal protein and food costs. Such manipulation of the supply-demand balance could

236.5 also result in increased use of such questionable feedstocks as imported used cooking oil (UCO), with uncertain origins and sustainability attributes that threaten to undermine the intentions of the LCFS.

236.6 Similar knock-on effects would impact demand and consumption effects across the range of liquid fuels under the LCFS, including those most promising such as renewable diesel.

Modifications to Section 95484

236.7 We wholeheartedly support the proposal to modify both near-term and post-2030 stringency of the LCFS carbon intensity benchmarks. Like other environmental commodity markets such as the EU ETS and California's own cap-and-trade scheme, the LCFS has demonstrated over time a clear ability to find equilibrium with appropriate aggressive targets. Recent and repeated over-compliance and credit price decline is a clear indicator that continued growth in low-carbon fuels warrants increased stringency to bring deficits and credits back into balance at a stable price level.

Carbon intensity benchmarks are fundamental to the design of market-based programs like the LCFS. It's important to note that LCFS credit prices have fallen significantly below their 2020 peak and are now roughly on par with 2016 pricing in large part to over-compliance. As CARB has noted, a robust credit market is critical in offsetting costs and driving compliance in later years. As previously demonstrated, the change in stringency can be managed by the value chain while delivering Californians the low carbon fuels they demand.

Modifications to Section 95488 – 95488.3

236.8 In subsection 95488(d), staff proposes to give the Executive Officer discretion to stop accepting applications for new fuel pathways for biomass-based diesel starting January 1, 2031. Simply put, this is wrong-headed and does not reflect science and is ultimately unnecessary.

Limiting applications for new pathways will terminate any development of either new feedstocks or sustainable farming practices. It sends absolutely the wrong signal and is, in effect, backtracking on California's leadership role in setting climate policy. No similar provisions exist in any other state with Clean Fuel Standards nor is there a counterpart in the EU.

CARB's own projections indicate legacy combustion engines will persist well beyond 2031. As the provision alludes, biofuels will play a roll beyond that time as well. This measure would lock in biofuel CIs to legacy feedstocks potentially depriving California of lower CI alternatives. The tenets of AB 32 envisioned a technology neutral approach, while climate needs have changed and CARB has evolved to

236.8 cont. supporting ZEV's, at no time has policy retrenched to prevent science based and documented and verified alternatives from entering the market.

The Board should remove this section from the final adopted package.

236.9 On the other hand, in subsection 95488.1(d)(4), we strongly support the proposal to add "alcohol to hydrocarbons" to the illustrative list of drop in fuels, in order to clarify that drop in fuels include hydrocarbon fuels (e.g., sustainable aviation fuel (SAF)) derived from alcohols. A robust SAF market is absolutely critical to decarbonize aviation. Adding additional sources of SAF beyond lipids is prudent and smart policy.

236.10 We do note, with some irony, that CARB may create a catch-22 by limiting certain crop-based lipids (based in part based on concerns over the impacts to food production and ILUC as voiced by Board members Balmes and Sperling – see Board minutes Fall 2022 into Spring 2023) while opening the flood gates of corn and sugar production for alcohol to hydrocarbons.

236.11 Staff proposes to add specification of the geographic region to Table 6 in section 95488.3(d) identifying where land use change (LUC) carbon intensity was modeled for specific feedstock/fuel combinations. We support the use of geographic specific data in this regard.

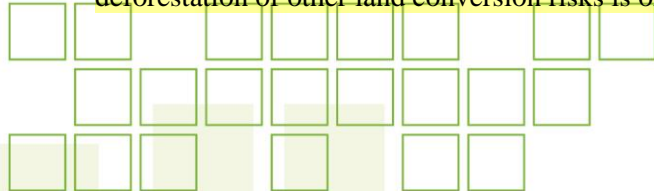
236.12 In doing so, staff propose vesting with the Executive Officer (EO) the ability to make determinations that no value in Table 6 is conservatively representative of a particular region/feedstock/fuel combination and assign a more conservative LUC value. The EO is directed to use empirical evidence including but not limited to satellite-based remote sensing data for land cover monitoring, crop yields, and emission factors from the AEZ-EF model or carbon stock datasets in making the determination.

While we agree with the spirit of the proposal – protect carbon sinks, to introduce conservative assumptions could limit introduction and use of new feedstocks and cropping systems for which robust datasets are limited or do not yet exist. To paraphrase Sherlock Holmes, data, data, data.

Rather than a piecemeal and clearly "one-way" approach to addressing LUC, the Board should forgo this provision and direct staff to comprehensively review and update LUC data to reflect current farming and land-use practices this decade and to develop a broad update of not only the GTAP model, but the underlying assumptions as well. Further, the Board should require periodic updates in between changes to the Scoping Plan.

Modifications to Section 95488.9

236.13 We wholeheartedly support the phase in of Sustainability Requirements for Biomass. Nuseed has been working with international certification bodies for several years and is confident of our data and verification schemes. As with many other companies and participants in the global value chain for sustainable renewable fuels, the experience gained over the last several years has been driven in large part by European Union rules. Thus, we encourage careful examination of these rules and a consistent application of standards where appropriate. The 2008 cut-off date for the purposes of demonstrating no deforestation of other land conversion risks is one example.



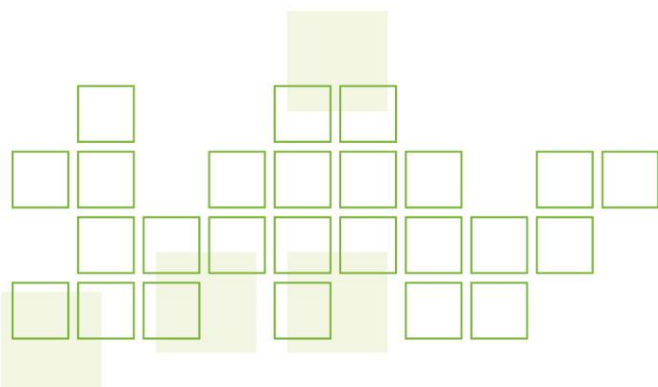
236.14 We also support the concepts behind using best environmental management practices that reduce GHG emissions or increase GHG sequestration. However, CARB lists just four vague “practices” as meeting sustainability certification requirements (those that maintain or enhance biodiversity habitat on agricultural or forested lands; those that enhance soil fertility and avoid erosion or compaction; those that apply fertilizers in a manner that minimizes runoff, and soil and water contamination; and those that reduce unsustainable water use, and minimize diffuse and localized pollution from chemical residues). This short section of the regulation will undoubtedly be the target of much attention, and the interpretation of these words are critical to the success or failure of new innovative feedstocks and agricultural practices.

236.15 Staff missed a major opportunity to recognize and reference a *plethora* of conservation and sustainability programs and practices already available globally and for which clear definitions exist. For example, clear reference can be made to practices that are known to achieve these environmental results, such as the usage of intermediate crops, adoption of reduced- or no-till practices, and the avoidance of certain chemical applications. Further detail can also be included to specify the performance levels that constitute “sustainable” practice across the board. A clear example are the words “reduce unsustainable water use.”

To leave the definition of what qualifies as sustainable water use up to the verification bodies alone will contribute to a lack of standardization across the LCFS program, and ultimately lead to more and less stringent verifiers rather than consistency. CARB should seek to avoid implementing policy that will encourage such “verifier-shopping.” Worse, the amendment contains, “but not limited to” language without addressing a process by which other practices can be identified, quantified and deployed.

236.16 The approach in this section is clearly a stick – the value chain must do these things or the feedstock won’t qualify. If the goal is to achieve lower CI fuels for Californians, the same approach that rewards things like innovative production, solar, wind and geothermal process energy, carbon capture and sequestration, development of infrastructure (in the case of ZEVs), then CARB should recognize the positive impact climate smart sustainable farming practices have and reward them through lower CIs and participation in credit generation.

236.17 As staff should know, the current administration has been a strong proponent of climate smart agriculture and is expanding the role it plays within the USDA and for farmers. In no way should CARB limit the ability of the federal government to develop its own data driven certification regimes based on US developed plans and criteria. We recommend eliminating the 2025 limitation and allow for the US federal government to develop its own certification regimes eligible for the LCFS. Waiting to refine this section until the next update will artificially handcuff the system and overwhelm the accreditation regimes in place.

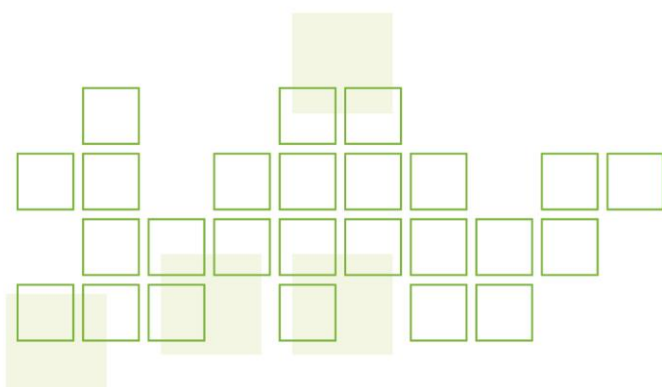




Thank you for the opportunity to provide comments. We recognize the significant amount of time, energy and effort by all in developing the proposed changes to the LCFS program.

Sincerely,

Scott R. Hedderich
North America Policy and Government Affairs Director





August 27, 2024

Clerks' Office
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Subject: Comments on the California Air Resources Board's August 12, 2024, Proposed Amendments to the Low Carbon Fuel Standard

Dear Chair Randolph and Honorable Members of the Board:

Southern California Gas Company (SoCalGas) and San Diego Gas & Electric Company (SDG&E), jointly referred to as the "Sempra California Utilities," appreciate the opportunity to provide comments on the California Air Resources Board's (CARB) August 12, 2024, Proposed 15-Day Amendments to the Low Carbon Fuel Standard (LCFS). This program has significantly reduced greenhouse gas emissions (GHGs) and air pollution and is a cornerstone of California's ambitious goal to achieve carbon neutrality by 2045.

The Sempra California Utilities believe that LCFS policy should continue to build upon the important efforts it has made in establishing clean fuels as critical resources that can enable GHG reductions in the transportation sector. The Sempra California Utilities request that CARB consider extending these learnings, innovations, and processes into an equally potent transition for the industrial sector. Our comments highlight the following: 1) CARB should establish an Industrial Clean Fuels Standard to advance clean fuel use in the industrial sector; 2) The proposed reduction in maximum avoided methane emissions crediting periods is premature and may harm the viability of existing projects; 3) Biomethane used in natural gas vehicles should continue to earn credits to support legacy vehicles beyond 2040; 4) CARB should clarify how an entity can demonstrate the deliverability requirements within section 95488.8(i)(2)(B); 5) Book-and-Claim (B&C) accounting provisions for biomethane should include biomethane used to produce onsite electricity for battery electric vehicle (BEV) charging; and 6) Regulatory uncertainty dampens investor confidence and should be minimized.

I. CARB should establish an Industrial Clean Fuels Standard to advance clean fuel use in the industrial sector.

237.7

Since its inception, the LCFS has provided credits for low carbon fuels that would not have been viable based on market competition with long-established fossil fuels. As CARB noted in a presentation this year to the Environmental Justice Advisory Committee, LCFS has driven a 12.6% reduction in the carbon intensity of California's transportation fuels, displaced 25 billion gallons of petroleum fuels, and replaced 60% of California's fossil diesel fuel with biomass-based diesel.¹ While RNG made up 5.1% of all on-road alternative fuels dispensed by volume, it generated 19.2% of all carbon dioxide equivalent (CO₂e) emission reductions of on-road alternative fuels reported under the California LCFS in 2023.² If CARB applies its proven methodology beyond the transportation sector to industrial fuel uses, it will have an even greater impact.

Natural gas plays a critical role in powering the foundations of our state's economy. Process heat accounts for about 85% of industrial natural gas use in California. Typical industrial process heating equipment includes boilers, furnaces, and evaporators, which produce heat via natural gas combustion, as well as combined systems that produce both heat and electric power. While decarbonizing some industrial process may allow for electrification, other processes are hard to electrify and will require reducing the carbon intensity of the current fuel mix via a combination of renewable natural gas (RNG), solar thermal heat, clean hydrogen, and other low carbon, zero carbon, and carbon negative fuels.³

CARB should extrapolate the success of the LCFS for mobile sources into an Industrial Clean Fuel Standard for stationary sources. This approach might take the form of a separate program or an expansion of the current LCFS program to include industrial stationary emission sources. Similar to the LCFS, such a standard could impose a decreasing emissions-based target on regulated entities, allowing the industrial sector to achieve emission reductions in a technology-neutral manner by choosing amongst various carbon reduction strategies including electrification, procuring low- and zero-carbon and carbon-negative fuels, utilizing carbon capture and sequestration, and/or improving energy efficiency. This policy regime would help fulfill the goals in CARB's 2022 Scoping Plan for the long-term deployment of biomethane for hydrogen production and its expanded use in stationary sources.⁴ Without initiating a process to develop an Industrial Clean Fuel Standard, it would be premature to place restrictive rules on the LCFS that could cause existing biomethane and other clean fuel projects to stall or to sell their fuel outside of the California market.

¹ https://ww2.arb.ca.gov/sites/default/files/2024-03/2024.3.15%20LCFS%20EJAC%20Slides_final.pdf

² California Air Resources Board, Low Carbon Fuel Standard Program Reporting Tool Quarterly. Available at: <https://ww2.arb.ca.gov/resources/documents/low-carbon-fuel-standard-reporting-tool-quarterly-summaries>.

³ California's industrial sector accounts for 33% (or 661 billion cubic feet) of the State's gas consumption, contributes 23% of the State's GHG emissions, and has the second highest emissions reduction potential for meeting the 2030 targets as set forth in SB 350.

⁴ <https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>; pg 88, 207 & 2012.

II. The proposed reduction in maximum avoided methane emissions crediting periods is premature and may harm the viability of existing projects.

237.9

In the proposed 15-day Amendments, CARB capped avoided methane crediting to 20 years with a hard stop at 2040 for biomethane used in CNG vehicles and 2045 for biomethane used to produce hydrogen or electricity. The Sempra California Utilities believe that the previous proposal of 30 years is more appropriate and requests CARB clarify the justification for this change. Currently, avoided methane crediting provides a pathway for payback on initial capital costs of methane capture projects and keeps these projects viable. Limiting avoided methane credits would financially undermine existing methane capture projects and discourage new ones. Dairy Cares states that long-term financial markets are necessary for dairy farmers to justify investing in long-term emission reduction solutions.⁵

Financing decisions and support for biomethane projects require policy certainty; markets will fail to attract new investment if regulators propose a new framework that prematurely curtails benefits for emissions reductions and deters new projects. These projects provide some of the most cost-effective investments the state is making in carbon reductions and should be strengthened, not abandoned.⁶ Given that methane capture projects can only succeed with incentives in place, CARB should not phase out credit for avoided methane emissions from biomethane before there is a viable alternative market so that California's progress on short-lived climate pollutant (SLCP) reductions is neither slowed nor reversed. Adequate support for clean transportation fuels is especially important, as we emphasized above, as those fuels could provide a pathway to truly revolutionary carbon reductions in the industrial sector. Competitive pricing and availability of supply are influenced substantially by CARB's decisions on methane reduction credit availability and will send critical signals to the market when looking to expand biomethane usage to other hard-to-abate sectors such as industry.

III. Biomethane used in natural gas vehicles should continue to earn credits to support legacy vehicles beyond 2040.

237.10

The Sempra California Utilities support the move towards zero-emission vehicles but submits that it would be unwise to set an arbitrary end date for using biomethane in natural gas vehicles under the LCFS. Section 95482(g) of the proposed regulation states that any project starting after 2029 will not be eligible to generate LCFS credits if the biomethane produced is used in a natural gas vehicle. This could immediately hinder the state's decarbonization and SLCP reduction efforts.

To reduce SLCP emissions as required by Senate Bill (SB) 1383 (Lara, 2016), new methane capture projects are needed in California. To support the goals of SB 1383, projects that break ground after 2029 need to be eligible to generate LCFS credits for selling biomethane for natural gas vehicles. Even with statewide shift to zero-emission vehicles, legacy natural gas vehicles, will remain on the road beyond 2040. If section 95482(g) is not removed, an unfortunate and unintended consequence

⁵ Dairy Cares Comments on May 31 and June 1, 2023 Low Carbon Fuel Standard Virtual Community Meeting. https://ww2.arb.ca.gov/system/files/webform/public_comments/4026/230614%20Dairy%20Cares%20Comments%20on%20LCFS%20Virtual%20Community%20Meetings%20%2800607595xBA8E1%29.pdf

⁶ <https://ww2.arb.ca.gov/sites/default/files/2020-11/dsg2-final-recs-112618.pdf>

237.10 cont. might be that some natural gas vehicle operators would revert to using fossil fuels after 2040 for their legacy vehicles, thereby negating the LCFS program’s goals.

The LCFS should allow biomethane to generate credits regardless of the vehicle type using the fuel, as long as the vehicle type does not affect the fuel’s carbon intensity. Therefore, CARB should eliminate section 95482(g) from the proposed regulation to permit the use of biomethane in natural gas vehicles as long as they remain on the road.

IV. CARB should clarify how an entity can demonstrate the deliverability requirements within section 95488.8(i)(2)(B).

According to section 95488.8(i)(2)(B), projects commencing after December 31, 2029, must verify that injection occurs in a pipeline that flows toward California at least 50% of the time on an annual basis. However, this requirement necessitates further clarification, as it remains unclear how an entity is expected to demonstrate physical flow and whether this verification must occur annually. Given the variability of gas flow driven by supply and demand, an annual verification could prove exceedingly challenging. Moreover, pipeline optimization is a complex process that relies on computer automation to efficiently meet demands while minimizing fuel usage. Therefore, imposing a 50% delivery requirement to California risks destabilizing the overall system by mandating flow to the state.

Additionally, in the proposed 15-day amendments, CARB indicated that the Executive Officer may approve a gas system map to facilitate the implementation of deliverability requirements. However, it is still ambiguous how the reporting entity is expected to utilize this map—based on directional flow data from 2020 to 2023—for projects that have yet to be developed.

Given these uncertainties, Sempra California Utilities seeks clarification on these issues and would appreciate a specific discussion on how CARB envisions these qualifications being met prior to any modifications to the B&C provisions. Furthermore, considering the current nascent conditions of the RNG market in California, where most RNG is sourced from out-of-state, requiring delivery to California would incur additional costs associated with scheduling gas delivery. This, in turn, could undermine the value that presently benefits customers using RNG as their transportation fuel.

V. Book-and-Claim accounting provisions for biomethane should include biomethane used to produce onsite electricity for BEV charging.

Biomethane can efficiently produce onsite electricity for BEV charging, aiding California’s ambitious zero-emission vehicle targets and supporting vehicle electrification⁷. Electrifying fleets according to CARB regulations can be challenging, primarily due to the significant capacity and energy demands of developing charging infrastructure for medium- and heavy-duty (MHD) vehicles. Given the high energy requirements of industrial MHD charging on limited spaces, microgrid technologies like fuel cells and linear generators are solutions that can meet these needs. These technologies can provide

⁷ <https://www.prologis.com/insights/success-stories/north-americas-largest-heavy-duty-ev-charging-hub-powered-microgrid>

237.13
cont.

reliable and resilient energy and augment grid power needed to meet the demands of electrifying fleets, thereby enabling the transition. Their beneficial operational attributes and capabilities can support the State's electrification efforts by addressing barriers to and benefits for electrification while supporting decarbonization and affordability impacts.

Facing several year delays for grid interconnections, companies are turning to onsite generation with energy storage as a way to meet fleet electrification goals before utility connections are established.⁸ This approach also provides added reliability and resilience capabilities for fleet operations when the utility connection is eventually made. Moreover, using renewable fuels, such as dairy biomethane and renewable hydrogen, would enhance project benefits. However, current LCFS rules allow B&C accounting for biomethane used in compressed natural gas trucks or hydrogen for fuel cell vehicles, but not for biomethane used to generate electricity onsite for BEV use. This restriction limits the broader adoption of innovative strategies like microgrids using fuel cell and linear generator technologies to accelerate BEV deployment and charging in MHD fleets. As such, B&C accounting provisions for biomethane should include biomethane used to produce onsite electricity for BEV charging.

VI. Regulatory uncertainty dampens investor confidence and should be minimized.

237.14

Regulatory uncertainty remains one of the most significant factors influencing investor decisions and cannot be overlooked by policymakers. While the requirements in section 95488.9(g) are limited to biomass, they should be modified to explicitly *exclude* other RNG feedstocks. Without such clarification, investors may perceive the language as yet another layer of uncertainty (in the event that similar provisions might be proposed for other RNG feedstocks in the near future). Imposing additional scrutiny on how facilities qualify their feedstocks not only hinders the growth of California's RNG market but also raises the cost of in-state RNG production compared to out-of-state alternatives.

Conclusion

The Sempra California Utilities appreciate the opportunity to provide comments and participate as a stakeholder regarding amendments to LCFS. We are committed to a decarbonized energy system that is affordable for all Californians. We look forward to continued engagement in CARB's regulatory process.

Respectfully,

/s/ Kevin Barker

Kevin Barker
Senior Manager
Energy and Environmental Policy
SoCalGas

/s/ Sarah M. Taheri

Sarah M. Taheri
Regulatory Affairs Manager
SDG&E

⁸ Ibid.



California Air Resources Board

Docket No. LCFS2024

RE: Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information for the Proposed Low Carbon Fuel Standard Amendments

August 27, 2024

To Whom it May Concern:

We write on behalf of Landus in response to the California Air Resource Board's (CARB) notice of modified text and additional documents for the proposed Low Carbon Fuel Standard (LCFS) amendments. Landus is a \$3 Billion farmer-owned cooperative touching 34 states and 16 countries, serving over 5,500 farmer-owners and their families, including those in the most rural areas of the Midwest. Our mission is to lead the way in innovation and sustainability, ensuring that our farmers have access to the best resources and technologies available.

238.1

We commend CARB for its ongoing efforts to drive the decarbonization through the LCFS program. This initiative has been pivotal in encouraging significant investments across the value chain, aiding California in its pursuit of emissions reduction goals, and spurring other states and regions to explore similar policies to drive down emissions.

238.2

However, we have significant reservations about the proposed 20% cap on soy and canola oil in the latest regulatory text. We believe these changes contradict the program's design and objectives, undermine the broader US renewable fuels market, reduce synergies between California's and other US state and federal policies, and harm American farmers while increasing California's reliance on imported foreign feedstocks. Given these concerns, Landus Cooperative urges CARB to reconsider this proposal.

Cap Will Contradict Goals of the LCFS

Currently there is a diverse mix of oils, fats, and other feedstocks being used to supply the low-carbon fuel demands of the LCFS program. A cap on the use of soybean oil and canola oil as feedstocks for biomass-based diesel removes a viable clean and renewable alternative for these fossil gallons. Currently, soybean and canola oil constitute 31% of reported biomass-based diesel feedstock, well above the proposed 20% threshold. Given the short implementation timeline and limited supply of other waste feedstocks, the only viable option to replace gallons currently made from these two feedstocks will be conventional diesel - moving the LCFS program backwards, not forwards.

Cap Will Slow Buildout of Sustainable Production

238.2
cont.

With grain markets falling and farm incomes at new record lows, many farmers and agribusinesses had looked to the expansion of biofuel markets as the bright spot to rebound the American agricultural economy. There have been significant investments made on farms with deployment of sustainable agriculture practices, and substantial developments of new processing assets to help bring those low-carbon products into the value-added marketplace. This cap will stifle those investments in expanded sustainable manufacturing and further suppress the financial viability of the American farmer and rural communities like those where we do business.

Cap Will Prioritize Foreign Feedstocks over Sustainable American Production

238.3

The program as currently structured will drive processors to utilize a larger percentage of waste feedstocks, and we've seen that reflected in the influx of used cooking oil and tallow imports into the U.S. in the last 12-18 months, much of that from China and South America respectively.

238.4

The same products that have been the subject of significant scrutiny on questionable authenticity as was reflected in the recent investigation opened by the US EPA. The proposed cap will only further expand these imports and disparately favor foreign waste products over oils sourced from sustainable and traceable crops grown here by U.S. farmers on U.S. farms and manufactured by U.S. processors.

Landus appreciates the opportunity to comment on this proposal and trusts the board will consider these issues earnestly, allowing us to continue supporting the transition from fossil fuels to renewable fuels across the country. If staff has any questions, please feel free to reach out to me at Elizabeth.Thompson@landus.ag

Sincerely,

Elizabeth Burns-Thompson
Vice President, External Affairs

Comment Log Display

Here is the comment you selected to display.

Comment 239 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name Charles

Last Name Davidson

Email charlesdavidson@me.com

Address

Affiliation Sunflower Alliance

Subject Concerns Regarding CARB's LCFS Policies on Renewable Diesel and SAF and the 20% Cap

Comment

Subject: Concerns Regarding CARB's LCFS Policies on Renewable Diesel and Sustainable Aviation Fuel and the 20% Cap

Dear CARB Executive Officer,

Although the California Air Resources Board's (CARB's) Low Carbon Fuel Standard (LCFS) amendments are moving in the right direction, I am writing to express my concern regarding the potential limits of the stringency and environmental effectiveness of "20% cap" amended policy on renewable diesel when using virgin food oils, such as soybean and canola oil feedstock.

The following are my specific points on the 20% cap, that is followed in the postscript to this letter containing excerpts from my Tier 2 Comments to CARB:

- The proposed 20% cap even for a single California refiner, raises significant concerns, regarding whether this cap applies to individual refineries or across multiple facilities operated by the same company. If it applies company-wide, this could allow companies with multiple refineries in California to effectively double their use of virgin food oils, leading to a substantial increase in the one company's use of soy or canola oils for renewable diesel production.
- CARB's 20% cap on virgin food oils is not considering the possibility that despite a potential future cap at the two existing California renewable diesel refineries, there could be an overall increase in the total statewide growth of renewable diesel production using soy and canola oil, because renewable diesel can

be produced 15 major petroleum refineries in California, not merely two, as currently.

- The "per company" 20% cap on virgin soy and canola oil feedstock for renewable diesel production does not account for the same refinery's (potential) simultaneous production of Sustainable Aviation Fuel (SAF) using the same soy and canola oil feedstock, thus increasing the refinery's total cumulative use of food-based feedstocks.
- The 20% cap does not place any pressure (or requirement) on the refineries to substitute any portion of their existing fossil fuel-produced hydrogen with green hydrogen (made, instead, using solar-powered hydrolysis).
- The arbitrary 20% cap does not take into account the actual embedded CO₂ in the farm-to-wheel lifecycle of renewable diesel (or SAF) produced from virgin food oil versus renewable diesel (or SAF) produced from waste food oils, fats and greases.
- The 20% cap amendment for soy and canola oil feedstock is not applicable for companies already certified before the amendment takes effect (and where more than 20% of their reported biodiesel and renewable diesel in 2023 was already derived from virgin soybean or canola oil), the new provision would take effect on January 1, 2028, to allow time for feedstock supply contracts to be adjusted.
- The Environmental Impact Report for the world's two largest renewable diesel projects revealed that the refineries availability of high-GHG natural gas-derived hydrogen is more rate limiting than

the availability of the virgin food oil stock itself.

- California already uses 47% of all soy grown for biodiesel and renewable diesel, combined, while waste lipid feedstock supplies are expected to be constrained, indefinitely, so that the amount of total virgin food oil used will be larger than waste food oils. (Soybean oil rapidly gaining ground as renewable diesel feedstock. Successful Farming. Chuck Abbot (2023)
<https://www.agriculture.com/soybean-oil-rapidly-gaining-ground-as-renewable-diesel-feedstock-84>

Thank you for considering my concerns.

Sincerely,

Charles Davidson

Hercules, CA

charlesdavidson@me.com

PS: ATTACHED:

See attachment for Post Script for accompanying Tier 2 Comments on the LCFS regarding renewable diesel (that are relevant to my comments on the proposed LCFS amendments):

The Unsustainability of Virgin Food Oil-Based Renewable Diesel Biofuels: Questions for the California Air Resources Board. Charles Davidson. (6/2024) charlesdavidson@me.com

Introduction...

Original File Name	Concerns Regarding CARB's LCFS Policies Renewable Diesel and Sustainable Aviation Fuel and the 20% Cap Amendment Dear CARB Executive Officer *** %22%22.docx
Date and Time	2024-08-27 21:05:05
Comment Was Submitted	

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)

Subject: Concerns Regarding CARB's LCFS Policies on Renewable Diesel and Sustainable Aviation Fuel and the 20% Cap

Dear CARB Executive Officer,

239.1 Although the California Air Resources Board's (CARB's) Low Carbon Fuel Standard (LCFS) amendments are moving in the right direction, I am writing to express my concern regarding the potential limits of the stringency and environmental effectiveness of "20% cap" amended policy on renewable diesel when using virgin food oils, such as soybean and canola oil feedstock.

The following are my specific points on the 20% cap, that is followed in the postscript to this letter containing excerpts from my Tier 2 Comments to CARB:

- 239.2 • The proposed 20% cap even for a single California refiner, raises significant concerns, regarding whether this cap applies to individual refineries or across multiple facilities operated by the same company. If it applies company-wide, this could allow companies with multiple refineries in California to effectively double their use of virgin food oils, leading to a substantial increase in the one company's use of soy or canola oils for renewable diesel production.
- 239.3 • CARB's 20% cap on virgin food oils is not considering the possibility that despite a potential future cap at the two existing California renewable diesel refineries, there could be an overall increase in the total statewide growth of renewable diesel production using soy and canola oil, because renewable diesel can be produced 15 major petroleum refineries in California, not merely two, as currently.
- 239.4 • The "per company" 20% cap on virgin soy and canola oil feedstock for renewable diesel production does not account for the same refinery's (potential) simultaneous production of Sustainable Aviation Fuel (SAF) using the same soy and canola oil feedstock, thus increasing the refinery's total cumulative use of food-based feedstocks.
- 239.5 • The 20% cap does not place any pressure (or requirement) on the refineries to substitute any portion of their existing fossil fuel-produced hydrogen with green hydrogen (made, instead, using solar-powered hydrolysis).
- 239.6 • The arbitrary 20% cap does not take into account the actual embedded CO₂ in the farm-to-wheel lifecycle of renewable diesel (or SAF) produced from virgin food oil versus renewable diesel (or SAF) produced from waste food oils, fats and greases.
- 239.7 • The 20% cap amendment for soy and canola oil feedstock is not applicable for companies already certified before the amendment takes effect (and where more than 20% of their reported biodiesel and renewable diesel in 2023 was already derived from virgin soybean or canola oil), the new provision would take effect on January 1, 2028, to allow time for feedstock supply contracts to be adjusted.
- 239.8 • The Environmental Impact Report for the world's two largest renewable diesel projects revealed that the refineries availability of high-GHG natural gas-derived hydrogen is more rate limiting than the availability of the virgin food oil stock itself.

239.9

- California already uses 47% of all soy grown for biodiesel and renewable diesel, combined, while waste lipid feedstock supplies are expected to be constrained, indefinitely, so that the amount of total virgin food oil used will be larger than waste food oils. (Soybean oil rapidly gaining ground as renewable diesel feedstock. Successful Farming. Chuck Abbot (2023) <https://www.agriculture.com/soybean-oil-rapidly-gaining-ground-as-renewable-diesel-feedstock-8419071>)

Thank you for considering my concerns.

Sincerely,
Charles Davidson
Hercules, CA
charlesdavidson@me.com

PS: My Tier 2 LCFS public comments to CARB are relevant to my comments on the proposed LCFS amendments:

The Unsustainability of Virgin Food Oil-Based Renewable Diesel Biofuels: Questions for the California Air Resources Board. Charles Davidson. (6/2024) charlesdavidson@me.com

Introduction

239.10

The California Air Resources Board's approach to renewable diesel biofuels, particularly those made from virgin food oils, is fundamentally flawed. CARB's carbon neutrality claim for tailpipe CO2 emissions arbitrarily eliminates three-quarters of the full lifecycle emissions of these biofuels from regulatory consideration. This profound greenhouse gas accounting ledger exclusion, for the *renewable diesel tailpipe CO2 emissions exemption allowance*, artificially lowers its *regulatable* GHG footprint, while masking its true environmental impact.

239.11

Additionally, CARB markedly underreports renewable diesel's refinery-level *per barrel* hydrogen requirements and per barrel CO2 GHG emissions, as clearly evidenced by the Contra Costa County Environmental Impact Report data, published after CARB approval.

239.12

CARB's renewable diesel policy over-relies on virgin food oils and raises severe sustainability and food security concerns, given the high demand for limited waste oil feedstocks and the low per-acre yield of oil from food-based crops, like soybean oil (4).

These issues necessitate a thorough reevaluation of CARB's policies to ensure that subsidies and incentives are reserved for truly sustainable biofuel feedstocks, such as waste-based oils, that provide genuine long-term environmental benefits.

Conclusion:

239.13 If CARB established a new biofuel policy that eliminated renewable diesel's *tailpipe CO2 emissions exemption allowance* and also accurately accounted for *refinery-level per barrel CO2 GHG emissions*, the refineries would *lose LCFS accreditation* for making virgin food oil-sourced renewable diesel.

Analysis of CARB's Policy on Renewable Diesel Biofuels

239.14 CARB's Stance on Carbon Neutrality: CARB asserts that "the tailpipe CO2 emitted from vehicles during biofuel combustion is considered carbon neutral, in accordance with IPCC and U.S. EPA GHG inventory guidelines, as the carbon released was uptaken from the atmosphere within a short timeframe by the plant that produced the oil". (1)

In this case, CARB's cyclic net zero policy overlooks the significant carbon sequestration potential of natural landscapes while hiding the true environmental impact of virgin food-based renewable diesel (when production is expanded globally to merely serve the California fuels market). While petroleum extraction has huge problems of high-GHG flaring events and unregulated methane leakage, in addition to abandoned wells, taking farmland out of food production or removing a forest that had been a carbon sink is not a cost-effective or efficient method to reduce transportation CO2 GHGs. According to Statas Advisors in 2022, the amount of CARB LCFS credits combined with Federal credits is \$3.32 per gallon subsidization. (5)

239.15 What other options are available to reduce transportation GHGs and limit the expansion of food-to-fuels conversion process. Electrification of trains and the heavy-duty trucking fleet. Or, 239.16 subsidize green hydrogen production and research that is used in making renewable diesel or 239.17 SAF, by employing solar-powered hydrolysis. Or, by subsidizing algal biofuels production and 239.18 research. More aggressive monitoring and regulation of gas field methane leakage.

239.19 CARB's current policy, based on 1995 IPCC guidelines, posits that "CO2 emissions from biofuel combustion should not be counted in the transportation sector's greenhouse gas inventory to avoid "double counting" since it is already accounted for in the Agriculture, Forestry, and Other Land Use (AFOLU) sector". (2)

CARB's approach to avoiding "double counting" leads to conflicting accounting methods under its current policy. This pertains to CARB's certifying virgin food oil-based renewable diesel as "carbon neutral", via the tailpipe CO2 emissions exclusion allowance (from vehicular combustion) and providing it with LCFS low-carbon subsidies.

Questions for CARB

239.20

1. **Resource Scarcity and Sustainability:** Two refineries in Contra Costa, Marathon and Phillips 66, plan to produce a total of 1.5 billion gallons of renewable diesel annually, mainly using virgin food oils such as soy, despite claims of intending to use waste oils. Considering the competitive global demand for limited waste oil feedstocks, the low oil yield from soybeans, only 57 gallons per acre per year (4) and the potential diversion of U.S. soybeans or the exploitation of virgin lands in South America, a pertinent question arises (3):

How does the California Air Resources Board (CARB) justify the certification of renewable diesel derived from virgin food oils as a low-carbon fuel eligible for substantial subsidies, despite the pressing issues of resource scarcity, food security, and sustainability concerns?

239.21

2. **Arbitrary Tailpipe CO2 Emissions Discount:** Given that tailpipe CO2 emissions account for 70-80% of the total lifecycle greenhouse gases content for both petroleum and renewable diesel, one might wonder:

How does the California Air Resources Board (CARB) justify the Low Carbon Fuel Standard's *tailpipe CO2 greenhouse gas exemption allowance* for renewable diesel produced from virgin food oils, which ideally should be reserved for waste-based feedstocks that would otherwise generate *high-GHG methane in landfills*.

239.22

3. **Inaccurate Carbon Sequestration Claims:** Consider that a mature forest can accumulate several hundred tons of carbon per acre over a century, compared to the mere yield of only 57 gallons of soybean oil per acre used for biofuel feedstock and combusted annually, but never sequestered. (5)
4. Given this (and without needing to consider the industrial-scale application of fertilizers and petrochemical herbicides needed for growing genetically-modified refinery soybean oil feedstock) one must question:

How does the California Air Resources Board (CARB) justify the "75%" *carte blanche* tailpipe CO2 emissions exemption allowance for renewable diesel, in light of the fact that while there is marginal carbon sequestration on an annual basis, over an entire century, soybean cultivation for biofuels results in absolutely no carbon sequestration (as forested lands)?

239.23

5. **CARB's Misplaced Priority:** CARB's heavily subsidized support for using virgin food oils as feedstock for renewable diesel overlooks the key advantage of subsidizing the conversion of waste oils to renewable diesel: the elimination of high-GHG landfill methane emissions. Therefore, one might ask:

239.23 cont.

How does CARB reconcile its subsidy allocation for renewable diesel derived from virgin food oils, considering there is no landfill methane diversion benefit as there is with waste oil?

239.24

- 6 **Renewable Diesel Refinery Emissions and Higher Per Barrel Carbon Intensity:** The Environmental Impact Reports (EIRs) for the Contra Costa County refineries' shift to renewable diesel production reveal that the process nearly doubles the hydrogen requirements and CO2 greenhouse gas emissions per barrel compared to the two refineries' traditional heavy petroleum diesel. Given this information:

How does CARB justify disregarding renewable diesel's substantial increase in *refinery-level* per barrel hydrogen needs and *per barrel* carbon intensity, compared to during the refineries' previous petroleum refining operations?

REFERENCES:

- 1) 1) **CARB. LCFS (Basics-notes).** p.19. <https://ww2.arb.ca.gov/sites/default/files/2020-09/basics-notes.pdf>
- 2) 2) CHAPTER 2 STATIONARY COMBUSTION 2.3.3.4 **2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories** 2.1CHAPTER 2 STATIONARY COMBUSTION Volume 2: Energy 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories Authors Amit Garg (India) and Melissa M. Weitz (USA) <https://www.ipcc.ch/report/2019-refinement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/>
- 3) Overcapacity Looms as More and More US Refiners Enter Renewable Diesel Market. Stratas Advisors. (June 11, 2020) <https://stratasadvisors.com/Insights/2020/06112020LCFS-RD-Investment>
- 4) **A Cap on Vegetable Oil-Based Fuels Will Stabilize and Strengthen California's Low Carbon Fuel Standard.** Jeremy Martin, Senior Scientist and Director of Fuels Policy. Union of Concerned Scientists (2024). <https://blog.ucsusa.org/jeremy-martin/a-cap-on-vegetable-oil-based-fuels-will-stabilize-and-strengthen-californias-low-carbon-fuel-standard/#:~:text=A%20Cap%20on%20Vegetable%20Oil-Based%20Fuels%20Will%20Stabilize,oil%20fuels%20and%20investing%20in%20alternati,ves%20to%20combustion> [In 2022 half of the bio-based diesel consumed in the United States was consumed in California, which accounts for just 12 percent of US population and just 7 percent of the nation's overall diesel (bio-based and fossil diesel combined). The factors that concentrated half of US bio-based diesel in California are only getting stronger, as more renewable diesel production capacity comes on-line in California, and California raises the targets for the LCFS.]
- 5) Biodiesel. DIVISION OF AGRICULTURE R E S E A R C H & E X T E N S I O N University of Arkansas System Division of Agriculture, Little Rock. DR. SAMMY SADAKA, P.E., P.Eng. FSA1050-PD-3-2017RV. <https://www.uaex.uada.edu/publications/PDF/FSA-1050.pdf>
- 6) Life Cycle Greenhouse Gas Emissions of Biodiesel and Renewable Diesel Production in the United States. Hui Xu*, Longwen Ou, Yuan Li, Troy R. Hawkins, and Michael Wang

GHG Calculations Based upon the Environmental Impact Reports (EIRs) from the Phillips 66 Refineries renewable diesel projects:

The nominal total refinery CO₂ GHGs and decreased throughput from 105,000 bpd (w 120K capacity) down to 67,000 bpd for renewable diesel (Rodeo Renewed Project 55K plus, I assume, the Nustar Soybean Oil Project, 12K bpd).

Note: The Phillips 66 refinery's large per barrel increase CO₂ greenhouse gases is based upon the simultaneous 1) 99% similar total refinery CO₂ GHGs before, using petroleum and after, producing renewable diesel and 2) the large increase in fossil fuel hydrogen production and 3) a decreased feedstock throughput from 105,000 bpd (w 120K capacity) with petroleum down to 67,000 bpd for renewable diesel. (ie, The Rodeo Renewed Project 55K, plus the Nustar Soybean Oil Project, 12K bpd).

Rodeo Renewed Project Draft Environmental Impact Report County File No. CDLP20-02040
State Clearinghouse No. 2020120330 October 2021

105,000 bpd (pre-project w petroleum) / 67,000 bpd (post project)
= 1.56 = ~56% Increase in per barrel CO₂ GHGs

Table 4.8-5. Total Annual Project Operational GHG Emissions

Source	Emissions (metric tons/yr)			
	CO ₂	CH ₄	N ₂ O	CO ₂ e
Rodeo Renewed Project Emissions				
Ocean Going Vessels and Harbor Craft	26,195	0.28	1.53	26,657
Rail	8,119	0.64	0.20	8,195
Trucks	2,720	0.00	0.43	2,847
Facility Stationary Sources	1,069,772	84.51	10.79	1,075,100
Electricity	1,180	0.41	0.09	2,889
Total Operational	1,109,661	85.84	13.04	1,115,689
Air Liquide H ₂ Plant	1,031,689	--	--	1,031,689
Total Operational with Air Liquide	2,141,350	85.84	13.04	2,147,378
CEQA Impact Evaluation				
Baseline Emissions within BAAQMD	2,165,272	93.54	13.69	2,171,455
Project Minus CEQA Baseline				-24,077
Significance Threshold				10,000
Exceeds Threshold?				No
Statewide Impact Evaluation (Informational only)				
Baseline Emissions Statewide	2,345,107	112	16	2,352,284
Project Minus Statewide Baseline				-204,905

Notes: Rodeo Refinery includes emissions from Rodeo Site and Carbon Plant.

Rodeo Renewed Project Attachment B FEIR Appendix B Air Quality and GHG Emissions Technical Data

Stationary Source Table 15 Air Liquide Hydrogen Plant Emissions Summary Phillips 66 Company - San Francisco Refinery Rodeo, CA																	
CAP and GHG Emissions ^{1,2,3}				Pre-Project Emissions (tons/year)							Post-Project Emissions (tons/year)						
Scaling Method	Baseline Activity	Project Activity	Units	NO _x	SO ₂	CO	POC	PM ₁₀	PM _{2.5}	GHGs (MT)	NO _x	SO ₂	CO	POC	PM ₁₀	PM _{2.5}	GHGs (MT)
Fuel Combustion	758	987	MMBTU/hr	17	0.010	0.95	1.1	3.6	3.5	--	22	0.013	1.2	1.4	4.7	4.6	--
Hydrogen Production	93.26	120	MMSCF H2/day	--	--	--	--	--	--	801,794	--	--	--	--	--	--	1,031,689
Total				17	0.010	0.95	1.1	3.6	3.5	801,794	22	0.013	1.2	1.4	4.7	4.6	1,031,689

Stationary Source Table 13 Baseline and Post-Project TAC Emissions from Miscellaneous Project Sources Phillips 66 Company - San Francisco Refinery Rodeo, CA												
Source ID	Description	Post-Project Status	Emission Type	Baseline Throughput Rate	Units	Post-Project Throughput Rate	Units	Baseline Emissions ¹ (tons/year)	CO	POC	PM ₁₀	PM _{2.5}
11	U240 B-301 Heater	Operational	Combustion	55	MMBTU/hr	33	MMBTU/hr	11	1.3	0.29	1.2	1.6
12	U240 B-302 Heater	Operational	Combustion	16	MMBTU/hr	24	MMBTU/hr	1.8	3.8	0.42	0.34	0.46
13	U240 B-301 Heater	Operational	Combustion	125	MMBTU/hr	93	MMBTU/hr	6.9	30	0.87	2.7	3.7
45	U240 B-301 A/B Heater	Operational	Combustion	62	MMBTU/hr	24	MMBTU/hr	1.4	0.12	0.82	0.26	0.81
437	Unit 110 Hydrogen Manufacturing Unit	Operational	Hydrogen Plant	12	MMSCF/day	22	MMSCF/day	--	--	--	--	--
438	U110 H-1 Furnace (H ₂ Plant Reforming)	Operational	Combustion	140	MMBTU/hr	225	MMBTU/hr	3.6	4.1	1.3	0.15	4.6

Notes:
¹ Baseline emissions were obtained directly from the facility's 2019 BAAQMD Rule 12-15 Emissions Inventory.
² Post-project emissions were estimated using baseline throughput and emissions and post-project projected rates.

Martinez Refinery Renewable Fuels Project" Draft ENVIRONMENTAL IMPACT REPORT Vol I
State Clearinghouse No. 2021020289 OCTOBER 2021.

Increase in CO₂ per barrel at the refinery:

Pre-Project (Petroleum):

$160 * 365 / 2170$

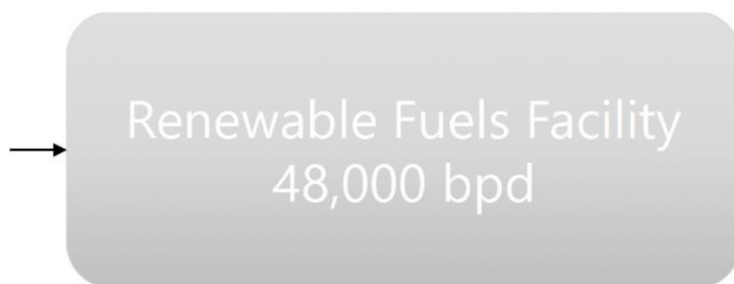
$= 26.9124423963134$

Post Project: $48 * 365 / 1145$

$= 15.3013100436681$

Post-Project per barrel CO2 GHG increase in $26.9 / 15.3$

$= 1.75 = \sim 75\%$ increase (at the refinery, per barrel of feedstock)



	Marathon Martinez	Refinery	Renewables	Delta Mtonnes/Yr
1	Capacity (mbpd)	160	48	
2	MPC GHG H2 Production (MTonnes/Yr)	448	687	239
3	AP GHG H2 Production (MTonnes/Yr)	230	275	45
4	GHG H2 Captured & Sold (MTonnes/Yr)	-56	-56	-
5	GHG All Other Combustion (MTonnes/Yr)	1547	239	-1,308
8	Total Direct GHG w/ AP (MTonnes/Yr)	2169	1145	-1,024

$\sim 60\%$ reduction in GHG as part of project

Will continue to capture & sell 56,000 MT of CO₂e

Life Cycle Greenhouse Gas Emissions of Biodiesel and Renewable Diesel Production in the United States. Hui Xu et al.

Table 3-8 Inputs and Outputs of Renewable Diesel II
Plants (lb or Btu per lb of renewable diesel II)

Inputs and Outputs

ASPEN Simulation Results as GREET Input

Inputs

Soy oil (lb)

1.174

Hydrogen (lb)

0.032

Natural gas (Btu)	84.05
Electricity (Btu)	93.83
Outputs	
Renewable diesel II (lb)	1
Propane fuel mix (Btu)	1095.5

Life Cycle Greenhouse Gas Emissions of Biodiesel and Renewable Diesel Production in the United States. Hui Xu et al.

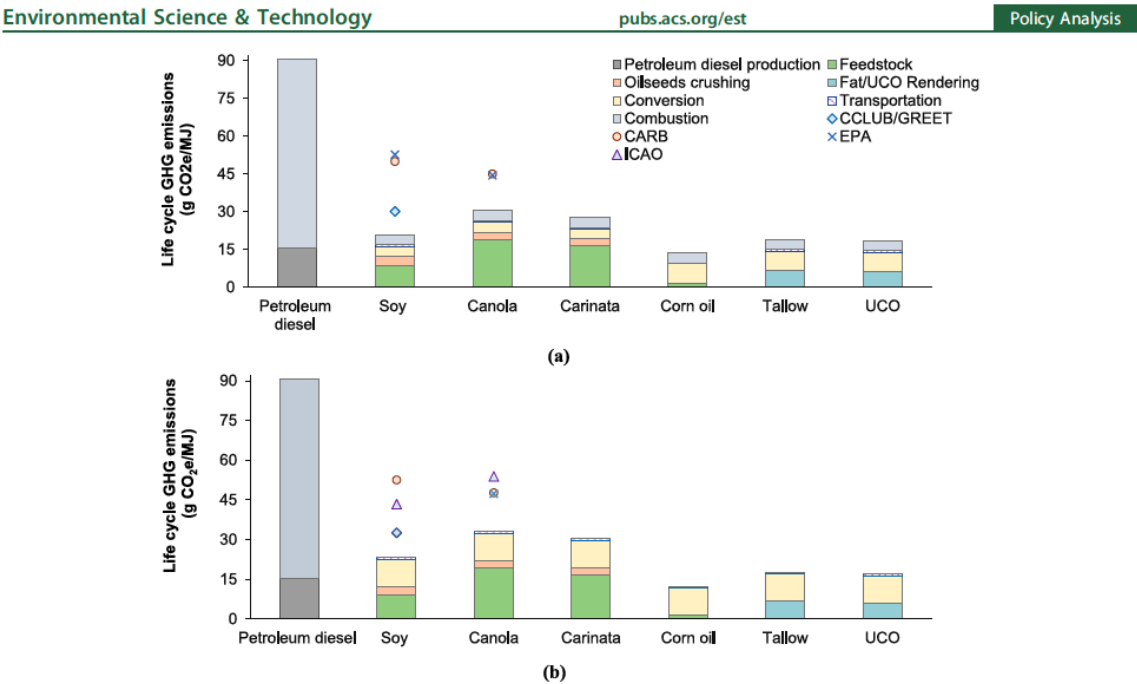


Figure 2. Life-cycle greenhouse gas (GHG) emissions of petroleum diesel versus (a) biodiesel (BD) and (b) renewable diesel (RD) pathways. Marker symbols represent life-cycle GHG emissions, including land-use change (LUC) emissions. UCO refers to used cooking oil. The rendering bar for UCO also includes UCO collection emissions. The corn oil pathway is based on distillers com oil (DCO), not edible com oil.

Biodiesel. DIVISION OF AGRICULTURE R E S E A R C H & E X T E N S I O N University of Arkansas System. Sammy Sadaka DR. SAMMY SADAKA, P.E., P.Eng., is assistant professor Extension

engineer with the University of Arkansas System Division of Agriculture, Little Rock FSA1050-PD-3-2017RV

August 27, 2024

Via electronic submittal

Chair Liane Randolph and
Members of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814
cotb@arb.ca.gov

Submitted via CARB's online Comment Submittal Form

Re: Comment on the Proposed Modifications (15-Day Changes) Low Carbon Fuel Standard Regulation

Dear Chair Randolph and Members of the Board,

Communities for a Better Environment (“CBE”) writes in opposition to the California Air Resources Board (“CARB”) proposed Low Carbon Fuel Standard (“LCFS”) modifications (15-day changes). CBE is an environmental justice organization, working with community members in East Oakland, Wilmington, Richmond, Southeast Los Angeles, and surrounding communities, which are heavily impacted by fossil fuel pollution from mobile sources, oil refineries, and drilling operations, power plants, airports, warehouses, and many other sources. This comment sets out CBE’s concerns regarding how CARB’s 15-day changes impact environmental justice communities. In particular, this letter explains that:

- 240.1 ▪ The twenty percent limit on soy and canola-based biodiesel will not correct the biofuels credit glut, thereby depressing the program, and resulting in continued pollution impacts for fence-line environmental justice communities.
- 240.2 ▪ The addition of identified regions in biofuels land use change analysis are insufficient to account for the range of imports and therefore will not reduce biofuels over crediting, which harms fence-line biofuels refinery communities.
- 240.3 ▪ Allowing biomethane book-and-claim accounting for fossil fuel-based hydrogen production perpetuates harm in environmental justice communities.
- 240.4 ▪ Removing fossil jet fuel from the program sends a bad message to polluting airlines, and the workers and communities they harm.
- 240.5 ▪ Diverting credits from utilities to Original Equipment Manufacturers will perpetuate historic barriers to access to electric vehicles and charging infrastructure for low-income communities and communities of color.

*CBE Comment on the Proposed Modifications
(15-Day Changes) to LCFS Regulation*

CBE and a broad coalition of organizations representing groups from environmental justice, environmental, labor union, and social justice organizations have been actively voicing many of the issues and suggestions raised in this letter throughout the rulemaking process. CBE is extremely concerned with the direction of these changes and the status of the rulemaking process and urgently requests that further changes and corrections are made to better align the program with the suggestions and concerns raised in this letter and throughout the rulemaking process.

I. CHANGES TO BIODIESEL CREDITING ACKNOWLEDGE PROBLEMS, BUT DO NOT PROVIDE AN ADEQUATE REMEDY.

CBE recognizes that the changes made to sections 95482(1) and 95488(d)(1) attempt to remedy the overrepresentation of renewable diesel in the program, at nearly 40% of the total program in the 2024 quarter one LCFS Reporting Tool (LRT).¹ Unfortunately, as explained at length below, the proposed twenty percent company-wide limit on canola and soy based biodiesel crediting, and Executive Officer discretionary pathway closure option are too opaque for companies to implement, for CARB to enforce, or for community stakeholders to decode. Further, these unclear and untimely changes will not correct the program's outstanding renewable diesel credit glut. Ultimately, these changes fail to correct the LCFS as it applies to biodiesel, and thereby perpetuate pollution harms to fence-line communities surrounding biofuels refineries.

To move forward in addressing biofuels' climate and health problems, CBE echoes prior ask for CARB to place a cap on credits for crop-based biofuels at 2020 levels and conduct a risk assessment of biofuel feedstocks. In lieu of the changes as they are proposed, this measure would more clearly and readily serve CARB's statutory mandate to achieve maximally technologically feasible and cost-effective emission reductions by boosting incentives for truly clean, scalable technologies including electrification. In addition, a cap at 2020 levels will be critical to begin addressing the harms of biofuel refining for fence-line communities, as well as the expansive impact of biofuels on global deforestation, and food security risks.

- a. Changes to the biodiesel rule are unclear regarding reporting, which will make them impossible to enforce in a timely manner.

The addition of subsection (i) in section 95482 introduces an unnecessarily opaque "company-wide" twenty percent credit eligibility limit that will likely lead to confusion for companies attempting to comply with the LCFS, CARB staff enforcing the LCFS, and members of the public seeking to understand the pollutants to which their communities are exposed.

The added twenty percent credit eligibility limit is applied to the "annual production reporting" of each "company" seeking to produce biodiesel and acquire biodiesel related credits. First, it is entirely unclear where the "annual production reporting" will be drawn from for new biodiesel applicants. Annual production reporting is only required once a fuel reporting entity has applied, and been accepted, thereby establishing an account in the LCFS Reporting Tool and Credit Bank and Transfer System (LRT-CBTS). Unlike the changes, the "company-wide"

¹ CAL. AIR RESOURCES BD., 2023 LCFS REPORTING TOOL (LRT) QUARTERLY DATA SUMMARY REPORT NO. 1 (2024).

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analysis required for hydrogen refueling infrastructure (HRI) is defined as “all the stations registered by an entity with a unique FEIN in the LRT-CBTS,” which is readily discernable because upon establishing an LRT CBTS account, hydrogen reporting entities are required to register all fueling supply equipment.² Unlike the HRI framework, producers of biodiesel are only required to report the volume of each specific blend stock produced per quarterly reporting period which is later compiled into an annual report.³ It is therefore unclear how CARB proposes to manage new canola and soy based biofuels applications, and delaying enforcement of a twenty percent limit for new applicants is confusing, unnecessary, and ineffective.

- b. The twenty percent company-wide credit limit on canola and soy oil-based biodiesel will not fix the credit glut, because of untimely enforcement and potential for growth.

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The twenty percent credit eligibility limit will not apply to biodiesel producers already receiving credits above twenty percent of their production until 2028. This delay in enforcement will drastically reduce the small benefit of a twenty percent limit on canola and soy-oil based biodiesel because of the existing glut of renewable diesel credits. As explored above, credits for renewable diesel represent roughly forty percent of the program, earning approximately 1.6 times more credits than the next largest creditor, electricity.⁴ Marathon Martinez and Phillips 66 Rodeo together account for a major share of the new renewable diesel capacity coming online in 2023 and 2024.⁵ The delayed enforcement timeline for already accepted biodiesel producers will prolong the subsidization of biodiesel, leaving credit prices low. Therefore, there is likely to be only a marginal change in renewable biodiesel crediting as a result of the twenty percent limit, ensuring that the LCFS program remains weighed down by renewable biodiesel credits.

CARB’s 2022 Scoping Plan includes plans for a phasedown in oil and gas refining by 2045.⁶ As oil refineries go offline following CARB’s oil and gas refining phasedown, they are likely to follow the existing trend towards biofuels production. As more refineries go offline, LCFS crediting provides motivation for refiners to bring once shuttered refineries back online for biofuels. Under CARB’s Plan there is significant potential for more companies to apply for biofuels applications, and the overall number of companies operating with a twenty percent limit for soy and canola-based biodiesel could increase the biofuels market overall. Further compounding this issue, the twenty percent limit on soy and canola-oil based biodiesel is likely to have little effect on the entire biofuels crediting market because oil refiners can easily shuffle feedstocks to produce biofuels from soy and canola oil to tallow and cooking oil. A twenty

² Cal. Air. Res. Bd., *Proposed 15-Day Changes* (Aug. 12, 2024) § 95486.2(4)(F), [hereinafter “15-Day Changes”].

³ 15-Day Changes § 95491(d) and (e).

⁴ CAL. AIR RESOURCES BD., 2023 LCFS REPORTING TOOL (LRT) QUARTERLY DATA SUMMARY REPORT NO. 1 (2024).

⁵ Phillips 66 Rodeo and Marathon Martinez have nameplate capacities of 680 and 480 million gallons per year, respectively, making them two of the largest renewable diesel producers in the state. Maria Gerveni & Scott Irwin, *Overview of the Production Capacity of U.S. Renewable Diesel Plants for 2023 and Beyond*, FARMDAILY (Mar. 29, 2023), <https://farmdaily.illinois.edu/2023/03/overview-of-the-production-capacity-of-u-s-renewable-diesel-plants-for-2023-and-beyond.html>.

⁶ *California’s 2022 Climate Change Scoping Plan Fact Sheet*, California Air Resources Board (Jun. 16, 2022), <https://ww2.arb.ca.gov/resources/fact-sheets/californias-2022-climate-change-scoping-plan-fact-sheet#:~:text=The%20Draft%202022%20Scoping%20Plan,and%20gas%20extraction%2C%20and%20refining.>

percent company-wide limit is, in other words, an insufficient long-term and short-term remedy for fixing and maintaining a steady credit price for renewable diesel.

A cap on credit subsidies for crop-based biofuels will help ensure that the glut of biofuels entering California does not slow down our transition away from combustion vehicles by diluting incentives for zero-emission technologies.⁷ For example, we know that the high volumes of biofuels expected under the LCFS will dilute incentives for investment in electrification and other real climate solutions.⁸ The twenty percent company wide limit on canola and soy-oil based biodiesel does not operate in the same way that a volume based cap does because as new biodiesel producers enter the market, the overall volumetric limit will increase. Implementing a cap on biofuels can correct this issue by creating a firm limit on the number of credits available in the market.

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- c. Granting the Executive Officer discretionary power to close biomass-based diesel pathway applications is an insufficient alternative remedy because it is too uncertain.

The changes to section 95488 grant the Executive Officers the power to choose to stop accepting new fuel pathways for all biomass-based diesel in the event that 132,000 class 3-8 ZEVs or NZEVs are registered in California. This change is unclear based on the language of the change itself, but also is uncertain because of the Executive Officers discretionary authority, and the lack of sufficient support in the LCFS for ZEV pathways in medium and heavy-duty class vehicles.

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First, it is unclear from the language of the change if the Executive Officer would be effectuating a complete ban on new applications or a selective rejection of new applications. While a complete ban on new fuel pathway applications for biomass-based diesel would be a solid step forward in correcting the LCFS's biomass-based diesel over crediting, the language of this change on its face does not clearly require the Executive Officer to do so. Further in this vein, the timeline for the decision itself is unclear. While the Executive Officer may choose not to accept new applications for biomass-based diesel beginning on January 1, 2031, the number of registered vehicles must exceed 132,000 NEVs or NZEVs on December 31, 2029, with a posted notification on August 31, 2030. Does this mean that the Executive Officer cannot exercise fuel pathway closure discretion if the 132,000 threshold is surpassed after December 31, 2029? As an important mechanism for enforcement, and a potentially significant step forward for the program the terms of this decision should at the very least be clear to CARB and members of the public.

This change grants the Executive Officer the discretion to make the choice not to accept new pathway applicants (either wholly or selectively) if the required amount of 132,000 NEV and NZEV vehicle registration amount is surpassed. At the end of 2023, the California Energy

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⁷ See Colin Murphy & Jin Wook Ro, *Updated Fuel Portfolio Scenario Modeling to Inform 2024 Low Carbon Fuel Standard Rulemaking*, at 8, U.C. Davis Policy Institute for Energy, Environment, and the Economy (2024) (explaining that the supply of inexpensive biofuel credits will diminish fuel producers' incentives to invest in more expensive, but innovative, technologies.).

⁸ *Id.* at 8 (“Obligated parties will have little incentive to invest in innovative, but riskier, approaches to reducing GHG emissions from transportation fuels until either the supply of inexpensive [renewable diesel] is exhausted, or it has displaced all petroleum diesel...”).

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Commission reported that there were 3,784 electric and hydrogen medium and heavy-duty ZEVs in California.⁹ To reach this threshold, the number of medium- and heavy-duty ZEV's would have to more than double itself every year. Such a steep growth rate would likely require an increase in investment in electrification that is not currently included in the program or represented in these changes. Therefore, the change is structurally incongruous with the lack of meaningful investment in the adoption of zero-emission vehicles.

In the Initial Statement of Reasons (ISOR), CARB recognized that achieving carbon neutrality will require a massive shift towards electric vehicles, and that this transition is technologically feasible. The outstanding glut of biofuels credits will diminish incentives to invest in other technologies, including electrification and zero-emission technology.¹⁰ As explored above, changes to canola and soy-oil based biodiesel are not timely or effective enough to motivate sufficient correction for existing over crediting. Further, none of the changes included provide incentives supporting investment in the development and uptake of medium and heavy-duty ZEVs. CARB should revisit this change to clarify that the triggered outcome is a complete bar on new biofuels applications and make further changes to support more rigorous investment in electrification.

- d. Biofuel reshuffling under the federal Renewable Fuel Standard violates CARB's duty to assure emission reductions are additional, and dilutes any purported reduction in over crediting from the twenty percent limit.

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The twenty percent limit change is further inadequate because CARB still has not addressed the issue of crediting reductions that should be attributed to the federal Renewable Fuel Standard ("RFS"). Under AB 32, CARB is required to ensure that any greenhouse gas emissions achieved are "real"¹¹ and "in addition to any greenhouse gas emission reduction otherwise required by law or regulation, and any other greenhouse gas emission reduction that otherwise would occur."¹² As CBE's prior comment explains, the federal RFS requires nationwide production of biofuels and allows for overcompliance in one state to compensate for undercompliance in another state.¹³ The double incentive of LCFS and RFS thus encourages biofuel producers to concentrate sales in California to take advantage of our LCFS incentives.¹⁴ This has led to California consuming an increasingly large share of the country's biodiesel and renewable diesel, and in 2022 California consumed half of all the biomass-based diesel

⁹ California Energy Commission, *Medium- and Heavy-Duty Zero-Emission Vehicles in California*, (May 1, 2024), <https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics-collection/medium>.

¹⁰ See Colin Murphy & Jin Wook Ro, *Updated Fuel Portfolio Scenario Modeling to Inform 2024 Low Carbon Fuel Standard Rulemaking*, at 8, U.C. Davis Policy Institute for Energy, Environment, and the Economy (2024).

¹¹ CARB must ensure that "[t]he greenhouse gas emission reductions achieved are real, permanent, quantifiable, verifiable, and enforceable." CAL. HEALTH & SAFETY CODE § 38562(d)(1).

¹² Emphasis added. CAL. HEALTH & SAFETY CODE § 38562(d)(2).

¹³ *CBE Comments on the Proposed 2024 Low Carbon Fuel Standard Regulation* (Feb. 20, 2024), https://www.arb.ca.gov/lispub/comm/iframe_bccomdisp.php?listname=lcfs2024&comment_num=6984&virt_num=313.

¹⁴ Jeremy Martin, *A Cap on Vegetable Oil-Based Fuels Will Stabilize and Strengthen California's Low Carbon Fuel Standard*, THE EQUATION (Jan. 30, 2024), <https://blog.ucsusa.org/jeremy-martin/a-cap-on-vegetable-oil-based-fuels-will-stabilize-and-strengthen-californias-low-carbon-fuel-standard/>.

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consumed in the U.S.¹⁵ Meanwhile, consumption outside California is declining.¹⁶ Therefore, under this dual system, a share of the biomass-based diesel consumption that CARB attributes to the LCFS is actually reshuffled from other states, where it would be consumed anyway due to the federal RFS. By taking credit for emissions reductions that should be credited to the federal RFS, CARB is violating AB 32's additionality requirement and inflating emission reduction estimates that will dilute the potential effect of a twenty percent soy and canola based biofuels limit.¹⁷ In the 2018 LCFS rulemaking, CARB addressed this by calculating the greenhouse gas emissions reductions attributable to the LCFS in order to count only reductions where "complying with the LCFS can be argued to be the primary reason for the action."¹⁸ CARB has backtracked on this issue, and continues to, by failing to correct for reshuffling, thereby reducing the effectiveness of attempts to limit biodiesel credits. Dual application of the LCFS and RFS will weaken the already weak results of the twenty percent limit by creating double incentives for oil produced within the credited twenty percent, and for other biofuels in the program. Further, incentives from the RFS will apply to LCFS deficit generating canola and soy-based biofuels created outside of the twenty percent limit for LCFS crediting.

- e. The impacts of biofuel refining on fence-line communities are current and drastic, fence-line communities are entitled to clear and accurate rulemaking and enforcement.

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Changes to the LCFS do not support a timely or effective reduction in incentives for biofuels refining. LCFS biofuel incentives drive rapid increases in renewable diesel production in California, largely occurring at oil refineries.¹⁹ As such, the LCFS is undermining the clean-up of pollutants in highly impacted refinery communities.²⁰

Refinery communities have been living with the racist impacts of fossil fuel pollution for a century and are deeply, and personally aware of the need to phase out polluting refineries. As retired oil refineries come back online for biofuels, refinery communities are again being asked to disproportionately bear the burden of pollution and safety risks from biofuel refinery conversion. The refinery conversions of Phillips 66 Rodeo, Marathon Martinez, and Altair Paramount are illustrative. Phillips 66 Rodeo and Marathon Martinez are located in the San Francisco Bay Area Basin, which is out of attainment with state standards for particulate matter

¹⁵ *Id.*

¹⁶ Martin, *supra* note 14 ("Rising California consumption has come partly at the expense of biodiesel consumption elsewhere in the US, which fell 28% percent in 2022 compared to its peak in 2016.").

¹⁷ 15-Day Changes, §954821, and §95491(d). (The twenty percent company-wide limit cannot inherently address reshuffling because it would only apply to annual reporting, which is limited to production in California, or import into California.)

¹⁸ CAL. AIR RES. BD., *Appendix F to Initial Statement of Reasons: Methodologies for Estimating Potential GHG and Criteria Pollutant Emissions Changes Due to the Proposed LCFS Amendments*, F-13 (Mar. 6, 2018), https://www.arb.ca.gov/regact/2018/lcfs18/appf.pdf?_ga=2.136358512.1729481274.1707759900-1149230758.1693940701.

¹⁹ See Martin, *supra* note 14.

²⁰ Jeremy Martin, *Everything You Wanted to Know About Biodiesel and Renewable Diesel. Charts and Graphs Included*, THE EQUATION (Jan. 10, 2024), <https://blog.ucsusa.org/jeremy-martin/all-about-biodiesel-and-renewable-diesel/>.

(PM10), fine particulate matter (PM2.5), and ozone.²¹ Further, the cities of Rodeo and Martinez are home to environmental justice communities where residents are disproportionately burdened by pollution, and vulnerable to health risks. According to CalEnviroScreen, residents in the census tract closest to the Phillips 66 refinery experience a pollution burden greater than 86 percent of census tracts in the state.²² For the census tracts nearest the Marathon refinery, the pollution burden is greater than 82–91 percent of state census tracts.²³ Communities near these refineries experience increased rates of asthma and cardiovascular disease, and newborns born near the refineries have increased risk of low birthweight.²⁴ Both the Rodeo and Martinez refinery communities are designated as “disadvantaged communities” by the California Environmental Protection Agency under SB 535 based on geographic, socioeconomic, public health, and environmental hazard criteria.²⁵

In another stark example of environmental injustice, the Altair Paramount refinery in Paramount, California took small steps toward producing biofuels in 2013, after it had ceased processing crude oil and gone idle in 2011.²⁶ In 2018, the refinery proposed a plan to substantially expand its operations to 25,000 barrels per day of biofuel feedstock throughput (up from 3,500 barrels per day). The City of Paramount in Los Angeles County is majority people-of-color and is considered an environmental justice community, where residents are exposed to a range of industrial pollutants, including high levels of hexavalent chromium (a cancer-causing air toxin).²⁷ Paramount is in the South Coast Air Basin, which is in “extreme” non-attainment of many federal air quality standards, including ground-level ozone.²⁸ The Environmental Impact Report for the expansion project estimated that the expanded refinery would release 1,743 pounds of VOCs and 2,133 pounds of NOx emissions per day, and it would require 50 rail car unloads per day and 540 diesel truck trips.²⁹ The Paramount refinery demonstrates how biofuel incentives can encourage previously shuttered oil refineries to expand refining operations, even when they are located within environmental justice communities that already face air pollution levels far beyond what is considered safe for human health.

These conversions also demonstrate that biofuel refining creates new health and safety risks for fence-line communities. Biofuel refining may require more intensive use of hydrogen

²¹ *Air Quality Standards and Attainment Status*, BAY AREA AIR QUALITY MGMT. DIST., <https://www.baaqmd.gov/about-air-quality/research-and-data/air-quality-standards-and-attainment-status> (last visited Feb. 9, 2024).

²² CalEnviroScreen 4.0, CAL. OFF. ENV’T HEALTH HAZARD ASSESSMENT, https://experience.arcgis.com/experience/11d2f52282a54cee6184203/page/CalEnviroScreen-4_0/?org=OEHA (last visited Aug. 25, 2024) (search for census tract 6013320001).

²³ *Id.* (last visited Aug. 25, 2024) (search for census tracts 6013320001, 6013320004, and 6013315000).

²⁴ *Id.*

²⁵ *SB 535 Disadvantaged Communities*, CAL. OFF. ENV’T HEALTH HAZARD ASSESSMENT, <https://oehha.ca.gov/calenviroscreen/sb535> (last visited Feb. 9, 2024) (see “Disadvantaged Communities Map” and search for census tracts 6013358000, 6013320001, 6013320004, and 6013315000).

²⁶ Verified Petition for Writ of Mandate and Complaint for Declaratory and Injunctive Relief at 11, *Communities for a Better Environment v. City of Paramount*, Los Angeles County Central District Superior Court, available at https://climatecasechart.com/wp-content/uploads/case-documents/2022/20220516_docket-na_petition-for-writ-of-mandate.pdf.

²⁷ *Id.* at 8.

²⁸ *Id.* at 8.

²⁹ *Id.* at 12–13.

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compared to fossil fuels, which can cause more frequent flaring hazards.³⁰ This is supported by site-specific evidence: since the Marathon Martinez facility reopened as a biofuel refinery in late 2022, there have been over 46 flaring incidents reported by the refinery.³¹ The Martinez refinery has also had an alarming number of health and safety emergencies. In a 2022 incident that the refinery failed to report, it released 20 to 24 tons of spent catalyst chemicals into the community, where residents found dust containing heavy metals settled onto front yards and vehicles.³² In November 2023, the refinery had two major fires that refinery officials described as “facility-wide emergencies;” one of these fires resulted in life-threatening injuries for a refinery worker and released over 200,000 pounds of renewable diesel fuel.³³ These incidents have triggered a federal investigation by the U.S. Chemical Safety Board and led the Contra Costa Health department and Bay Area Air Quality Management District to conduct a surprise inspection at the facility, and local health officials have publicly expressed concerns about the frequency of safety incidents at the refinery since reopening.³⁴

The seminal statute AB 32 requires that CARB move forward “in a manner that is equitable [and] seeks to minimize costs and maximize the total benefits to California,”³⁵ and ensure that measures “do not disproportionately impact low-income communities”³⁶ or interfere with “efforts to achieve and maintain federal and state ambient air quality standards and to reduce toxic air contaminant emissions.”³⁷ The subsequent adoption of SB 32 is further instructive, demanding that CARB in adopting rules to maximally reduce greenhouse gas emissions “in a manner that benefits the state’s most disadvantaged communities and is transparent and accountable to the public.”³⁸ Under this mandate, CARB should further study the direct and indirect effects of biofuels on refinery communities so that there is adequate support for transparent and accountable rulemaking. The sections that follow provide further detail regarding how the twenty percent limit change is insufficient to support CARB in fulfilling the mandates of AB 32.

i. *The twenty percent limit’s untimely and ineffective implementation will prolong and promote harms to environmental justice communities.*

These changes prolong and promote the existing harms of biofuels production by providing for an ineffective and untimely limit on canola and soy-oil based biodiesel. Further,

³⁰ *Phillips 66 Rodeo Renewed Project (File No. LP20-2040) – comment concerning draft environmental impact report* at 38, submitted by Communities for a Better Environment and other environmental organizations (Dec. 17, 2021), available at https://www.nrdc.org/sites/default/files/rodeo_renewed_deir_comment.pdf; see also Katie Lauer, *Biofuel is poised to usurp crude oil refining in the Bay Area. But are their ‘renewable’ fuels a green solution or ‘greenwashing’?*, EAST BAY TIMES (Feb. 4, 2024), <https://eastbaytimes.com/2024/02/04/biofuel-is-poised-to-usurp-crude-oil-refining-in-the-bay-area-but-are-their-renewable-fuels-a-green-solution-or-greenwashing/>.

³¹ *Health officials conduct surprise inspection at Martinez refinery after recent incidents*, ABC7 NEWS (Dec. 26, 2023), <https://abc7news.com/martinez-refining-company-surprise-inspection-refinery-flaring-air-quality/14228185/>.

³² *Id.*

³³ Ted Goldberg, *Federal Agency Probes Marathon’s Martinez Refinery After Two Large Fires Last Month*, KQED (Dec. 5, 2023), <https://www.kqed.org/news/11968786/recent-fires-at-marathons-martinez-refinery-spark-major-safety-concerns>.

³⁴ *Id.*; ABC7 NEWS, *supra* note 31.

³⁵ CAL. HEALTH & SAFETY CODE § 38562(b)(1).

³⁶ CAL. HEALTH & SAFETY CODE § 38562(b)(2).

³⁷ CAL. HEALTH & SAFETY CODE § 38562(b)(4).

³⁸ S.B. 32, 2016, Reg. Sess. (Ca. 2016).

including co-processing of biomass and petroleum feedstocks in the applicable definition of credit-generating renewable diesel³⁹ will encourage major oil producers to further entrench communities who already experience the harms of oil refining with the expansion into biofuel refining co-processing with petroleum. Again, AB32 requires CARB to act in a manner that does not interfere with efforts to reduce toxic air contaminants, maximizes benefits with minimal costs, and is equitable and does not disproportionately impacting low-income communities.⁴⁰ The experiences at Phillips 66 Rodeo, Marathon Martinez, and AltAir Paramount refineries provide examples of how biofuel refining extends existing pollution and creates new harms in disadvantaged communities. The clear evidence that producing biofuels at oil refineries can create serious, under-studied health and safety risks for low-income communities, communities of color, and communities heavily impacted by air toxics undoubtedly indicates that CARB should be acting to rein in biofuels crediting that incentivizes expanded production.

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As set out above, the twenty percent per company limit does not limit the expansion of the market, and as oil refining is phased down in line with the 2022 scoping plan, biofuels credits will incentivize oil refineries to pivot and continue operation as biofuels refineries. Further, the twenty percent limit does nothing to discourage the uptake of other biofuels such as tallow and cooking oil-based biofuels. Environmental justice communities, such as Martinez, Rodeo, and Paramount, as well as new communities where biofuels production expands will bear the burden of the little studied health and safety impacts of biofuels refining. As such, CARB's twenty percent limit does not adequately or equitably minimize costs to Californians and will ultimately prolong the disproportionate health and environmental burdens faced by refinery communities.

ii. *Unaccounted for reshuffling under the RFS concentrates harmful biofuel refining in California's environmental justice communities.*

As explored in section one, subsection d of this comment, dual incentives under the federal RFS and LCFS have resulted in a trend towards concentrating biofuels production and use in California. Oil refineries are generally located in areas with higher pollution burdens that are largely comprised of low-income households and people of color, due in part to a history of racist housing discrimination. As biofuel producers concentrate in California because of reshuffling incentives not addressed by changes to include a twenty percent cap, oil refineries come back online as biofuels refineries and California's fence-line refinery communities will face new pollution burdens and risks despite California's much needed commitment to reduce the use and impacts of fossil fuel. To comply with additionality requirements under California law⁴¹ and ensure the program is administered in a manner that does not disproportionately impact low-income communities,⁴² CARB should correct the program to adequately account for reshuffling under RFS.

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³⁹ 15-DAY CHANGES § 95481.

⁴⁰ CAL. HEALTH & SAFETY CODE § 38562(b)(1), (b)(2), and (b)(4).

⁴¹ CARB must ensure that any greenhouse gas emission reductions achieved are "real" and are "in addition to any greenhouse gas emission reduction otherwise required by law or regulation, and any other greenhouse gas emission reduction that otherwise would occur." CAL. HEALTH & SAFETY CODE § 38562(d)(1) & (2).

⁴² CAL. HEALTH & SAFETY CODE § 38562(b)(4).

- iii. The twenty percent limit does not account for or reduce the externalized impacts of biofuel refining on fence-line communities.

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Pollution from oil refining itself is not the only biofuel refining related pollution that impacts fence-line environmental justice communities. Biofuels refining creates an array of diverse stationary and mobile pollution sources that must be adequately accounted for. For example, in the Environmental Impact Report for the Marathon Martinez biofuel conversion project, the county estimated that the biofuel refinery would require 180 diesel truck trips through the area per day, 63 railcars per day (an increase compared to the oil refinery due to the transport of biofuel feedstocks), and 400 marine vessels per year (also an increase compared to the oil refinery).⁴³ Looking at cumulative impacts on air pollution, the county found that the conversion would have a significant and unavoidable impact on PM2.5 exposure for residents and workers in the area.⁴⁴ Similarly, the Phillips 66 Rodeo refinery conversion is estimated to have significant impacts on pollution-causing activities. The refinery is now one of the largest biofuel refineries in the world. The Environmental Impact Report for the conversion found that the refinery's increased need for delivery of feedstocks would cause marine and rail traffic to increase substantially compared to when the refinery processed oil: rail car unloads per day would increase from 4.7 to 16, and tanker vessel and barge calls per year would more than double.⁴⁵ The refinery requires approximately 16,000 diesel truck trips per year.⁴⁶ Martinez is located in the San Francisco Bay Area Basin which is out of attainment with state standards for particulate matter (PM10), fine particulate matter (PM2.5), and ozone.⁴⁷ Marathon Martinez is an illustrative example of how conversion to biofuels refining will contribute to an increase in diverse and distinct air pollution sources for fence-line communities. The immense amount of pollutants from diverse sources associated with biofuels refining conflicts with CARB's statutory requirement to complement efforts to attain air quality standards and to avoid disparate harms in low income communities and communities of color. The twenty percent limit has no deterrent power for the expansion of companies who elect to convert to biofuels production as oil and gas is phased down under the Scoping Plan. As such, this rule change fails to satisfy CARB's statutory requirements under AB 32. As previously recommended, CARB should implement a cap on biofuels credits. A cap on the market for biofuels credits could provide a deterrent effect on the incursion of biofuels conversions, while CARB and Air Quality Management Districts otherwise address the issue of biofuel related pollution affecting fence-line communities.

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- f. An effective cap on credits for crop-based biofuels would better achieve maximum technologically feasible and cost-effective emission reduction, and more readily incentivize electrification.

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⁴³ Contra Costa Cnty. Dep't of Conservation and Dev., *Draft Environmental Impact Report Vol. I* (County File# CDLP20-02046), at 2-36–38 (Oct. 2021), <https://www.contracosta.ca.gov/DocumentCenter/View/72957/Martinez-Refinery-Renewable-Fuels-DEIR-Vol-1-Complete-DEIR>.

⁴⁴ *Id.* at 3.3-40.

⁴⁵ Verified Petition for Writ of Mandate at 13, *Communities for a Better Environment v. County of Contra Costa*, Contra Costa County Superior Court, Case No. N22-1091 (2023).

⁴⁶ *Id.*

⁴⁷ *Air Quality Standards and Attainment Status*, BAY AREA AIR QUALITY MGMT. DIST., <https://www.baaqmd.gov/about-air-quality/research-and-data/air-quality-standards-and-attainment-status> (last visited Aug. 26, 2024).

240.23
cont.

A cap on crop-based biofuels at 2020 energy levels is an important step toward addressing the local and global environmental harms of biofuels; it also better serves CARB's statutory objectives. Under AB 32, CARB's primary regulatory objective is to "achieve the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions. . . in furtherance of achieving the statewide greenhouse gas emissions limit."⁴⁸ The twenty percent limit change, which encourages an unchecked increase in crop-based biofuels conversions and does not meaningfully reduce the biodiesel credit market, does not maximize technologically feasible and cost-effective reductions. Capping crop-based biofuels would open up room in the LCFS to prioritize investments in scalable technologies that are truly clean and drive us toward our goal of carbon neutrality by 2045.

240.24

The twenty percent limit will not provide cost-effective emission reductions. Analysis by the International Council on Clean Transportation and the Union of Concerned Scientists shows that biomass-based diesel will likely only be economical to produce when it is subsidized, because the costs of producing vegetable oils are regularly higher than the costs of wholesale diesel (without even considering the costs of producing diesel from vegetable oils).⁴⁹ Reducing crediting will only increase the burdensome cost of vegetable oil, potentially furthering credit shuffling to other biofuel feedstocks circumventing the twenty percent limit. Further, many of the new renewable diesel production facilities are oil refineries. For these refineries, part of the benefit of converting to biofuels is the opportunity to offset their compliance burden and delay a costly facility closure process.⁵⁰ The twenty percent limit does not adequately limit the market for biofuels credits and will thus be used to enshrine oil giants' impacts to local communities despite a transition away from fossil fuels. The misapplication of credits to benefit more polluting fuels like biofuels is not a cost-effective measure of enforcement because credits that are offered for biofuels in lieu of crediting other fuels such as electrification reduce the effectiveness of the program. CARB should correct this by providing for a cap on biofuels.

240.25

The glut of credits for renewable diesel will undermine LCFS incentives for electrification and other scalable clean transportation technologies. Setting a cap on biofuels would help stabilize credit prices and focus credit money on electrification.⁵¹ As explained above, the twenty percent limit is insufficient to remedy the glut of credits because of its delayed implementation, opportunities for feedstock shuffling for other biofuels, and incidence of credit shuffling under the RFS. In the ISOR, CARB recognized that achieving carbon neutrality will require a massive shift towards electric vehicles, and that this transition is technologically feasible. However, continuing to allow a glut of credits to weigh down the market inhibits progress toward this transition by allowing biofuel credits to crowd out opportunities for regulated parties to invest in electrification.

240.26

⁴⁸ CAL. HEALTH & SAFETY CODE §§ 38560, 38560.5(c).

⁴⁹ JANE O'MALLEY ET AL., SETTING A LIPIDS CAP UNDER THE CALIFORNIA LOW CARBON FUEL STANDARD 4 fig. 2 (2022), <https://theicct.org/wpcontent/uploads/2022/08/lipids-cap-ca-lcfs-aug22.pdf>.

⁵⁰ Martin, *supra* note 14.

⁵¹ *Id.*

II. CHANGES TO LAND USE CHANGE (LUC) VALUES FOR BIOFUELS DO NOT ADEQUATELY OR DIRECTLY CORRECT CARBON INTENSITY VALUES FOR INTERNATIONAL FEEDSTOCKS.

240.27 Changes pertaining to Land Use Change (LUC) effects for biofuels feedstocks to include identifying regions of analysis are insufficient to address LUC related carbon intensity misrepresentations. These changes represent an important acknowledgement of the drastic impacts of LUC effects related to the programs biofuels incentives. However, identifying regions of analysis alone does not sufficiently correct carbon intensity values because they still do not reflect the range of specific LUC effects of regional biomass producers internationally. Further, the Executive Officer's ability to adjust the regional representations is not adequately outlined. Finally, these shortcomings, including underestimating LUC changes, will adversely affect fence-line refinery communities. One basic step CARB should take is to calculate LUC effects for each region that provides imported crop-based feedstocks in the program.

- a. Regional analysis of soy and Canola is inadequate because it is limited to the U.S. and North America.

240.28 Changes to section 95488.3 that identify the region of analysis for each LUC factor are insufficient because they only identify one region of analysis per biomass type and make no substantive changes to the LUC analysis. CARB has already approved fuel pathways for a major biofuel producer, Phillips 66, to produce biofuels from soybean oil imported from Argentina,⁵² and imports from South America are likely to accelerate under the proposal that only limits soy-based oil biofuels credits on an individual company basis. Land use change effects vary by region due to specific domestic economic factors and trade dynamics, and South American soybean oil presents particularly strong deforestation risks.⁵³ One study that looked at soybean oil cultivation in Brazil found that its direct and indirect LUC impacts could outweigh the carbon benefits of replacing fossil diesel.⁵⁴ By focusing its LUC analysis on U.S. soy feedstock production shocks, CARB is underestimating the carbon intensity of the feedstocks that this proposal will incentivize. Since CARB continues to provide credits to biofuels sourced from imported crop-based feedstocks, the proposal's failure to thoroughly evaluate LUC by region produces indefensibly inaccurate carbon intensity estimates.⁵⁵ Underestimation of the LUC effects of biofuels can have catastrophic consequences. In South America, deforestation linked to soybean farming is destroying critical tropical forests like the Gran Chaco Forest in Argentina and Paraguay, which is one of the biggest carbon sinks in the world, provides a critical habitat for thousands of plant and animal species, and is an ancestral home to many Indigenous communities. These crop-based feedstocks have numerous harmful effects, including climate

⁵² Low Carbon Fuel Standard Tier 2 Pathway Application No. B0520, Phillips 66 Rodeo (certified Dec. 26, 2023), https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/comments/tier2/b0520_cover.pdf.

⁵³ *Comments on Tier 2 Pathway Application No. B0520*, submitted by Communities for a Better Environment (Dec. 13, 2023), available at <https://ww2.arb.ca.gov/public-comments/lcfs-fuel-pathways-public-comments/webform/submission/7151>.

⁵⁴ David M. Lapola et al., *Indirect land-use changes can overcome carbon savings from biofuels in Brazil*, 107 PNAS 3388 (2010), <http://www.pnas.org/content/107/8/3388.full.pdf+html>.

⁵⁵ See *Comments on Tier 2 Pathway Application No. B0520* at 2–3, submitted by University of California, Davis Policy Institute for Energy, Environment, and the Economy (Dec. 13, 2023), available at <https://ww2.arb.ca.gov/public-comments/lcfs-fuel-pathways-public-comments/webform/submission/7161> (hereinafter “U.C. Davis Comments”).

impacts from deforestation, loss of indigenous lands, and increased food insecurity. The lack of effective changes to restrict crop-based biofuels will accelerate these effects. It is therefore especially important for CARB to accurately estimate the LUC effects of crop-based feedstocks.

240.28
cont.

As CBE has previously supported, CARB should provide a region-specific direct and indirect land use change analysis for fuel pathway applications that rely on imported crop-based feedstocks. While the changes acknowledge that regional analysis is important, they merely identify one preset region per biomass type, and provide an inadequate corrective remedy for regional analysis when the pre-calculated regional analysis does not match the actual biofuel source region. If CARB provided modeling analysis that reflected a region-specific production shock, it would more accurately account for domestic economic factors and trade dynamics to arrive at a carbon intensity estimate that better aligns with the true climate impacts of feedstocks.⁵⁶ CARB should substantively correct carbon intensity valuation by studying regional producers land use change effects, and incorporating findings into regional carbon intensity valuations.

- b. Executive Officer ability to supersede the LUC calculation table is not an adequate remedy because it is unclear what “conservatively representative” is, or how it would be surmised.

240.29

Changes to section 95488.3(d) grant the Executive Officer the ability to supersede the calculated LUC changes if the Executive Officer determines that they are not “conservatively representative of a particular region/feedstock/fuel combination” based on the best available empirical data. CBE appreciates that this change acknowledges the diverse range of factors needed for a comprehensive analysis but is concerned with the lack of clarity regarding the Executive Officer’s calculations, as well as when and how this discretionary correction tool will be used. First, this is not a sufficient remedy for CARB’s failure to accurately calculate LUC factors because it leans too heavily on an unclear standard of discretion. No definition or further specification is provided for the Executive Officer to base their determination of when the LUC calculation in table 6 is not “conservatively representative” and what scope of analysis the Executive Officer should use to create an appropriate substitution LUC value. Further, while the provision is backloaded with sources for the final determination of a new value, there is no standard for determining whether Table 6 values are not a conservative representative and therefore triggering valuation of a more appropriate LUC effect. Uncertainty regarding when a more appropriate LUC effect should be evaluated could result in underuse of this process. This tool is not practically useful for correcting LUC values if it is not exercised regularly with a clear set of standards. Without accurate, accountable LUC factors, CARB will undervalue the carbon intensity of biofuels, further deflating renewable diesel credit prices and depressing the market.

- c. Underestimating carbon intensity based on low LUC calculations, and permissive sustainability certification will adversely impact refinery communities.

240.30

With inaccurate LUC values based on region, CARB will continue to underestimate the climate harm of crop-based fuels and thereby over-incentivize biofuels which will drive over-crediting and increases in harms for fence-line communities. The asserted climate benefits of the

⁵⁶ See *U.C. Davis Comments*, *supra* note 55, at 2–3.

240.30
cont.

proposal are based in part on the carbon intensity advantages assigned to biomass-based diesel. Concerningly, CARB's analysis is rooted in an incomplete and inaccurate evaluation of the climate impacts of biomass-based diesel. Biomass-based diesel in California is increasingly produced from virgin vegetable oil, primarily soybean oil, and producers are starting to import soybean oil from South America. The Environmental Protection Agency ("EPA") technical documents comparing LUC models shows that of the models CARB used to calculate LUC effects, only the GTAP model found that displacing fossil diesel with soybean diesel led to lower greenhouse gas emissions, while the other two models found that soybean biodiesel could emit more greenhouse gas than fossil diesel due to deforestation.⁵⁷ This EPA publication suggests, at the very least, that the GTAP model may be seriously underestimating the land use change effects of crop-based feedstocks. LUC changes continue to include the GTAP model and the AEZ-EF model, the addition of regions of analysis did not change the LUC values in Table six. One of the most important reasons to accurately estimate land use change effects is that these estimates are used in Tier 2 fuel pathway applications to calculate carbon intensity values for crediting biofuels. In this context, underestimating a land use change value results in over-crediting a biofuel project. Further, as explained above, the Executive Officers discretionary ability to amend LUC values does not correct LUC undervaluation. Underestimating LUC effects inflates biofuels crediting, and credits for biofuels support costly biofuel production and investment in biofuel refinery conversions. As explored at length in section one, subsection e of this comment, over incentivizing biofuels has an adverse impact on fence-line refinery communities who bear the burden of direct and indirect pollution from biofuels refining.

240.31

240.32

In sum, crop-based biofuels present serious, likely underestimated, direct and indirect land use change risks, as well as impacts to fence-line communities and the 15-day changes will not reduce these risks. Echoing CBE's prior asks, one basic way CARB should address land use change risks is by providing more thorough analysis for fuel pathway applications.

III. BIOMETHANE BOOK-AND-CLAIM ACCOUNTING FOR HYDROGEN PERPETUATES POLLUTION HARMS IN ENVIRONMENTAL JUSTICE COMMUNITIES.

240.33

Changes to section 95482(h) revokes crediting for fossil fuel-based hydrogen production beginning in 2031 but, counterintuitively continues to allow crediting for fossil fuel-based hydrogen production with indirect book-and-claim biomethane matching for hydrogen production. CARB's continued support for book-and-claim crediting despite acknowledging that fossil fuel-based hydrogen is not a path forward is deeply concerning. Indirect book-and-claim accounting permitted under section 95488.6(i)(2) will encourage hydrogen producers to produce fossil fuel-based hydrogen, because they can make fossil-based hydrogen look carbon negative by purchasing avoided methane credits from dairy digesters that may not even operate in California.

⁵⁷ Dan Lashof, *EPA's New Renewable Fuel Standard Will Increase Global Carbon Emissions – Not Lower Them*, WORLD RESOURCES INST. (Jul. 3, 2023), <https://www.wri.org/insights/us-renewable-fuel-standards-emissions-impact>.

240.34

The LCFS should only incentivize green hydrogen produced in a manner consistent with Environmental Justice Equity Principles.⁵⁸ The Environmental Justice Equity Principals were created as a framework to prevent rapidly developing hydrogen projects from perpetuating the injustices that polluting infrastructure has imposed on fence-line communities historically and today.⁵⁹ The Hydrogen Equity Principles call for green hydrogen that is not defined by CO₂ equivalent,⁶⁰ in direct conflict with the direction of the program’s permissive book-and-claim accounting system. Rather, the Principles outline how hydrogen can be produced without climate emissions, through electrolysis of water using surplus wind and solar energy.⁶¹

240.35

While hydrogen *can*⁶² be a zero-emission energy carrier at its point of use, there is an array of hydrogen production methods with a range of potential local climate emissions. Hydrogen produced from fossil fuels, known as grey hydrogen, involves using steam reformation of natural gas to create hydrogen.⁶³ Steam reformation is both energy intensive and highly polluting.⁶⁴ For example, Shell Energy has had two certified pathways for production of fossil-based hydrogen produced from natural gas via steam methane reformation at facilities in Wilmington and Carson, communities with already exceptionally high fossil fuel pollution.⁶⁵ Shell uses book-and-claim accounting to claim the environmental attributes of biomethane derived from manure digesters in Minnesota; Minnesota biomethane does not have to actually reach California. Under this scheme, CARB has certified Shell to earn LCFS credits using carbon intensity values of -147 and -152 gCO₂e/MJ—these low carbon intensity values make the pathway more valuable than most electric vehicle pathways.⁶⁶ Shell is earning highly valuable LCFS credits to produce fossil-based hydrogen in deeply burdened environmental justice communities.

While Cap and Trade allows polluters to pay for the privilege of polluting EJ communities, book-and-claim credits for fossil hydrogen funnel money right back into polluters’ pockets in these same communities, counting the fossil gas extracted in EJ communities as a net climate benefit while benzene, NO_x, carbon monoxide, methane, and all manner of particulate matter poison the same neighborhoods.⁶⁷

⁵⁸ *Equity Principles for Hydrogen: Environmental Justice Position on Green Hydrogen in California*, COMMUNITIES FOR A BETTER ENV’T (Oct. 10, 2023), <https://www.cbecal.org/wp-content/uploads/2023/10/Equity-Hydrogen-Initiative-Shared-Hydrogen-Position-1.pdf>.

⁵⁹ *Id.* at 2.

⁶⁰ *Id.* at 3.

⁶¹ *Id.* at 2-3.

⁶² Hydrogen combustion results in NO_x emissions, a smog precursor which increases risk of asthma.

⁶³ Arjun Makhijani & Thom Hersbach, *Hydrogen: What Good Is It?*, INST. FOR ENERGY AN ENV’L RESEARCH, at 14 (Jan. 2024), <https://ieer.org/wp/wp-content/uploads/2024/01/What-Good-is-Hydrogen-IEER-report-for-Just-Solutions-January-2024.pdf>.

⁶⁴ *Id.* at 51-52.

⁶⁵ Low Carbon Fuel Standard Tier 2 Pathway Application No. B0348, Shell Energy (certified Sep. 29, 2022), https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/comments/tier2/b0348_cover.pdf; Low Carbon Fuel Standard Tier 2 Pathway Application No. B0349, Shell Energy (certified Sep. 29, 2022), https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/comments/tier2/b0349_cover.pdf (hereinafter “Shell Hydrogen Pathway Applications”).

⁶⁶ See *LCFS Pathway Certified Carbon Intensities*, CAL. AIR RESOURCES BD., <https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities> (last visited Aug. 27, 2024) (Note that the Wilmington facility is now a retired pathway).

⁶⁷ INST. FOR ENERGY AN ENV’L RESEARCH, *supra* note 59, at 30-31.

240.35
cont.

Currently, funding and incentives abound for hydrogen infrastructure development. It is essential that the LCFS program send the correct signal to hydrogen producers regarding acceptable long term hydrogen infrastructure development. Grey hydrogen production is already the cheapest, most widely used option for hydrogen production.⁶⁸ Crediting for book-and-claim accounting provides additional incentives for the proliferation of fossil fuel-based hydrogen production that will crowd out more expensive, but less polluting hydrogen produced from electrolysis.⁶⁹ Allowing fossil fuel-based hydrogen production to proliferate at this early stage in hydrogen infrastructure development could deeply entrench California in continuing dependence on fossil fuels for hydrogen production. To stop sending the wrong signals to an emerging market, CARB should end biomethane book-and-claim crediting for hydrogen.

IV. REMOVING FOSSIL JET FUEL FROM THE PROGRAM SENDS A BAD MESSAGE TO POLLUTING AIRLINES.

240.36

Changes throughout the program removing fossil jet fuel are a substantial backslide in policy. In such a hard to decarbonize sector, it is essential that the cost of pollution is adequately accounted for. Removing fossil jet fuel from the program fails to internalize the substantial emissions impact of aviation, and its pollution impacts on airport workers, and communities surrounding airports. Further, the use of fossil jet fuel is not without consequences for the communities and workers who work and live in and around airports. Communities surrounding airports and airport workers have increased hospital admissions for respiratory disorders including asthma, and chronic bronchitis, as well as cardiovascular issues such as heart disease, and stroke.⁷⁰ Fossil jet fuel deficit generation could provide an important platform for investing in technology development to decarbonize air travel and remedy its impacts while also appropriately compensating for a significant sector of California's greenhouse gas emissions.

240.37

V. ELECTRIC VEHICLES AND CHARGING ACCESS ALREADY EXCLUDE LOW-INCOME COMMUNITIES AND COMMUNITIES OF COLOR; WITHOUT CLEAR AND EXPLICIT DIRECTIVES, OEM CREDIT DIVERSION WILL FURTHER ENTRENCH INEQUITY.

Changes to section 95483 give the Executive Officer discretion to direct up to forty-five percent of base credits otherwise obligated to go towards Electrical Distribution Utilities (EDUs) to be used for specified purposes if sales of new zero emissions vehicles represent less than a thirty percent of certified zero emissions vehicles. Under these changes, OEMs must use base credit benefits towards specified eligible projects to support transportation electrification. However, the eligible uses are flawed in the following ways:

⁶⁸ Elena Krieger et al., *Green Hydrogen Proposals Across California*, PSE HEALTHY ENERGY, at 15 (May 21, 2024) <https://www.psehealthyenergy.org/work/green-hydrogen-proposals-across-california/>.

⁶⁹ *Id.* at 75 (“If green hydrogen incentives and subsidies are allowed to flow to the dominating SMR industry, it could shut down the fledgling industry of green hydrogen production via electrolysis before it even begins.”).

⁷⁰ S. Lin et al., *Residential Proximity to Large Airports and Potential Health Impacts in New York State*, Int. Arch. Occup. Environ. Health (2008); see also Quan Qi et al., *Hidden danger: The long-term effect of ultrafine particles on mortality and its sociodemographic disparities in New York State*, J. of Hazardous Materials, Volume 471, (2024).

- There are no additionality mechanisms to ensure that rebates and incentives are actual, and not otherwise reflected in price spikes.
- There are no equity mechanisms to ensure that OEM's will subsidize EV charging infrastructure in historically underserved communities, or that rebates and incentives will be offered to underserved communities.
- There are no requirements for OEM marketing, education, and outreach to be targeted to reach historically underserved communities.
- It is unclear what alternative OEM projects can be developed, and what, if any, equity requirements the Executive Officer can apply.

While the eligible credit projects require “multilingual marketing, education, and outreach,” a promising acknowledgement of the need for language justice, there are no further equity requirements. As it stands, affluent, white communities have been the main benefactors of government investment in zero-emission vehicles. Electric vehicles are still rare in low-income and rural communities and communities with the largest percentages of Black and Latinx residents.⁷¹ Further, these same communities bear the brunt of criteria pollutant harms related to fossil fuel based medium and heavy-duty vehicle use.⁷² Without clear requirements, there is little to no incentive for OEMs to work to ensure that credit projects such as installing EV charging infrastructure, or rebates and incentives are not inequitably distributed in line with existing barriers to access to these benefits. Particularly in light of the equity requirements that public utilities are subject to under the California Public Utilities Commission,⁷³ the shift of credits to OEMs without any equity requirements will continue to leave low-income communities and communities of color experiencing unequal access to electrification and heightened pollution burdens.

While the changes specify that credit proceeds cannot be used to pay the cost of regulatory compliance, support lobbying costs, employee bonuses, shareholder dividends or settlement costs there is no promising regulatory requirement to show that the credit proceeds are not used for marketing, education, or outreach that would otherwise happen to promote the sales of OEM vehicles, or that rebates and incentives will not be otherwise offset by price increases. CARB should prioritize electrification investment that reduces access barriers to ensure low-income communities receive benefits from the LCFS and do not disproportionately bear its costs.

⁷¹ Nadia Lopez & Erica Yee, *Who buys electric cars in California — and who doesn't?*, CALMATTERS (Mar. 22, 2023), <https://calmatters.org/environment/2023/03/california-electric-cars-demographics/#:~:text=Communities%20with%20high%20concentrations%20of,faces%20electrifying%20the%20entire%20fleet.>

⁷² Environmental Justice and Transportation, U.S. ENV'T PROT. AGENCY, <https://www.epa.gov/mobile-source-pollution/environmental-justice-and-transportation#:~:text=Pollution%20from%20the%20transportation%20sector,disproportionate%20exposures%20to%20this%20pollution> (last visited Aug. 27, 2024).

⁷³ See *Environmental & Social Justice Action Plan*, Version 2.0, CAL. PUBLIC UTILITIES COMMISSION (April 7, 2022) <https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/news-and-outreach/documents/news-office/key-issues/esj/esj-action-plan-v2jw.pdf>.

Conclusion

240.38

CBE appreciates the opportunity to comment on the 15-day changes and urges the Board to direct CARB staff to make critical changes that will align the LCFS with AB32 requirements and the needs of environmental justice communities. In doing so, CBE urges CARB to more thoroughly and comprehensively explore the comments and suggestions that CBE and a broad coalition of organizations representing groups from environmental justice, environmental, labor union, and social justice organizations have been working diligently to share. Regretfully, CBE expresses deep concern regarding the direction of these changes and the status of the rulemaking process. CBE requests with urgency that CARB make further changes and corrections to better align the program with the suggestions and concerns CBE has raised in this letter and throughout the rulemaking process. CBE again uplifts our asks for a cap on biofuels, an end to book-and-claim biomethane, hydrogen crediting, and the addition of fossil jet fuel as a deficit generator.

Sincerely,

Lauren Gallagher
Attorney & Legal Fellow
Communities for a Better Environment



VIA ELECTRONIC FILING

August 27, 2024

Matthew Botill
California Air Resources Board
1001 I Street
Sacramento, California 95814
Re: DVO, Inc. Comments on Low Carbon Fuel Standard 15-Day Amendments

Dear Mr. Botill:

WTE, LLC is a U.S.-based developer and owner of anaerobic digesters to RNG projects. We have one operational project and a second soon to be capturing biogas and converting it for injection of RNG into the national pipeline grid. RNG from these projects will qualify as renewable fuel under the Low Carbon Fuel Standard and be used as vehicle fuel in California. We have made significant investment of financial and personal time and resources to bring these important projects forward.

241.1

WTE has other projects under development consideration that have been in part put into suspension due in large part to the recent dips and uncertainties of the LCFS program. Investor sentiments have served to hold the development of these projects back until direction of the LCFS program becomes clearer. We look forward to CARB instituting improvements in the 2024 Rulemaking that we hope will result in increased program certainty.

We thank CARB and CARB staff for the opportunity to provide the following comments on the LCFS 15-day amendments:

241.2

- **Near Term CI Ambition:** We support an increased near-term ambition from the proposed 9% to something greater, such as 11% proposed by other stakeholders. This course-correction should help boil off the current credit bank surplus and the resulting economic consequences.

241.3

- **Credit True Up:** WTE supports the proposed language to include a full credit true-up including the temporary period once verification is complete.

241.4

- **Step Down in Avoided Methane Crediting from Three Periods to Two:** We do not support the proposed step down in the total number of crediting periods for avoided methane emissions for some subset of projects breaking ground before January 1, 2030, from three to two. This would be an extremely problematic change as it would reduce project lifetimes and create significant headwinds for investment decisions. In addition, lacking further economic incentive support, at the end of only a second avoided methane crediting period, projects we have developed and

potential future projects run the risk of abandonment as it may no longer be cost-effective to continue operations. We believe the avoided methane crediting periods should be at least three.

241.5

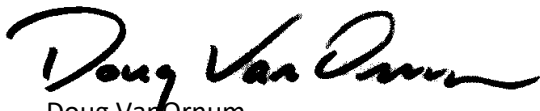
- **Deliverability Language:** We find very troubling the proposed language limiting delivery of out-of-state RNG to pipelines with >50% directional flow into California. The direction of pipeline flows are not controlled or controllable by RNG project owners. Pipeline operators make their own decisions about directionality of products they carry. The current book and claim approach has helped incentivize RNG projects in the U.S. We strongly believe the proposed directional deliverability language by CARB in the 15-day proposed language will further disincentivize investment in these critical RNG projects.

241.6

- **Accessibility to Non-Colocated Renewable Power:** To help further incentivize development in the renewable power industry, we urge CARB to remove the co-located power generation requirement and allow greater and more diverse sources of green power to help produce RNG.

We appreciate CARB's consideration of our views and concerns and look forward to a more robust and reliable LCFS program to support the interests of all stakeholders

Sincerely,



Doug VanOrnum

Member

WTE, LLC

www.wte.llc

August 27, 2024

VIA ELECTRONIC SUBMITTAL

Clerk of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Global Clean Energy's Comments on the Proposed 15-Day Changes to the Low Carbon Fuel Standard Regulations

Dear Honorable Members of the California Air Resources Board:

Thank you for the opportunity to provide input on the California Air Resources Board's ("CARB") Proposed 15-Day Changes to the Proposed Amendments to the Low Carbon Fuel Standard ("LCFS") Regulations (the "15-Day Changes").¹ As currently drafted, the 15-Day Changes would cap LCFS credit generation for biomass-based diesel derived from soybean and canola and would provide a much-needed runway to adjust existing feedstock supply plans (see proposed 17 CCR § 95482(i)). As drafted, the current language for the runway to adjust feedstock plans, unfortunately, would not include the new Bakersfield Renewable Fuels Facility ("Bakersfield Facility"), which is just weeks away from production. Over \$1 billion has been invested in Bakersfield to transform the brownfield site into a California-made low-carbon fuel hub in the Central Valley.

242.1

Global Clean Energy Holdings, Inc. ("GCE"), the parent company of the Bakersfield Facility, respectfully requests a minor amendment to provide the Bakersfield Facility with the same runway being offered to others. This modification would ensure a level playing field and allow the Bakersfield Facility to adjust existing feedstock supply plans. An amendment is vitally necessary to avoid shutting down the new state-of-the-art California clean fuels Bakersfield Facility and to prevent the loss of high-paying jobs in an important SB 535 Disadvantaged Community ("DAC").

A. BAKERSFIELD FACILITY BACKGROUND

For almost twenty years, GCE has been a proud California-based clean energy and renewable fuels innovator. In 2020, we acquired an idled refinery in Bakersfield that had historically produced conventional fuels from crude oil. GCE immediately began retrofitting the

¹ Given the limited 15-day window provided to analyze and prepare written comments on the significant 15-Day Changes, GCE respectfully reserves the right to provide additional comments and supplemental information to CARB for consideration of this important matter.



Honorable Members of the California Air Resources Board
August 27, 2024
Page 2

facility to produce renewable diesel with the lowest possible carbon intensity from traditional biofuel feedstocks and camelina, its proprietary oilseed crop that grows on fallow land and does not contribute to land use change or food displacement. This transformation of the Bakersfield Facility will result in long-lasting benefits for the Central Valley, one of California's regions most impacted by local air pollution and the effects of climate change

Over the past four years, more than \$1 billion has been invested into transforming the Bakersfield Facility from a brownfield site into a cutting-edge renewable fuels production center. Today, the facility is home to over 200 dedicated employees and contractors, who enjoy average annual pay greater than \$100,000, as well as generous healthcare and retirement benefits. Since construction began, GCE has partnered with the State Building and Construction Trades Council of California, bringing together numerous trades from 19 local unions. This collaboration has resulted in nearly four million labor hours over the last four years.

The Bakersfield Facility will exclusively produce renewable fuels in California that will be distributed within the Central Valley and throughout the Golden State. The Bakersfield Facility is directly aligned with LCFS' goals to decrease the carbon intensity of fuels, reduce petroleum dependence, and achieve air quality benefits.

As GCE expands its upstream camelina production, the Bakersfield Facility will initially rely primarily on soybean and canola oil, exceeding the 20 percent cap. Unlike certain biofuel feedstocks that can vary significantly in quality and impact facility performance, vegetable oils like soybean and canola are homogenous and are essential bridge feedstocks to renewable fuels while camelina production is scaled up in the future growing seasons. To ensure a smooth ramp-up, contracts with soybean and canola oil suppliers are already in place. GCE plans to reinvest revenues from LCFS credits generated during the Bakersfield Facility's initial startup phase to create additional jobs in the Central Valley, supporting a just energy transition. These funds will also drive the robust growth of GCE's camelina² business, accelerating the shift away from traditional feedstocks like soybean and canola oil.

B. THE IMMEDIATE CAP ON LCFS CREDIT GENERATION FROM SOYBEAN AND CANOLA OIL WOULD SHUT DOWN THE BAKERSFIELD FACILITY

242.2

The proposed 15-Day Changes would immediately cap the generation of LCFS credits from soybean and canola oil feedstock at the Bakersfield Facility. This restriction would shut down our Bakersfield Facility before it even commences operations. GCE has made significant

² Camelina is part of a new class of crops – intermediate crops – that provide feedstocks for renewable fuel and sustainable aviation fuel without causing land use change. Camelina is grown on existing farm acres during the otherwise idle or fallow period while providing cover crop benefits. Camelina has the potential to receive the lowest carbon intensity of available feedstocks on the market. Camelina-based renewable diesel has an estimated CI score of ~24 (without meal credit) and an estimated CI Score of ~7 (with meal credit).

Honorable Members of the California Air Resources Board
August 27, 2024
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plans, contracts, and investments based upon the projected ability to initially generate LCFS credits from soybean and canola oil feedstock at its Bakersfield Facility.

The proposed 17 CCR § 95482(i) would limit credits for biomass-based diesel produced from soybean and canola oil up to 20 percent of annual biomass-based diesel upon the regulation's effective date. Proposed section 95482(i) contains a limited runway, or grandfather clause, for companies with existing fuel pathways whose 2022 production from soybean or canola feedstock exceeded 20 percent of combined 2023 LCFS reporting. For these companies, the public notice for the 15-Day Changes would provide a runway for the 20 percent cap to "take effect starting January 1, 2028, to provide time to adjust feedstock supply contracts as needed."

242.2
cont.

The current language in the proposal, however, would give the Bakersfield Facility no time to adjust feedstock supply contracts and currently would not provide the January 1, 2028, phase-in. While the Bakersfield Facility has been undergoing retrofitting processes, we have entered into significant contracts with soybean and canola oil suppliers to be ready for production this year and respectfully request the same runway being offered to others to avoid a shutdown.

C. PROPOSED SOLUTIONS

With just weeks before the startup of our \$1 billion+ Bakersfield Facility, we are respectfully requesting a minor amendment to the proposed soybean and canola oil cap in the 15-Day Changes. This adjustment is necessary to ensure a level playing field and to align with CARB's goals of reducing the carbon intensity of fuels, decreasing petroleum dependence, and improving air quality.

A standardized implementation schedule for 2028 would prevent the shutdown of the Bakersfield Facility and be greatly appreciated. However, extending the implementation of the soybean and canola oil feedstock cap to January 1, 2030, would provide the essential time needed for the growth of ultra-low carbon intensity intermediate crops (also referred to as harvestable cover crops) like camelina. This extension would further support the broader goals of the LCFS by ensuring a sustainable and successful transition.

242.3

Since its inception, GCE has been focused on producing the most sustainable, least carbon-intensive, lowest-cost renewable fuel possible, without impacting food production or causing land use change. To achieve this goal, we have invested for over fifteen years in the development and cultivation of camelina. Grown on existing dryland farms during idle or fallow periods of the year, camelina cultivation does not impact food security, compete for scarce water resources, or displace food or feed crops. Moreover, growing camelina provides numerous benefits to farmers and soil health, including retaining moisture, minimizing runoff, reducing erosion, and increasing soil organic carbon, among others.

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242.3
cont.

Due to recent efforts to expand the use of regenerative agriculture practices, the planting of intermediate crops like camelina continues to rise. Over the past two years, GCE has cultivated nearly 250,000 acres of camelina on over 1,000 farms. However, we estimate that over 1 million acres will be needed to supply the Bakersfield Facility at full capacity. Expanding to this scale will require additional time to attract and educate new growers, increase the crop's footprint, and account for unpredictable factors such as weather, pests, diseases, and other environmental challenges that could impact production. Given these considerations, GCE respectfully requests that CARB extend the compliance date to January 1, 2030. This extension would accommodate these variabilities and incentivize the production of cleaner, ultra-low-carbon transportation fuels made in California.

Below we present two separate solutions for the Board's consideration.

- **Option 1: Standardize the Soybean and Canola Oil Cap Implementation Schedule for All Facilities**

A simple solution is to provide all facilities using soybean or canola oil as feedstock under the LCFS credit program until January 1, 2030, to comply with the cap—standardizing the implementation schedule and eliminating the inequitable grandfather clause in the proposed 17 CCR § 95482(i). This minor modification would provide time needed to adjust for future compliance and avoids unfairly benefiting certain fuel producers by favoring 2023 feedstock choices, giving them a competitive edge based on a limited historical snapshot. This equitable modification would allow the Bakersfield Facility time to commence operations this year and to provide renewable diesel for California. For the first option, below is suggested amended language to 17 CCR § 95482(i):

Biomass-based diesel produced from soybean oil and canola oil is eligible for LCFS credits for up to twenty percent combined of total biomass-based diesel annual production reporting, by company. Any reported quantities of biomass based diesel produced from soybean oil or canola oil in excess of twenty percent on a company-wide basis will be assigned a carbon intensity equivalent to the carbon intensity benchmark shown in Table 2 in Section 95484(e) for the applicable data reporting year, or the certified carbon intensity for the associated fuel pathway – whichever is greater. For companies with biomass-based diesel pathways certified prior to the effective date of the regulation and for which the percentage of biomass-based diesel produced from soybean oil or canola oil was greater than 20 percent of combined reported biodiesel and renewable diesel quantities for 2023 LCFS reporting, ~~†~~ This provision takes effect beginning January 1, 2030²⁸.

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- **Option 2: Adjust the Soybean and Canola Oil Cap to 2030 for Facilities Registered Under 40 CFR Part 80**

242.4 The U.S. Environmental Protection Agency's regulations found at 40 CFR Part 80 regulate fuels and fuel additives under the federal Renewable Fuel Standard. In order to qualify for RINs credits, facilities must be registered under 40 CFR Part 80. In lieu of a certified LCFS fuel pathway, which can take over a year to obtain, and which the not-yet-operational Bakersfield Facility does not possess, we propose that facilities producing renewable diesel that are currently registered under 40 CFR Part 80 be granted until 2030 to comply with the proposed soybean and canola oil cap. Here is suggested amended language to 17 CCR § 95482(i) for this second option:

Biomass-based diesel produced from soybean oil and canola oil is eligible for LCFS credits for up to twenty percent combined of total biomass-based diesel annual production reporting, by company. Any reported quantities of biomass based diesel produced from soybean oil or canola oil in excess of twenty percent on a company-wide basis will be assigned a carbon intensity equivalent to the carbon intensity benchmark shown in Table 2 in Section 95484(e) for the applicable data reporting year, or the certified carbon intensity for the associated fuel pathway – whichever is greater. For (i) companies that have an approved registration under 40 CFR Part 80 or (ii) companies with biomass-based diesel pathways certified prior to the effective date of the regulation and for which the percentage of biomass-based diesel produced from soybean oil or canola oil was greater than 20 percent of combined reported biodiesel and renewable diesel quantities for 2023 LCFS reporting, this provision takes effect beginning January 1, 2030~~28~~.



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D. CONCLUSION

242.5

Thank you again for the opportunity to provide comments. GCE respectfully urges CARB to amend the proposed soybean and canola oil feedstock cap runway timing to avoid shutting down the Bakersfield Facility, as it commences operations. We are available any time and would appreciate the opportunity to meet to quickly discuss solutions. Thank you for your consideration of this critical matter—we look forward to working together on the resolution.

Sincerely,

A handwritten signature in black ink, appearing to read "Noah Verleun", is written over a light blue horizontal line.

Noah Verleun
President & CEO

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office: +1 503 427-1968
e-mail: john@CleanFuture.us

August 27, 2024

Ms. Rajinder Sahota
Deputy Executive Officer - Climate Change & Research
California Air Resources Board
1001 I Street
Sacramento, California 95814

(Comment submitted electronically)

RE: CleanFuture Comments on the August 12, 2024 Proposed Amendments to the Low Carbon Fuel Standard

Dear Ms. Sahota:

CleanFuture appreciates the opportunity to submit written comments in response to the proposed amendments to the Low Carbon Fuel Standard (LCFS) posted on August 12, 2024. CleanFuture appreciates the time and effort that staff has put into engaging the public and crafting the updates to the program over the last several years and for considering CleanFuture's comments submitted in response of the 45-day draft rule package published last December. This letter focuses on selected elements of the proposed amendment:

1. Establish a Temporary CI for Biogas-to-electricity
2. Align Deliverability of Low-CI Electricity with other Fuels and other Clean Fuel Standards
3. Allow Book-and-Claim of Biomethane to Off-site Electric Generators
4. CARB's Proposed Remedy of 4x Penalty for CI Exceedance is Excessive and Discourages Investment
5. Clarify Site Visits for Third-party Verification (3PV) of Electricity and Hydrogen for Quarterly Fuel Transaction Reporting (QFTR)

CleanFuture is a leading environmental company that has worked for over a decade to electrify and improve the efficiency of a wide range of vehicle fleets. CleanFuture, Inc. has built a strong platform connecting clean vehicle fleet customers with low carbon fuels (electricity and other fuels), particularly zero and sub-zero CI fuels, serving both on the supply and demand side in multiple programs and jurisdictions. CleanFuture is also an active fuel pathway developer.

CleanFuture provides the following comments:

1) Establish a Temporary CI for Biogas-to-electricity

243.1 No temporary CI exists for dairy biogas-to-electricity projects and CARB's failure to correct this discriminates and disadvantages the use of Low-CI electricity in electric vehicles. A temporary CI pathway is available for biomethane from dairy manure and swine manure in *Table 8- Temporary Pathways for Fuels with Indeterminate CIs* however Table 8 excludes biogas-to-electricity if produced from that same dairy manure or swing manure. CARB staff must remedy this oversight by establishing a temporary pathway for biogas-to-electricity with dairy manure or swine manure feedstock. Because biogas-to-electricity from dairy manure projects consistently have a lower (more negative) CI than bio-CNG, CleanFuture suggests a temporary CI of -200 gCO₂e/MJ for these biogas-to-electricity projects.

Project economics for biogas-to-electricity projects is more challenging because biogas-to-electricity projects are not eligible to participate in the federal Renewable Fuel Standard. Failure to allow a temporary CI for biogas-to-electricity further disadvantages dairy biogas electricity projects than if those projects were to upgrade and clean that same biogas into biomethane for vehicles.

243.2 CleanFuture is appreciative and commends CARB for proposing a credit True-Up back to the temporary CI, recognizing the actual GHG emission reductions that have occurred when a project's provisional CI score is certified. Unfortunately, with no temporary CI for Dairy Biogas-to-Electricity, these projects are ineligible to be retroactively credited and are further disadvantaged. They are also exempt from the Tier 1 pathway approach since no Tier 1 GREET

243.3 model was developed for electric projects. This means that biogas-to-electricity projects are subject to approximately two years of review time and therefore two years without credit generation and are denied a True-up as a temporary pathway.

2) Align Deliverability of Low-CI Electricity with other Fuels and other Clean Fuel Standards

243.4 CARB should level the playing field across pathways for book-and-claim. Under the existing LCFS regulation, biogas-to-electricity projects participating in the LCFS must physically wheel the power into California, while biomethane projects may be located anywhere in North America and use book-and-claim accounting to demonstrate use for LCFS compliance. The most efficient, cost-effective way to make sure the LCFS program enables the most beneficial projects is to maintain a level playing field for pathways that rely on the same feedstock. A major step towards aligning requirements for projects with the same feedstock (biogas) and unlocking the untapped emissions reductions of biogas-to-electricity supporting transportation electrification, would be to let biogas-to-electricity projects use book-and-claim accounting anywhere in the Western Electricity Coordinating Council (WECC), as is already the case in Oregon under their Clean Fuels Program and in Washington under their Clean Fuel Standard. CARB's goal of exportability of the LCFS into other jurisdictions, and other jurisdictions are adopting or aligning their respective clean fuel standards with the LCFS, yet CleanFuture

encourages CARB to reciprocate and adopt beneficial rules and practices that may originate outside of California.

3) Allow Book-and-Claim of Biomethane to Off-site Electric Generators

243.5 An important opportunity for CARB to incentivize additional GHG emission reductions is to expand the language in §95488.8(i)(2) to allow for the book-and-claim of pipeline-injected biomethane to be used to generate Low-CI electricity as a transportation fuel. Currently, CARB recognizes electricity as a transportation fuel in §95482(b) and moreover in §95488.8(i)(1) recognizes that “Low-CI electricity used as a transportation fuel can be indirectly supplied through a green tariff program...or other contractual electricity supply relationship.” This is achieved by REC-matching, where the reporting entity must demonstrate that the low-CI electricity is supplied through book-and-claim accounting to electric vehicle charging provided “that any renewable energy certificates associated with the low-CI electricity were retired in the WREGIS for the purpose of LCFS credit generation” (see §95491(d)(3)). However, in the context of electricity derived from low-CI dairy biogas, this pathway requires the RECs to be created from a generator co-located with the digester.

Given the recognition CARB has for 1) book-and-claim of Low-CI electricity production to be matched to electric vehicles, and 2) biomethane injected into the commercial distribution pipeline and withdrawn at a CNG station in California, CleanFuture argues that by the same logic, biomethane injected and withdrawn via book-and-claim should qualify for the purposes of generating electricity. In this construct, RECs generated from an electric generator located off-site from the dairy powered by gas fed through the utility pipeline should similarly be allowed to match RECs to electric vehicles.

Please consider including the following edits in bold and underline to the draft LCFS regulation:

Section §95488.8(i)(2):

(2) *Book-and-Claim Accounting for Pipeline-Injected Biomethane Used as a Transportation Fuel or to Produce Hydrogen **or to Generate Electricity**.* Indirect accounting may be used for RNG used as a transportation fuel or to produce hydrogen **or to generate electricity** for transportation purposes (including hydrogen that is used in the production of a transportation fuel), provided the conditions set forth below are met:

(A) RNG injected into the common carrier pipeline in North America (and thus comingled with fossil natural gas) can be reported as dispensed as bio-CNG, bio-LNG, or bio-L-CNG, or as an input to hydrogen production **or to electricity production**, without regards to physical traceability. Entities may report natural gas as RNG within only a three-quarter time span. If a quantity of RNG (and all associated environmental attributes, including a beneficial CI) is pipeline-injected in the first calendar quarter, the quantity claimed for LCFS reporting must be matched to natural gas sold in California as RNG no later than the end of the third calendar

quarter. After that period is over, any unmatched RNG quantities expire for the purpose of LCFS reporting.

...

- (C) To substantiate RNG quantities injected into the pipeline for dispensing as bio-CNG, bio-LNG, or bio-L-CNG or as an input to hydrogen production or to electricity production, the pathway application and subsequent Annual Fuel Pathway Reports must include the following documents linking the environmental attributes of RNG (in MMBtu or Therms) with corresponding quantities of natural gas withdrawn:
1. Unredacted monthly invoices showing the quantities of RNG (in MMBtu) sourced and the contracted price per unit;
 2. Unredacted contract by which the fuel pathway holder obtained the environmental attributes.

This approach aligns with CARB's existing book-and-claim accounting framework and greater GHG reductions could be realized by making this targeted change to the regulatory text that is consistent with CARB's objectives of supporting the transition to zero emission transportation. As noted, this recommendation is fully aligned with CARB's goals expressed in the Initial Statement of Reasons (ISOR), which seeks to ensure the LCFS program incentivizes "the production of low-carbon and renewable alternatives, such as low-CI electricity" and acknowledges that "biomethane can play a key role in decarbonizing stationary sources" and additional end uses such as electricity generation can displace the need for fossil gas.

CARB would be remiss to lose this opportunity to encourage and incentivize low-CI dairy biomethane to be used for electricity generation. This will create an additional market for biomethane derived from dairy biogas, as CARB has signaled it is seeking to phase it out of combustion in CNG vehicles and "direct biomethane to sectors that are hard to decarbonize or as a feedstock for energy."¹ Directing biomethane as a feedstock to electricity production is a readily available solution and further encourages grid resiliency, and also alleviates local electric distribution constraints. CleanFuture has many large fleet clients with inadequate electric supply capacity at fleet depot locations, with Advanced Clean Fleets (ACF) and other requirements for zero emission vehicles this is a monumental challenge. Allowing book-and-claim electricity from biomethane (offsite from the digester) to electric vehicle fleet fueling could bolster and alleviate electric distribution constraints at freight and goods movement facilities.

4) CARB's Proposed Remedy of 4x Penalty for CI Exceedance is Excessive and Discourages Investment

CleanFuture remains concerned that the four-to-one CI penalty is likely to have a dampening effect on project investments. The language in the proposed regulation for 95486.1(g) was not developed or vetted in a workshop, the proposed language would apply a four-to-one CI penalty if it moves unfavorably to the credit-generating CI during the true-up, which is in

¹ <https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>

243.6
cont. addition to the necessary credit adjustment. Operators will be forced to apply an overly conservative margin of safety to the CI of projects, reducing its quarterly revenues. Entities that intend in good faith to comply with the true-up, but fall short, will be disproportionately penalized, resulting in a disincentive for investment when more investments are needed to achieve the LCFS program goals.

5) Clarify that Site Visits for Third-party Verification (3PV) of Electricity and Hydrogen is to the Central Records Location for Quarterly Fuel Transaction Reporting (QFTR)

243.7 As stated in our 45-day comments, CleanFuture is supportive of moving towards 3PV of quarterly fuel transaction reports (QFTR) if the verification protocols and guidelines for electricity and hydrogen can be reasonably matched with the characteristics of dispensing these fuels with high transaction counts of relatively low transaction value across diffuse and diverse vehicle applications and locations.

As several verification providers, aggregators, and other parties have noted in comments to the 45-day rule package, it would not just be logistically and financially infeasible, but outright *impossible*, for verifiers to send their employees to visit the thousands of disparate sites containing electricity FSE. We do not believe this was CARB's intent when including electricity transaction types as subject to third-party verification requirements under the revisions in §95500.

CleanFuture submits that site visits are costly and unnecessary for EV transactions, and instead third-party verification of EV charging should be verified by desktop review; CARB should remove requirements for site visits to EV charging stations in §95501(b)(3) to recognize that EV charging fuel transaction data is housed on electronic records systems and not individual EV charging stations. A site visit requirement burdens the participation of EV charging in the LCFS; remote site visits / desktop reviews were proven to be effective during the pandemic. CleanFuture urges CARB to modify rule text to allow desktop review of EV charging transactions.

243.8 If CARB insists on a site visit for third-party verification of EV transactions, then CleanFuture requests for CARB to clarify that for verification of transaction types identified in §95500(c)(1)(E), the required site visit is to the location where the records are stored. Any additional site visits are to be performed at the verifier's discretion following a risk-based approach informed by a sampling plan.

As part of Oregon's rulemaking process to update the clean fuels program, Oregon has proposed clear rules that provide the necessary flexibility for third-party verifiers to ensure with adequate certainty that participants are not misreporting data. As proposed in the current Oregon draft rules, for entities using credit aggregators (i.e., designated entities), site visits to facility locations (beyond where the aggregator's records are kept) may be performed at the verifier's discretion.² This represents a typical set of requirements for verification bodies to

² <https://ormswd2.synergydcs.com/HPRMWebDrawer/Record/6798709/File/document>

come to a reasonable level of assurance - the standard for a positive verification statement - as opposed to seeking an absolute level of assurance by visiting every parking lot in the state with a registered FSE.

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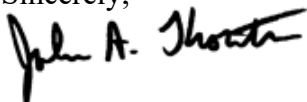
While we understand that CARB desires to apply verification requirements equally to all reporting entities throughout the LCFS program, the nature of EV charging equipment is such that the verification process could require multiple months of continuous travel to achieve 100% visitation of all sites with registered FSE. This impractical requirement would pose serious issues for verification bodies and designated entities alike, while adding exorbitant costs to participate in the program. Failing to make these changes would discourage EV participation in the program, especially for entities with many distributed FSE.

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While we feel the estimated cost of verification as shown in Table 46 on page A-1 of the SRIA is exorbitant, we are concerned that the actual verification costs will be significantly higher for entities with many distributed FSE unless CARB makes this clarification.

CleanFuture appreciates this opportunity to provide feedback, and we look forward to continuing to work with CARB on the LCFS program. Please advise if any further input on these issues would be constructive.

Sincerely,



John A. Thornton, President
CleanFuture, Inc.



August 27, 2024

Liane Randolph, Chair
Members of the Board
California Air Resources Board
Via comment portal

**Comments on the Modified Text and Availability of Additional Documents
and/or Information: Proposed Low Carbon Fuel Standard Amendments
(Proposed 15-day Changes)**

244.1 The UN forecasts that global population will increase by another 2 billion people between now and the mid 2080s. The World Bank forecasts that global per capita incomes will also continue to increase. Because agricultural productivity growth is not keeping pace with the ever increasing demand for food resulting from population and per capita income growth, there is constant pressure to convert undisturbed natural forests, grasslands and wetlands to agriculture. In the process the carbon stocks of these lands are released and their future value as carbon sinks is greatly diminished. **Any increase in biofuels made from crops results in sure destruction of more natural land.** California's Low Carbon Fuel Standard credits play a major role in the planet's deforestation crisis. With this unfortunate fact in mind we submit the following comments on behalf of the undersigned organizations.

- 244.2 1. Subsection 95482(i) of Attachment A-1 proposes to "provide credits for biomass-based diesel produced from virgin soybean oil and canola oil up to 20% of annual biomass-based diesel reported on a company-wide basis"...beginning on 1/1/2028 if a company share was greater than 20 percent in 2023, otherwise effective immediately.¹ **We recommend that the 20 percent limit be changed to 10 percent beginning on 1/1/2028 for those over 10 percent in 2023, and that no soybean oil or canola oil feedstock qualify for credits beginning 1/1/2030, the COP26 deadline for ending and reversing deforestation worldwide.**

- a. According to Figure 6 on CARB's Dashboard website, soybean oil and canola oil accounted for about 20 percent of the biomass-based diesel produced for the California market in 2023.² The intent of this modification seems to be

¹ [Attachment A-1](#), Proposed 15-Day Changes, Proposed Amendments to the LCFS Regulation, 8/12/2024.

² [LCFS Data Dashboard](#), California Air Resources Board.

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stopping this share from increasing. *This is a worthwhile but entirely insufficient goal, since the amount of biomass-based diesel produced from soybean oil and canola oil is already at unsustainable levels.*

The rate of tropical forest destruction, including in Amazonia, Indonesia and Malaysia, has been increasing recently despite global commitments to end deforestation by 2030.³ *California's LCFS program is a large contributor to this forest destruction made worse by its role as a model for other state LCFS programs and for federal RFS program changes expected in 2025 to adopt the LCFS carbon intensity approach.*

- b. Companies whose feedstocks were less than 20 percent soybean or canola oil in 2023 should not be allowed to increase their use of these feedstocks, because if they do, the overall share of these feedstocks could increase. Forest destruction is occurring mostly in the tropics, because forest land is insufficiently protected there. Sadly, these tropical forests are also the most biodiverse habitats in the world.⁴ Local, indigenous activists who are trying to protect them are not able to attend CARB's many workshops— unlike the oil companies who are increasingly becoming the major biomass-based diesel producers in the US.
 - c. The best opportunity for halting the destruction of tropical forests and savannas is to immediately reduce and then quickly eliminate the use of crop-based biofuels. This would enable land that is currently being used to grow crops for biofuels to be used to grow crops for feeding people. European countries have been reducing their use of vegetable seed oil-based diesel. Many EU countries allow no credits for soybean oil-based diesel for road transport and several have reduced allowable credits for canola oil-based diesel. The EU recently disallowed all crop-based biofuels from qualifying for mandated emissions reductions in aviation and maritime transportation.⁵
2. Subsection 95482(a) proposes to "remove fossil jet fuel from the list of transportation fuels the LCFS applies to." This decision appears to recognize that pushing airlines to use so-called more sustainable aviation fuel (SAF), currently the only viable substitute for fossil jet fuel, makes little sense when the benefits from SAF are questionable.

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³ [Forest Declaration Platform](#), UNDP.

⁴ The Kunming-Montreal Global Biodiversity Framework adopted at COP 15 in December 2022, in addition to pledging to conserve and manage at least 30% of the world's land, coastal areas and oceans, pledged to reduce to near zero the loss of areas of high biodiversity, and to phase out subsidies that harm biodiversity.

⁵ Unlike CARB's models EU models estimate all vegetable seed oil-based diesel to have larger carbon intensities than fossil diesel.

244.3
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- a. **LCFS credits for SAF should be discontinued until better alternatives for fossil jet fuel are available and fossil jet fuel producers incur deficits.**

- b. Current approved LCFS pathways for SAF are for the Hydrotreated Esters and Fatty Acids (HEFA) process, which uses vegetable seed- and waste-oils to produce fuel that can be added to fossil jet fuel. Several companies that produce renewable diesel (RD) also produce SAF, which is nothing more than upgraded RD. Increasingly, fossil fuel refineries are being retrofitted into RD and SAF refineries, and oil companies are qualifying for LCFS credits for both RD and SAF. **Oil companies should not receive credits for SAF if they incur no deficits for the fossil jet fuel they produce. Awarding such credits is counter to the LCFS's basic principle, that fuels used in California with a CI higher than the annual benchmark incur deficits, while those with a CI lower than the benchmark receive credits.**

244.4

- c. Discontinuing new LCFS credits for crop-based SAFs will also demonstrate California's leadership and adherence to the original intent of the federal Inflation Reduction Act's (IRA's) requirement that a SAF's greenhouse gas emissions be 50 percent less than the petroleum jet fuel it replaces according to CORSIA estimates.

- i. Unfortunately, many ethanol producers are planning to produce "alcohol to jet" (AtJ) SAF and qualify for IRA's federal tax credits. According to CORSIA estimates, neither corn ethanol nor soybean oil meets the 50 percent threshold. However, intense lobbying of the US Treasury by the USDA and ethanol companies resulted in Treasury approving a less conservative 40BSAF-GREET model for estimating the carbon intensity of AtJ and USDA estimates for additional emissions reductions if US corn producers use specific "climate smart agricultural" (CSA) methods.⁶ Approval of such a contrived solution totally ignores the latest scientific research.
- ii. Recent US research has shown that the rapid increase in US corn production to meet increasing RFS volume requirements for ethanol between 2008 and 2016 resulted in large increases in global food prices and larger greenhouse gas emissions than would have occurred had ethanol not replaced petroleum diesel.⁷ We can expect more of the same if ethanol companies ramp up production for SAF.

⁶ Wiesemeyer, J, [The New GREET Model is Finally Here: An In-Depth Look at What it Means for Farmers](#), Farm Journal AgWeb, 5/1/2024.

⁷ Lark, T, [Environmental Outcomes of the US Renewable Fuel Standard](#), Proceedings of the National Academy of Sciences, 2/2022.

- 244.5 3. **The LCFS should concentrate on accelerating the transition of road transportation to electric vehicles** since this is both a worthy and practical climate solution. EVs are continually improving. The Chinese company Nio recently began making EVs that can travel 620 miles on a single charge.⁸ Sadly, US companies have scaled back their EV production plans because EV sales have been slower than expected, partially because California's LCFS credit price has dropped enough to substantially reduce funding for EV rebates and EV charging stations. If the LCFS program were to begin phasing out credits for crop-based RD, the credit price would increase as would funds for accelerating the EV transition.
- 244.6
- a. NASA and the Chinese are working on solid state batteries that will be safer and lighter than lithium batteries.⁹ If successful, the safety and range of EVs would vastly increase and electrifying long-distance aviation would become feasible.
- 244.7 b. For years, European government models have estimated the carbon intensity (CI) of soybean oil- and canola oil-based biomass diesel to be greater than fossil diesel's CI. The LCFS should be supporting solutions of the future not solutions from the past that have been shown to be false.
- 244.8 4. **The proposed amendments fail to limit the use of distiller's corn oil in the production of biomass-based diesel. We suggest that its share be limited to 5 percent beginning 1/1/28 and to zero by 2030.**
- a. According to Figure 6 on CARB's Dashboard around 13 percent of biomass-based diesel feedstock was distiller's corn oil in 2023.
- b. Distiller's corn oil is fed to animals if it is not used to produce renewable diesel (RD). When it is used to produce RD, soybean oil or some other vegetable oil is substituted for it in animal feed. These indirect land use effects of distiller's corn oil have not been included in CARB's estimate of its carbon intensity. The LCFS credits received by ethanol producers for distiller's corn oil also have direct land use effects which have been ignored in carbon intensity estimates.
- c. The LCFS credits encourage greater production of corn ethanol and hence greater production of corn, a crop linked to many environmental problems.
- i. Corn already accounts for around 28 percent of US harvested acreage. Corn production is heavily-subsidized through the federal

⁸ Johnson, P, [Nio's semi-solid state EV battery supplier ramps output as 621-mile range ET7 rolls out](#), electrek.co, 6/17/24.

⁹ White, C, [NASA's SABERS Working on Solid-State Battery Packs That Are 40% Lighter With Triple Energy Power Without Lithium-Ion Drawbacks](#), Science Times, 9/26/23 and KrASIA Connection, [China's CATL unveils new battery tech that could power electric airplanes](#), 7/31/23

244.8
cont.

Farm Bill, despite the fact that hardly any corn produced in this country is used to feed people: 45 percent is used to produce ethanol, 40% is used to produce feed grains for animals, and 10% or more is exported.¹⁰ Astonishingly, half the chemical fertilizer consumed in the US is used to grow corn that is not used to feed people.

- ii. Corn uses more irrigation water than any other crop.¹¹
- iii. Corn is produced on large monoculture farms that are degrading soil quality and reducing biodiversity in rural areas, depriving farms of the many crucial services biodiversity provides including pollination, pest control and improving air and ground water quality.¹²

- d. **The misguided Treasury decision regarding tax credits for corn ethanol-based SAF, if allowed to hold, will be even more damaging to the environment if CARB fails to limit the amount of distiller's corn oil that can qualify for LCFS credits.**

244.9

- 5. **CARB must limit the amount of used cooking oil (UCO) and tallow that are eligible for biomass-based diesel credits.** The global supply of UCO and tallow is limited, but lucrative incentives in the US and EU, in the form of greater credits for UCO and tallow than for virgin vegetable oils, often push the price of UCO above the price of palm oil opening the door for substantial fraud. US imports of UCO from China skyrocketed in 2023, as more supplies became available after the EU drastically reduced its UCO imports from China based on evidence that many were mostly virgin palm oil. It is practically impossible to accurately validate the paper trail that verifies the origin of UCO imports. **A sustainable approach to UCO would limit LCFS credits to domestically supplied UCO.**

244.10

- 6. The world continues to undervalue its natural land and oceans. Until recently, these major carbon sinks were absorbing 50 percent of the world's carbon emissions. Unfortunately, the carbon absorptive capacity of tropical forests has decreased especially rapidly, cut in half since the 1990s.¹³ Recognition of the need to protect and restore natural forests, grasslands and wetlands should propel CARB to eliminate crop-based biofuel credits. A small fraction of the freed up land could be used to provide an equivalent amount of transportation energy from solar power and, the rest of the land could be used for growing crops to feed people or rewilding.¹⁴

¹⁰ [Feed Grains at a Glance](#), Economic Research Service, USDA, 12/21/2023.

¹¹ [The future of US corn, soybean and wheat production depends on sustainable groundwater use](#), Dartmouth College, Science Daily, 1/28/2022.

¹² [How does biodiversity impact food security?](#), Zurich, 1/13/2023.

¹³ [Tropical forests' carbon sink is already rapidly weakening](#), University of Bristol News and Features, 3/4/2020.

¹⁴ Fehrenbach, H et al, [The Carbon and Food Opportunity Costs of Biofuels in the EU27 plus the UK](#), Transport and Environment, 2023.


7. CARB is California's air steward. The LCFS program relies on carbon intensity (CI) estimates, but the CI values assigned by CARB to many alternative fuels are highly questionable. Other international and national model estimates of carbon intensity are much higher for vegetable seed oil biomass-based diesel. For this reason, it is important that CARB keep its larger mission of providing clean air for California's inhabitants in sight as it sets LCFS policy.

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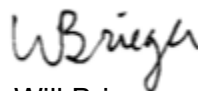
- a. **Currently, the tailpipe emissions of crop-based fuels are disregarded when calculating their carbon intensity.** It is assumed that tailpipe carbon emissions are merely returning carbon to the atmosphere that was previously sequestered by the plant as it grew, hence they cancel each other out. But this totally ignores the harm tailpipe emissions have on people living and working near large highways and city streets. Electric vehicles on the other hand have no harmful tailpipe emissions since they are powered by batteries not fuel combustion.
- i. The benefit from a plant's removal of carbon dioxide from the atmosphere as it grows on a farm does not cancel out the harm of a vehicle emitting carbon dioxide (with other pollutants) as it is driven on a congested city road in a densely populated area.
- ii. CARB should give some weight to the harm alternative combustion fuels create. While there is much uncertainty associated with their CI values there is no uncertainty about the harm tailpipe emissions from all combustion fuels have on people and the environment. Clean electricity offers a solution for both global warming and respiratory health. **The CI of combustion fuels should be weighted more heavily to adjust for this problem.**

Thank you very much for considering these comments. We look forward to reviewing the final LCFS proposal.

Sincerely,



Janet Cox,
CEO
Climate Action California



Will Brieger
Legislative Team Lead
350 Sacramento



Daniel Chandler, Ph.D.
Steering Committee
350 Humboldt



August 27, 2024

The Honorable Liane Randolph
Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95864

Re: 15-day Changes to the Proposed Low Carbon Fuel Standard Regulation

Investing in regulatory policy is risky and the 15-day proposed changes to the Low Carbon Fuel Standard strongly reinforce this fact.

On behalf of the undersigned, we are pleased to submit the following comments for consideration as the California Air Resources Board (CARB) deliberates the proposed 15-day updates to the Low Carbon Fuel Standard (LCFS). We appreciate the considerable time that staff have committed to developing the LCFS updates. However, the proposed 15-day changes deviate from the prior proposal that simply needed fine tuning to achieve the goals of the LCFS and support implementation of other CARB policies. The departure from a technology-neutral performance standard to one that dictates innovation pathways with extremely specific requirements will have negative consequences impacting the development of hydrogen as an alternative fuel and energy carrier in California.

Need for an Additional 15-day Comment Period

The recent 15-day changes to the regulation package have introduced significant challenges that undermine the progress made during the years leading up to and the release of the initial 45-day comment period. These modifications have not been previously workshopped and seem more political than policy. This is a major concern for this nascent industry as many of the changes undermine years of collaboration with CARB staff to achieve a positive market signal while our existing hydrogen refueling station (HRS) network is struggling with current LCFS market conditions.

The most pressing issue is the imposition of a more stringent and separate renewable content standard for hydrogen compared to other zero-emission fuels. This approach diminishes the benefits of diverse hydrogen production pathways and disregards a holistic, ecosystem-based strategy crucial for hydrogen's role in California's energy future. The LCFS is vital for the deployment and decarbonization of hydrogen. However, the new restrictions risk undermining the program's effectiveness by introducing higher costs and conflicting with sound energy policy.

Moreover, these changes are inconsistent with the broad range of technologies endorsed by the U.S. National Clean Hydrogen Strategy and Roadmap, which are necessary to meet hydrogen production targets and job creation goals through 2050. Without a single workshop to discuss these significant shifts, the state risks setting an energy policy that not only hampers innovation in this emerging field but

also imposes unnecessary costs and barriers to integrating hydrogen into a highly renewable energy system.

Given these substantial impacts, it is imperative to extend the comment period to allow for a thorough review and to ensure that the policy supports, rather than hinders, the development of a robust hydrogen economy.

Carbon Intensity Benchmark

CARB's proposal to accelerate the reduction of Carbon Intensity (CI) benchmarks between 2025 and 2029 represents a positive shift in the program's ambition. In previous comments we supported this acceleration, aimed at eliminating a surplus of credits, including a 9% step down in 2025, with the reduction slope increasing from 20% to 30%. While the benchmarks for 2030 and beyond remain consistent with the initial 45-day notice

Based on secondary market reactions and the current size of the bank, these reductions may still fall short of providing the necessary market signals to drive notable change until later in the decade. When contemplated in the context of the overall proposal, we have concerns that the market signal may not be sufficient to support the costs of the newly proposed requirements. The 1.45% annual declines are too small given ZEV mandates considering the compounding impact they will have on LCFS credit generation (from charging/ hydrogen refueling) and deficit creation (less deficits due to less gasoline demand).

Furthermore, with the appropriate CI benchmarks, there is simply no need to impose arbitrary restrictions on fuels throughout the 15-day changes, as the market would manage those details while allowing innovation and technology deployment to drive decisions.

Recommendation: CARB may want to contemplate a 2% annual stepdown between 2025 and 2030 achieving a 32.75% benchmark in 2030. This is less than one auto-adjustment mechanism (AAM) trigger but may send a stronger market signal and achieve the same 2035 benchmark of 52.5%. We do support maintaining the AAM as a backstop.

§ 95481. Definitions and Acronyms

The definition of "Medium-Duty Vehicle" (MDV) is misaligned for vehicle refueling behavior. While there are varying government definitions for MDVs, based on the utilization for this rulemaking it is best to use the Federal Highway Administration Gross Vehicle Weight Rating (GVRW) Category.¹

Recommendation: Increase MDV to mean a vehicle that is rated at 10,001 and 26,000 pounds GVRW. This also requires adjusting the "Light-Duty Vehicle" (LDV) definition to mean a vehicle that is rated at 10,000 pounds or less GVRW.

§ 95482. Fuels Subject to Regulation

The LCFS program must remain technology-neutral to effectively support California's hydrogen economy. Removing LCFS crediting eligibility for hydrogen produced from fossil natural gas undermines the potential for carbon capture and sequestration (CCS), while also assuming that the carbon intensity of the natural gas grid will remain unchanged until 2030. Natural gas-derived hydrogen with CCS is a cost-effective form of clean hydrogen currently being produced in the US. This removal will hinder the

¹ <https://afdc.energy.gov/data/10380>

hydrogen industry's ability to deliver clean, low-cost hydrogen to the market and many end users, in an environment where gasoline and diesel-parity pricing is sought. Additionally, CCS infrastructure paired with biomethane has significant environmental benefits and is a long-term necessity for achieving carbon neutrality.

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However, we need time and supporting policy to build the infrastructure and capacity to capture and direct biomethane to centralized hydrogen production facilities. Without appropriate economics adoption of fuel cell vehicles and hydrogen end uses will be delayed as current economics, legal uncertainty with the zero-emission rules, and LCFS market conditions do not support the macro or microeconomic needs to drive the transition. This shift represents a departure from the LCFS program's longstanding commitment to science-based regulation. The elimination of CCS, a proven technology, defies this principle and risks setting a dangerous precedent.

Justifying this change by pointing to the Investment in Infrastructure and Jobs Act does fail to recognize the scale and pace of CARB's adopted mandates and imposes additional costs of approximately \$2-3.50² per kilogram of hydrogen during a market transition from cheaper vehicles and fuels. Delaying transition to hydrogen and fuel cells will prolong the combustion of diesel and the harmful associated emissions to communities along our transportation and goods movement corridors.

The scale of California's Hydrogen Hub does not match the needs to achieve CARB's own regulatory ambition with vehicles, fleets, buses, forklifts, and other end uses – let alone significant enough to end the eligibility of a cost-effective hydrogen production within the LCFS. These projects face significant investor and local permitting hurdles, with development timelines ranging from forty to over sixty months. If these projects do not reach a final investment decision by the end of 2025, they may not come online by 2030. By eliminating CCS from LCFS crediting, CARB effectively removes increasingly lower carbon hydrogen from California's hydrogen economy. This decision narrows the field of low-carbon hydrogen producers, reduces competition, and allows the few green hydrogen producers to charge a premium in the absence of competitive pressure. Instead of promoting competition to drive down hydrogen prices and improve service, this approach stifles market development and undermines California's hydrogen economy before it even begins. Furthermore, this decision also curtails the potential deployment of innovative, non-reforming processes like methane pyrolysis.

The electric sector only has a 60% renewable requirement on retail sales by 2030 that is supported by billions in ratepayer funds annually along with substantial State general fund and special fund expenditures to support the goal – on top of significant, decadal state and federal tax credits. By 2045 retail sales from the electric sector must maintain 60% renewable and the remaining 40% shall be zero carbon by 2045. The California Energy Commission's (CEC) recent California Energy Resources and Reliability Outlook, required by SB 423 (Stern, Chapter 243, Statutes 2021) report highlights the flexibility in energy resources that can contribute to this zero-carbon goal, yet this flexibility is not extended to the hydrogen industry under the proposed LCFS changes. The elimination of natural gas as a feedstock also precedes completion of the SB 1075 (Skinner, Chapter 363, Statutes 2022) report and the Governor's Office of Business and Economic Development's California Hydrogen Market Development Strategy which are intended inform when and how to transition the hydrogen sector. This creates an arbitrary and unnecessary bias against hydrogen, imposing a standard that even the electric sector is not required to

245.12

² Dependent on the value of LCFS credits, higher values increase cost of biomethane attributes and vice versa.

meet. Furthermore, these requirements are only on retail electricity, which discounts about 10-15% of energy on the electric grid during the year.

In addition, California ratepayers invest between \$5-6 billion annually in procurement costs to support renewable electricity for the electric sector, as indicated in the annual Padilla Report on Costs and Cost Savings for the RPS Program. This far exceeds the comparatively small investment from California in renewable hydrogen, even when considering the expected federal funds for the hydrogen hub (ARCHES). Given these disparities, imposing additional constraints on hydrogen is both inequitable and counterproductive to California's broader environmental renewable goals.

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It is important to keep in mind that current market conditions do not favor electrolytic hydrogen production. Two key factors contribute to this situation, the first one is electrolyzer capital cost (CAPEX) and second is the time-matching & additionality principles in the 45V credit proposed guidelines. The effect of these two factors multiplies each other exacerbating the issue. On one side, electrolyzer CAPEX on completed projects around the world has proven to be higher than initially expected. The total cost of installed electrolyzers is beyond the initial assumptions of \$2,000/kW, which in a 24 x 7 operation represents from \$6 to \$10/kg on the final hydrogen cost for capital recovery. The risk and uncertainty of hourly time matching and additionality requirements imposed by proposed Internal Revenue Service 45V draft guidelines, and several failed California Assembly Bills, would limit capacity factors and in turn increase hydrogen costs due to lost productivity.

These economic dynamics are exacerbated in California where the electricity costs are significantly higher than neighboring states. In California, electricity operational costs only account for \$6 to \$8/kg on the total cost of hydrogen. In many cases, California produced electrolytic hydrogen could be close to \$20/kg total cost before LCFS credits. The resulting cost would be prohibitive for the adoption of any mobility application. Prematurely taking hydrogen pathways off the table, as proposed in this section, will jeopardize the future of hydrogen mobility success in the state.

CARB should focus on maintaining a technology-neutral LCFS that encourages innovation, competition, and cost-effectiveness, ensuring that all potential low-carbon hydrogen sources can contribute to California's clean energy future.

Recommendation: Do not adopt the 15-day proposed change.

§ 95486.2. Generating and Calculating Credits for ZEV Fueling Infrastructure Pathways.

The 15-day changes propose striking the December 31, 2025, date for applications received. This change undermines the long-lead time planning for development of approximately 50 HRS awarded by CEC Clean Transportation Program and other funding source grants that are relying on the terms of the current rule to help credit their development. Furthermore, CEC grants for hydrogen refueling were designed based on the current HRI pathway when LCFS values were much higher than they are today. This proposed change further adds to the headwinds facing the development and investment in those station awards. Adding this strikeout compounds our concerns of losing those investments.

Recommendation: Do not adopt the 15-day proposed changes. We strongly suggest that the eligibility of the current LD HRI program be extended through the end of 2025 and stations already awarded by the CEC be grandfathered in the current LD HRI program.

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§ 95486.3. Generating and Calculating Credits for ZEV Fueling Infrastructure Pathways for Light- and Medium-Duty Vehicles.

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We appreciate the strategic pairing of Medium-Duty (MD) with Light-Duty (LD) vehicles, as they often frequent the same fueling locations due to their shared operational focus on serving population centers. This alignment is backed by a white paper from U.S. Auto Manufacturers³, emphasizing the industry's view on MD vehicles and their specific operational needs. In our 45-day comment letter, we proposed—and continue to advocate—that these stations and the HRI credits supporting them should accommodate high-flow refills of 10 kilograms or more per session for vehicles with a gross vehicle weight rating of 26,000 pounds or lower, commonly known as Class 6 vehicles.

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However, we are concerned about the low station capacity requirements set at 2,000 kg/day with a 50% derating factor. Under the 15-day changes, this would necessitate building larger stations that would receive fewer HRI credits than the current program for MDV trucks. In effect, CARB is requiring stations to be 40% larger while providing 20% fewer credits. The current program's capacity at 1200 kg/day without derating is sufficient given the appropriate flow rates to refill medium duty vehicles and will go a long way toward building the foundations of a self-sufficient statewide network.

The proposal further restricts credit generation by capping it at 1.5 times the capital expenditures (capex). The original intent of the HRI capacity credit was to offset ongoing operations and maintenance (O&M) costs, thereby reducing costs for drivers. Linking cumulative HRI credits to capex undermines this objective by limiting station providers' ability to (a) support ongoing O&M while maintaining affordable hydrogen prices and (b) continue expanding the station network.

Recommendation: We recommend removing the 50% derating for public hydrogen refueling stations and eliminating the capex limit to better support ongoing operations and network expansion. If CARB believes it is necessary to limit crediting, then select either the cap or the derating but not both.

§95486.4. Generating and Calculating Credits for ZEV Fueling Infrastructure Pathways for Heavy-Duty Vehicles.

245.17

As stated in our 45-day comments, we truly appreciate the diligence and hard work staff has put in with our organization to develop this pathway and we believe this is critical for the successful deployment of fuel cell electric trucks in compliance with the requirements set forth in CARB's Advanced Clean Fleets regulation. Unfortunately, some of the proposed requirements for Heavy-Duty Hydrogen Refueling Infrastructure (HD-HRI) stations present significant challenges that could undermine the development of a robust hydrogen fueling network in California.

Limiting Crediting

The proposal to apply a 50% de-rating factor for shared HD-HRI stations is also problematic, especially given the accelerated benchmarks. A more reasonable approach would be to advocate for a 25% de-rating factor, considering the revised slope. CARB's goal with the HD HRI proposal is to ensure the state does not put the market in a "chicken-and-egg" scenario, where fleets are waiting for stations and stations are waiting for fleets. Designed to eliminate this conundrum and deploy HD HRS early in the

³ [Necessity for H₂ Refueling Stations for Medium-Duty Fuel Cell Electric Vehicles in the U.S.](#), United States Council for Automotive Research, August 23, 2023

market cycle, our industry made the original HD HRI proposal⁴ in September of 2022 based on the current LCFS compliance curve and determined that under projected market conditions the financial risk of deploying capital was balanced against projected HRI program income.

The proposal further restricts credit generation by capping it at 1.5 times the capital expenditures capex. The original intent of the HRI capacity credit was to offset ongoing operations and maintenance O&M costs, thereby reducing costs for drivers. Linking cumulative HRI credits to capex undermines this objective by limiting station providers' ability to (a) support ongoing O&M while maintaining affordable hydrogen prices and (b) continue expanding the station network.

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While we applaud CARB's efforts to accelerate the pace of decarbonizing the state's transportation sector, the unintended consequences put the deployment of previously planned HD HRS at risk. CARB has made two arguments against adjusting the 50% discount. The first is that the price of the LCFS "will" increase and developers will see ample revenue from this outcome. In the eyes of developers, a significant increase in the LCFS price may or may not happen. HD HRS are (very) costly investments and aligning commercial fleets with take-or-pay agreements to ensure a return on capital at this point in the market cycle is exceptionally challenging. Unless developers are given the right program signal from CARB in the form of an acceptable HRI discount, many planned HD HRS developers simply will not act, HD HRS will not get built and the market will be facing the chicken-and-egg scenario this program was designed to avert. We would further note that the proposed amendments go to great lengths to support the ARCHES program. ARCHES' primary market development segment is transportation where they propose 5,000 HD fuel cell trucks for the program and over 50 HD HRS. Given this goal, HD HRS deployments supported by the HD HRI are critical to the program's success.

The second argument made by CARB is a concern of giving "too much away" to developers in the form of HRI credits. This is a fair concern and one we shared leading to the development of a derating mechanism; however, CARB has already addressed this by placing a cap on HD HRI program revenue for each asset. Given the cap, any concern of over-paying developers is moot. If in fact LCFS prices rise as CARB intends, developers will hit the cap (sooner), if prices fail to rise then developers may (or may not) reach the cap and are left with 10 years of HD HRI credits and the risk associated with this market-based program. A 25% discount would better align with the program's goals of HD HRS deployments and promote deployments which support the state's decarbonization goals.

Recommendation: The proposed 50% derating factor and capex credit limit should be reevaluated to ensure they do not undermine station development and ongoing operations. If CARB believes it is necessary to limit crediting, then select either the cap or the derating but not both. They serve the same purpose but when paired they deteriorate the value proposition of investing in a HD HRS.

Station Location Limitations

The requirement that HD-HRI stations must be located within five miles of any Federal Highway Administration (FHWA) Alternative Fuel Corridor is highly restrictive and overlooks critical freight routes such as drayage routes. This requirement could inadvertently limit the redundancy of the fueling network and eliminate high traffic points in the freight system which are essential for reliable service. There is no sound rationale for this restriction. While many refueling activities occur near freight

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⁴ <https://www.arb.ca.gov/lists/com-attach/8-lcfs-wkshp-aug18-ws-AmhVJIM+VnwHLABh.pdf>

corridors, not all do, and refueling should not be constrained by proximity to these corridors. CARB staff currently has the authority to accept or reject HRI credit applications, which should be based on the merits of each proposal rather than an arbitrary distance requirement. For example, the Otay Mesa border crossing—one of the busiest freight corridors—is not within five miles of a designated clean corridor, yet it sees over a million truck crossings annually. This is a clear example of how such a rule could undermine the strategic placement of HRS.

Recommendation: We recommend Executive Officer discretion on requirements for HD-HRI station placement outside of the five-mile limit.

Disqualifying Early Investments

The proposal to disqualify stations permitted before January 1, 2022, from HRI crediting further impacts the eligibility of existing heavy-duty stations. These stations are the ones most in need of support, especially given the current low demand. Imposing such restrictions could jeopardize the economic viability of these stations, which are crucial for bridging the gap until more infrastructure is built. This approach contradicts the goal of fostering a sustainable hydrogen network. If they are able to meet the requirements of the proposal they should be credited.

Recommendation: We also suggest revising the eligibility criteria to include stations permitted before January 1, 2022, to November 1, 2021.

HyCap Capacity Methodology

Additionally, the method for calculating station refueling capacity using the HyCap model or an equivalent methodology approved by the Executive Officer needs standardization and additional work. Without a consistent methodology, the program may face unintended consequences, such as discrepancies in capacity estimation that could skew the allocation of credits and affect the overall effectiveness of the HRI program.

Recommendation: Continue to work with station developers and the National Renewable Energy Laboratory to develop standardization for a second 15-day proposal.

The provision requiring that HD-HRI stations must not impose any obstacles, such as access cards or PIN codes, to dispense fuel could unintentionally hinder the adoption of hydrogen technology. Training and onboarding are critical for fleet operators who frequently rotate drivers and ensuring that drivers are comfortable with new fueling technology is essential. Security measures, such as access cards, should not be seen as barriers as long as the stations remain accessible to customers.

Recommendation: Redefine publicly available to recognize security features intended to keep the general public safe but allows access for customers.

§ 95486.3 and §95486.4. – Crossover Concerns

Renewable Content Requirement

The proposed requirement that HRS achieve 40% renewable content before 2030 and 80% thereafter is inequitable. This requirement should be technology-neutral, aligning with the renewable content of the grid at that time to ensure fairness across different energy sectors. Applying this mandate exclusively to

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hydrogen places the industry at a competitive disadvantage compared to other energy sources that receive significant federal, state, and ratepayer subsidies. This is particularly concerning given the lack of a pathway for hydrogen to generate Hydrogen-Renewable Identification Numbers (H-RINs) under the federal Renewable Fuel Standard (RFS), further economically disadvantaging hydrogen compared to renewable natural gas and electricity. While the industry is committed to increasing renewable content, such a stringent and exclusive requirement is costly and discriminatory.

Regarding the renewable content requirement, the mandate that stations must have 40% renewable content before 2030 and 80% thereafter is overly stringent and should be technology-neutral, aligning with the renewable content of the grid at that time. This alignment ensures fairness across different energy sectors and avoids placing undue burdens on the hydrogen industry (see comments above on this policy).

Recommendation: Hydrogen should not be required to be more renewable than the grid, meaning 60% renewable content by the end of 2030 and in 2045 100% renewable and clean.

Credit Generation and Market Growth Implications

245.23

The restriction limiting HRI credits to 2.5% of deficits in the prior quarter, with a further limitation of 1% for any single applicant, is another restrictive measure that could significantly limit the program's impact. It is crucial to assess what these caps mean in terms of the number of stations and ensure they do not stifle network growth. Companies willing to take early risks in this market should not be disincentivized from building and deploying future stations.

Recommendation: Eliminate the 1% cap for a single entity.

Station Construction Timeline

245.24

The requirement that stations must be constructed within 24 months or risk application cancellation is too rigid. Given the complexities and potential delays in station construction, this timeline could result in the cancellation of viable projects and further deter investment. HRS have not received the same legislative support for streamlining and interconnection that charging infrastructure has enjoyed over the years. While we have worked diligently to advance our own legislative efforts, these remain incomplete, and the timing of station openings is far less predictable than for charging stations. HRS relies heavily on HRI credits to secure financing, and the risk of losing HRI approval due to permitting delays, supply chain issues, or construction setbacks introduces too much uncertainty for investors.

Recommend: Providing an extension process subject to Executive Officer approval.

Concerns Over Private Depot Crediting

245.25

As previously expressed, we continue to assert that private depots should not be overbuilt and capacity crediting for private fleets is counterproductive to the purpose and intent of HRI. It hinders effective utilization of resources and undermines the efficiency of the infrastructure. Private depots carry no risk since they control their own demand. The purpose of the HD HRI program is to eliminate the risk of underutilization and promote the installation of HD HRS absent adequate bilateral contracts that would secure offtake and return on capital invested. Should CARB want to extend crediting to private depots, it should be limited and restricted to public transit fleets only. We want to reiterate that the purpose of the

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HD HRI program is to eliminate the risk of underutilization and promote the installation of HD HRS absent adequate bilateral contracts that would secure offtake and return on capital invested.

Recommendation: Should CARB want to extend crediting to private depots, it should be limited and restricted to public transit fleets only.

§ 95488.1. Fuel Pathway Classifications.

245.26

The classifications list different fuel pathways for hydrogen but does not list biomass gasification to hydrogen. The omission of renewable hydrogen from biogenic sources also slows our efforts to capture methane emissions. In 2016, the Legislature adopted, and Governor Brown signed the Short-Lived Climate Pollutant Strategy requiring deep emissions reductions. According to the 2020 Lawrence Livermore “Getting to Neutral” analysis, there are fifty-six million bone dry tons of organic waste produced per year and “gasifying biomass to make hydrogen fuel and CO₂ has the largest promise for CO₂ removal at the lowest cost and aligns with the state’s goals on renewable hydrogen”. The State has also funded projects to utilize forest waste for hydrogen generation (through the Department of Conservation) to help meet its wildfire reduction and clean energy goals, but this proposal would exclude those projects from permit streamlining and other incentives. This policy package should be expanded to ensure these facilities qualify for fuels production thus incentivizing development with as much offtake as possible.

Recommendation: Include biomass gasification in this section.

§ 95488.8. Fuel Pathway Application Requirements Applying to All Classifications.

245.27

The proposed approach to indirect accounting for low- CI electricity, biomethane, and low-CI hydrogen only includes electrolytic hydrogen production. The 2022 Scoping Plan describes the need and utilization of hydrogen across sectors, modelling that approximately half of all hydrogen in 2045 would come from biogenic sources. Allowing all hydrogen production to utilize low-CI electricity for production and processing further deliver on California’s goals to deeply decarbonize the economy. Relegating these benefits to a singular hydrogen production pathway limits the benefits to the environment and economy by restricting this decarbonization and crediting benefit to electrolytic hydrogen that as we have discussed faces headwinds in the absence of specific electric sector policies and grid access that will allow it to be produced cost-effectively and control the RECs associated with electric procurement.

Recommendation: With a focus on carbon intensity and the absolute necessity to develop decarbonized hydrogen production from a variety of biogenic feedstocks to mitigate the detrimental impacts of methane emissions and biomass, CARB should not limit these provisions to electrolytic hydrogen only.

Conclusion

245.28

While we appreciate the intention to create a robust and reliable hydrogen fueling infrastructure, the 15-day proposed changes creates restrictions risk undermining this goal. A more flexible and balanced approach is needed—one that promotes competition, supports existing infrastructure, and aligns with California’s broader energy and climate changes goals without imposing unnecessary burdens on the hydrogen industry.

245.29

After years of workshops, we are concerned that this late in the rulemaking there are substantial problems that will stifle the renewable and clean hydrogen industry in California. It is imperative that CARB urgently revise and issue an additional 15-day proposal that will enable hydrogen investments in the state in support of our zero-emissions end use regulations. We appreciate CARB staff's work on the development of the proposed rule and their commitment to improving the LCFS. We are committed to working with CARB to get this regulation to the point where we can fully support adoption in November.

Thank you,

Katrina Fritz, President and CEO
California Hydrogen Business Council

Teresa Cooke, Executive Director
California Hydrogen Coalition

Frank Wolak President and CEO
Fuel Cell and Hydrogen Energy Association

Janice Lin, Founder and President
Green Hydrogen Coalition

cc: Rajinder Sahota, Deputy Executive Officer
Matt Botill, Division Chief
Jordan Ramalingam, Manager

Comment Log Display

Here is the comment you selected to display.

Comment 246 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Henry
Last Name	Stern
Email Address	henry.stern@sen.ca.gov
Affiliation	
Subject	California Legislators Concerns with Decision to Exempt Aviation Jet Fuel
Comment	<div>See attached letter from California legislators who are concerned with the recent decision in the 15-day proposed amendments to continue the aviation jet fuel exemption. The legislators signed on advocate for including all jet fuel, combusted over and in California, as a deficit generator.</div>
Attachment	www.arb.ca.gov/lists/com-attach/7582-lcfs2024-VTISMQRiBT8HcII+.pdf

Original File Name

Legislative Signon Ltr - Aug 2024 CARB LCFS Jet Fuel_final.pdf

**Date and Time Comment Was
Submitted**

2024-08-27 22:39:49

If you have any questions or comments please contact Clerk of the Board at (916) 322-5594.

[Board Comments Home](#)



August 27, 2024

Honorable Liane M. Randolph
Chair of the California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Comments on Proposed Low Carbon Fuel Standard Amendments

Dear Chair Randolph and Executive Officer Cliff:

We, the below group of legislators, are concerned about recent proposed amendments to the California Air Resources Board (CARB) Low Carbon Fuel Standard (LCFS). The LCFS has remained strong over the years because it is a cost-effective market mechanism to drive innovation while lifting up the workers and communities most impacted by our fossil fuel addiction.

246.1 With fidelity to that mission, we are concerned that the exemption for aviation jet fuel as a deficit generator (as published in the August 12, 2024 proposed modifications) would constitute a notable backslide in the needed efforts to hold the aviation industry and jet fuel producers accountable.

Over the past year, CARB staff have discussed the concern that aviation jet fuels are a major contributor to climate change. California's aviation footprint is among the largest in the world and rising. A 2021 inventory of statewide aviation emissions estimates that California's aviation sector generated approximately 34 million metric tons of CO₂ emissions in 2018.¹ Though it would advance both Senate Bill 32 and Clean Air Act goals, the aviation sector until now has been exempt from regulations, even on the jet fuel they burn in California during intrastate flights.

¹ Brandon Graver et al., CO₂ Emissions from Commercial Aviation, 2013, 2018, and 2019, International Council on Clean Transportation (Oct. 2020), available at <https://theicct.org/wp-content/uploads/2021/06/CO2-commercialaviation-oct2020.pdf>.

During this comment period, we have seen robust public participation of airport workers, frontline communities of color, environmental advocates, and communities in the pathways of some of the nation’s busiest airports. Respiratory illnesses like asthma and chronic obstructive pulmonary disease (COPD) are much more common among airline workers and communities of color impacted by airports. Thousands of Californians have weighed in during CARB’s public process, overwhelmingly supporting holding airlines and jet fuel producers accountable for their climate, air quality, and public health impacts.

While we understand the prospect of the preemption challenge here, we urge CARB to reconsider this decision. Historically, industries have constantly raised the specter of a legal threat in order to avoid falling under existing regulatory frameworks. CARB has already successfully triumphed in litigation to operate this specific program, and existing federal laws pertaining to aviation provide ample leeway for states to regulate jet fuel under conditions that CARB could certainly meet using a carbon intensity threshold requirement. This would not require any changes to aviation equipment. CARB has already successfully triumphed in litigation to operate these programs, found ways to regulate trucks coming in from Mexico, ships from overseas, and trains from other states.

Ending the exemption for jet fuel will drive needed innovation in the aviation sector. The International Air Transport Association has a commitment of airlines to achieve net zero carbon by 2050, and airlines such as Alaska Airlines, American Airlines, Delta, JetBlue, Southwest, and United Airlines have made individual pledges on similar timelines.² However, progress is lacking. In 2023, United Airlines topped U.S. carriers with only 0.17% of its fuel from cleaner sources.³ In lieu of other efforts to incorporate more sustainable aviation fuel and cleaner solutions, ending the jet fuel exemption in the LCFS is the best way to galvanize innovation, produce clean fuels, and protect frontline communities. As a state, we cannot simply walk away from the “difficult-to-decarbonize” or “hard-to-abate” sectors. We must drive innovation to reduce carbon emissions and public health impacts through using all of the tools available. The LCFS is the tool sitting in front of us.

We are strongly recommending that CARB adopt the following:

- To include all aviation jet fuel—including intrastate, interstate and international flights—combusted over and in California in LCFS as a deficit generator. If this is not possible initially, a minimal first would be to include intrastate jet fuel as a deficit generator and to have a re-opener within 12 months of implementation to assess future plans;
 - To limit the use of crop-based feedstock used in Sustainable Aviation Fuel; and
 - To implement these policies in 2025.
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- 246.1 cont.

² International Air Transport Association, “Fly Net Zero” (webpage), available at: <https://www.iata.org/en/programs/sustainability/flynetzero>.

³ Ben Elgin, “European Airlines Outpace US Carriers on Cleaner Jet Fuel” Bloomberg (Aug. 18, 2024), available at: <https://www.bloomberg.com/news/articles/2024-08-19/european-airlines-outpace-us-carriers-on-green-jet-fuel>.

246.1 cont. In addition, we are committed to monitoring and ensuring CARB, the South Coast Air Quality Management District, and the U.S. Environmental Protection Agency uphold the commitments made in their publicly released July 2024 Scoping Memo on aviation. The Legislature has already attempted previous efforts to spur action, such as pushing to accelerate the phase out of leaded aviation fuel and getting airports to undertake net-zero plans. We note and support the Governor's July 22, 2022 letter to Chair Randolph, which called on CARB to adopt an aggressive 20% clean fuels target for the aviation sector and take greater action to reduce dependence on petroleum.⁴

The Legislature will be closely watching these agencies to ensure effective ways to reduce emissions from the aviation sector through the production and use of cleaner aviation fuels and other low-carbon alternatives to fossil jet fuel are implemented in a timely manner.

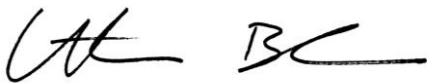
Sincerely,



Henry Stern, Senator District 27



Josh Becker, Senator District 13



Catherine Blakespear, Senator District 38



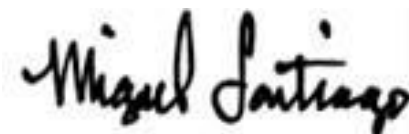
Ben Allen, Senator District 24



Dave Min, Senator District 37



Al Muratsuchi, Assemblymember District 66



Miguel Santiago, Assemblymember District 54



Tina McKinnor, Assemblymember District 61

⁴ Governor Newsom Letter to California Air Resources Board Chair Liane Randolph (July 22, 2022), available at: <https://www.gov.ca.gov/wp-content/uploads/2022/07/07.22.2022-Governors-Letter-to-CARB.pdf>.

A handwritten signature in blue ink, appearing to read "D. Connolly".

Damon Connolly, Assemblymember District 12

A handwritten signature in blue ink, appearing to read "Monique Limón".

Monique Limón, Senator District 19

A handwritten signature in black ink, appearing to read "Caroline Menjivar".

Caroline Menjivar, Senator District 20

Comment Log Display

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Comment 247 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Ravi
Last Name	Sekhon
Email Address	rsekhon@centerlinelogistics.com
Affiliation	Centerline Logistics
Subject	Comments on LCFS regulations amendment

Comment

Ravi Sekhon
rsekhon@centerlinelogistics.com
(206) 550-7659

August 27, 2024

California Air Resources Board (CARB)
1001 I Street
Sacramento, CA 95814

Subject: Support for Including Green Methanol as a Marine Fuel in the LCFS

Dear California Air Resources Board Members,

I am submitting this letter in support of including green methanol as a marine fuel in the Low Carbon Fuel Standard (LCFS). I believe that CARB should actively promote the increased production, sale, and utilization of green methanol not only to lower carbon emissions but also to enhance air quality in our communities.

Green methanol offers significant environmental benefits when compared to conventional marine fuels like diesel. It can reduce carbon dioxide emissions by as much as 95%, cut nitrogen oxide emissions by up to 80%, and completely eliminate emissions of sulfur oxides and particulate matter. These substantial reductions make green methanol a cleaner and more sustainable option for marine transportation.

One of the major advantages of green methanol is that the existing

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infrastructure in California can handle this fuel. Storage tanks currently used for traditional marine fuels can be repurposed to store green methanol, and barges used to transport conventional bunker fuels within the ports can similarly be adapted for green methanol. This flexibility reduces the time and cost associated with transitioning to green methanol, as it avoids the need for completely new infrastructure. In contrast, other zero-carbon or low-carbon marine fuels that are being considered would require the construction of entirely new facilities and equipment, which would take years to permit and build.

Amending the LCFS regulations to permit low-carbon-intensity (CI) green methanol to generate credits when used in specific applications, such as marine transportation, would create incentives for its adoption. This change would encourage its use in place of traditional fossil fuels, ultimately helping to decrease overall emissions in these sectors.

Such a change aligns perfectly with CARB's dual objectives of improving local air quality and tackling the global challenge of climate change. The growing demand for green methanol in various transportation sectors, particularly in the maritime industry, underscores its potential. Many major transportation companies are transitioning their fleets to run on green methanol, with numerous vessels expected to call on California's ports. Therefore, fostering the production and use of green methanol within the state is of critical importance.

This initiative also complements efforts by California's port authorities to address emissions from the marine transportation sector. For example, the San Pedro Bay Ports Clean Air Action Plan

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(CAAP), adopted in 2006, outlines a comprehensive strategy to reduce pollution from ocean-going vessels and other port-related sources.

As CARB acknowledged in the 2022 Climate Scoping Plan, marine transportation is a challenging sector to decarbonize. Continued support for low-carbon liquid fuels is essential as the industry transitions away from fossil fuels. One effective way to maintain this support would be to amend the LCFS regulations to include green methanol as an optional fuel for marine transportation. Many stakeholders have expressed this need in their comments on the ongoing rulemaking package, and I urge CARB to act swiftly to incorporate this change.

Thank you for considering this matter. I appreciate your leadership in addressing both local air quality and global climate issues and your efforts to support innovative low-carbon solutions.

Sincerely,

Ravi Sekhon

Attachment

Original File Name

**Date and Time Comment Was
Submitted**

2024-08-27 22:14:05

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Comment 248 for Proposed Low Carbon Fuel Standard Amendments (lcfs2024) - 15-1.

First Name	Philip
Last Name	Sheehy
Email Address	philip.sheehy@icf.com
Affiliation	ICF
Subject	ICF Analysis of SAF in California LCFS (LanzaJet)
Comment	<div>ICF prepared the attached document for LanzaJet regarding the role of sustainable aviation fuel (SAF) in the Low Carbon Fuel Standard program.</div>
Attachment	www.arb.ca.gov/lists/com-attach/7584-lcfs2024-WyhXMFA3VlpWOVM9.pdf
Original File Name	SAF in California LCFS for LanzaJet 240827 FINAL.pdf

**Date and Time Comment Was
Submitted**

2024-08-27 23:04:21

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August 2024

ICF Report



Sustainable Aviation Fuel in California's Low Carbon Fuel Standard

Submitted to:

LanzaJet, Inc.

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Deerfield, IL 60015

Submitted by:

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Executive Summary

The pressure for airlines to reduce GHG emissions from passengers, investors, governments, and society has increased in recent years. In December 2023, the California Air Resources Board (CARB) published its Staff Report related to regulatory amendments to California's Low Carbon Fuel Standard (CA LCFS) program, which included a proposal to regulate *intrastate* jet fuel for the first time. During regulatory amendments in 2018, CARB proposed and ultimately approved the opportunity for renewable jet fuel or sustainable aviation fuel (SAF) to generate credits in the LCFS program; however, there was no action at that time to regulate its conventional counterparts.

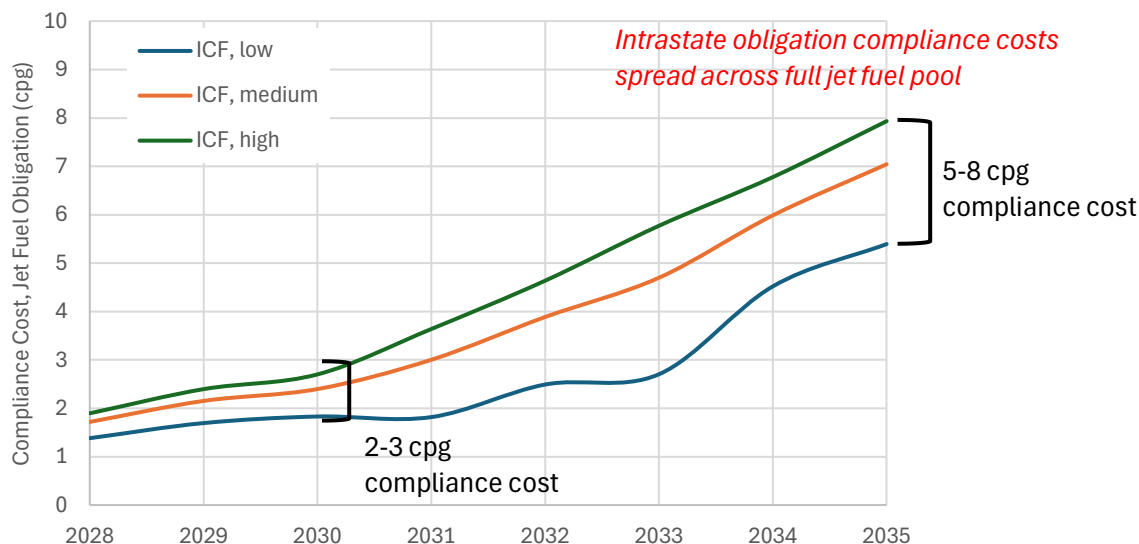
ICF evaluated the potential the compliance costs (in cents per gallon, cpg) associated with regulating intrastate jet fuel and the opportunity for SAF in the California LCFS market in the context of other SAF production incentives and its competitive positioning with respect to another drop-in fuel, renewable diesel.

Jet Fuel Compliance Costs

ICF Conclusion 1: ICF estimates that the potential jet fuel compliance costs associated with an intrastate jet fuel obligation will increase from around 1-2 cpg in 2028 and increase to 5-8 cpg over the period of the analysis to 2035.

ICF's analysis is summarized in the figure below.

ICF Analysis of Jet Fuel Compliance Costs in the CA LCFS w/ Intrastate Jet Fuel Obligation



For the sake of reference, intrastate flights burn jet fuel at a rate of about 1.8 gallons per mile traveled. Considering the flight distance between Sacramento (SMF) and Los Angeles (LAX) is about 375 miles, the implied compliance cost in 2035 is \$36 to \$54 per flight. ICF assumes that airlines would distribute these costs across both passengers and cargo according to their pricing algorithms, which presumably include customer willingness and ability to pay.

SAF vs RD: Value Stack Differential

248.1

ICF Conclusion 2: The value stack differential between SAF and renewable diesel will persist and constrain the opportunity for SAF deployment unless the incentive structure is rebalanced e.g., by including jet fuel in broader decarbonizing policies and via additional state tax incentives.

ICF Conclusion 3: An intrastate jet fuel obligation under the LCFS could help narrow the incentive gap between SAF and renewable diesel and may help shift low carbon fuel producers toward SAF production.

Hydroprocessed esters and fatty acids (HEFA), whereby waste oils and fats, such as used cooking oil and inedible animal fats, are converted into jet fuel, remains the most common pathway for SAF production today, with several emerging competitive SAF production pathways e.g., via alcohol-to-jet (AtJ) processing and Fischer-Tropsch (FT) pathways. SAF production via HEFA and AtJ pathways will compete directly with renewable diesel for investment and for incentive dollars—because these same technologies and facilities produce both renewable diesel and SAF, the incentive gap between the fuels will have a material impact on strategic decision making by producers. Minor production cost differences between SAF production pathways notwithstanding, the incentive value stack is the key factor driving disproportionate supply of renewable diesel and SAF.

The table below shows the incentives available for each fuel when delivered to the California market. ICF made several assumptions to develop these values as outlined in more detail in Section 5 of the report. ICF conducted the analysis for 2025, when the Blender’s Tax Credit expires and the market transitions to the Clean Fuel Production Credit (Section 45Z of the Inflation Reduction Act).

Value Stack for SAF vs Renewable diesel in 2025 without intrastate obligation on jet fuel

Value Stack Component	Value to SAF \$/gal	Value to RD \$/gal	Assumptions
Commodity	\$2.42	\$2.49	June 2024 average
Federal Incentives			
IRA (45Z)	\$0.64	\$0.37	Assuming 30 g/MJ
RFS	\$0.80	\$0.85	\$0.50 D4 RIN
State			
Low carbon fuel standards	\$0.33	\$0.34	\$50/t, 9% CI stepdown
Carbon compliance costs			
Cap-at-Rack	--	\$0.41	\$40 CCA
LCFS compliance cost	--	\$0.16	\$50/t, 9% CI stepdown
TOTAL	\$4.19	\$4.62	

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cont.

The key difference between the value stacks is linked to the carbon compliance costs shown in the table above. These are the compliance costs that refiners face because of the carbon constraining programs in California—including the LCFS program and the cap-and-trade program.

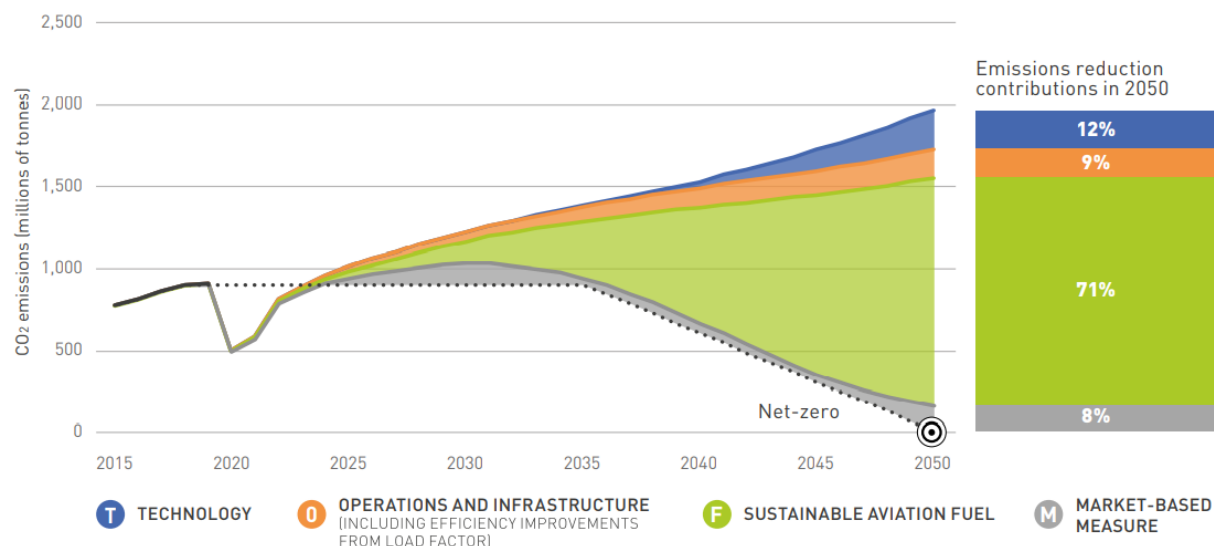
1 Introduction

In December 2023, the California Air Resources Board (CARB) published its Staff Report related to regulatory amendments to California's Low Carbon Fuel Standard (CA LCFS) program. The CA LCFS program is one of the main drivers for transportation decarbonization in California, and complements other regulations focused on GHG emission reductions economy-wide (e.g., cap-and-trade) and on the vehicle side of transportation (e.g., Advanced Clean Cars). There was a significant non-road aspect of the Staff Report: CARB has proposed to regulate *intrastate* jet fuel for the first time. During regulatory amendments in 2018, CARB proposed and ultimately approved the opportunity for renewable jet fuel or sustainable aviation fuel (SAF) to generate credits in the LCFS program; however, there was no action at that time to regulate its conventional counterparts.

In the following sections, ICF evaluates the potential compliance costs associated with regulating intrastate jet fuel. ICF also evaluated the opportunity for SAF in the California LCFS market in the context of other SAF production incentives and its competitive positioning with respect to another drop-in fuel, renewable diesel. First, we provide a brief overview of the role of SAF in the context of decarbonizing the aviation sector, and summarize the various incentives available to SAF producers, especially via the Inflation Reduction Act.

2 Decarbonizing the Aviation Sector

The pressure for airlines to reduce GHG emissions from passengers, investors, governments, and society has increased in recent years. It is widely recognized that a basket of four key measures is required for achieving aviation decarbonization by 2050: New technology aircraft, operational improvements, offsets, and sustainable aviation fuels. Considering the energy intensity of medium to long haul flights, and the need for liquid hydrocarbons to meet the energy requirements, SAF is considered as the most important technology to support aviation decarbonization.

Figure 1. Expected Emissions Reductions in Aviation Industry by Reduction Source¹

The aviation industry has considerable ambitions for SAF as a crucial method to decarbonize the sector, in parallel with aircraft and engine technology development and operational efficiencies. The Air Transport Action Group (ATAG) Waypoint report² suggests that up to 390 million tons per year of SAF will be required globally to meet the industry's target of a 50% carbon emissions reduction from 2005 levels by 2050, and over 450 million tons per year to achieve net zero carbon emissions in the same period.

SAF production

Existing SAF production is generally produced via hydroprocessed esters and fatty acids (HEFA), whereby waste oils and fats, such as used cooking oil and inedible animal fats, are converted into jet fuel. This conversion process is cheap, well proven, and is also extensively used to produce renewable diesel. These facilities tend to be large, with typical capacities of 50–500 million gallons per year (MGPY). There are other emerging pathways e.g., via alcohol-to-jet (AtJ) processing and Fischer-Tropsch (FT) pathways. These pathways can convert municipal waste, woody biomass, agricultural residues, industry waste gases, etc. into jet fuel and renewable diesel. Several facilities are under construction. These facilities are more complex and costly, but their feedstock can be cheaper. Compared to existing HEFA facilities, they are less sensitive to feedstock prices, have fewer constraints on feedstock availability, but use less proven technology. The initial facilities are expensive, but the cost is expected to rapidly decrease as the technology is improved.

¹ ATAG Waypoint 2050 Report, scenario 2

² *Ibid.*

3 Incentivizing SAF

There is an interesting dynamic emerging with respect to incentivizing SAF, in large part because it is more expensive than its conventional counterpart and because it is significantly disincentivized as compared to diesel substitutes like renewable diesel, in part as a result of the existing exemption for jet fuel under existing regulations like Cap-and-Trade and the LCFS program. To overcome these obstacles and expand SAF consumption, additional policy support will be necessary e.g., via additional incentives or regulatory intervention that helps to level the obligation across refined products, including gasoline, diesel, and jet fuel.

The current incentive-only domestic regulatory structure includes several components (see Table 1), including via the Inflation Reduction Act (IRA) from 2022, the federal Renewable Fuel Standard (RFS), state-level programs like the California LCFS, Oregon Clean Fuels Program (OR CFP), and Washington's Clean Fuel Standard (WA CFS), and state-level tax incentives.

Table 1. SAF Incentives and Renewable Diesel

Incentive	Description	
Federal	Sustainable Aviation Fuel (SAF)	Renewable Diesel (RD)
Biodiesel Mixture Excise Credit Blenders Tax Credit (BTC)	<ul style="list-style-type: none"> SAF is not eligible for the Biodiesel BTC. 	<ul style="list-style-type: none"> RD is eligible for a tax incentive up to \$1.00 per gallon blended with petroleum diesel.
Inflation Reduction Act 2022	<ul style="list-style-type: none"> For 2023–2024, the SAF Blender's Tax Credit (Section 40b) offers \$1.25 per gallon for producers achieving a GHG emission reduction of at least 50% compared to petroleum-based jet fuel. Producers will receive an additional \$0.01 per percentage reduction over the 50% requirement, with a maximum benefit of \$1.75 per gallon. For 2025–2027, the Clean Fuels Production Credit (CFPC, Section 45z) will go into effect and provides a per gallon incentive for SAF with lifecycle GHG emissions reductions less than 50 kgCO_{2e}/mmBtu. If wage and apprenticeship requirements are met, the base value is \$1.75 per gallon of SAF multiplied by the percent reduction below the 50 kgCO_{2e}/mmBtu threshold. 	<ul style="list-style-type: none"> For 2025–2027, the Clean Fuels Production Credit (CFPC, Section 45z) will go into effect and provides a per gallon incentive for RD with lifecycle GHG emissions reductions less than 50 kgCO_{2e}/mmBtu. If wage and apprenticeship requirements are met, the base value is \$1.00 per gallon multiplied by the percent reduction below the 50 kgCO_{2e}/mmBtu threshold.

Incentive	Description	
Renewable Fuel Standard <ul style="list-style-type: none"> The federal RFS requires volumetric blending of renewable fuels and SAF is eligible to contribute towards compliance by generating Renewable Identification Numbers (RINs) i.e., the currency through which compliance is achieved. RINs are reported as ethanol gallon equivalents 	<ul style="list-style-type: none"> SAF is eligible to generate D3, D4, D5, D6, and D7 RINs depending on the feedstock, conversion technology, and product SAF has a 1.6 multiplier for RINs after adjusting for the energy density of the fuel compared to ethanol. 	<ul style="list-style-type: none"> RD is eligible to generate D3, D4, D5, D6, and D7 RINs depending on the feedstock, conversion technology, and product RD has a 1.7 multiplier for RINs after adjusting for the energy density of the fuel compared to ethanol.
State		
Low carbon fuel standards <ul style="list-style-type: none"> Low carbon fuel standards in California, Oregon, and Washington establish carbon intensity benchmarks against which the transportation fuel market must achieve aggregate GHG emissions reductions each year. 	<ul style="list-style-type: none"> SAF is an opt-in fuel for these programs and generates credits depending on the CI of the fuel and the benchmark in any given year. However, petroleum jet fuel is not regulated in any of these programs today. California has proposed to regulate intrastate jet fuel. 	<ul style="list-style-type: none"> RD is an opt-in fuel for these programs and generates credits depending on the CI of the fuel and the benchmark in any given year. Petroleum diesel is regulated in these programs uniformly; because of this, the value generated by RD in the program includes what are often referred to as "avoided deficits" i.e., by displacing petroleum diesel with RD, credits are generated, and deficits are also avoided by displacing petroleum diesel.

4 Compliance Costs

With a focus on accelerating decarbonization of aviation fuels in line with deep greenhouse gas (GHG) emission reductions called for in AB 1279 and the 2022 Scoping Plan Update, and to incentivize SAF production further, CARB staff proposed to eliminate the exemption to *intrastate* jet fuel starting in 2028. The exemption would be lifted for "flights that take off and land within the State of California." As one might expect with any regulatory amendment, questions have been raised regarding the associated compliance costs.

With this context, we express our serious concern with a new proposal by the California Air Resources Board (CARB) to regulate jet fuel as an obligated fuel under the LCFS Program. CARB's proposed changes to the LCFS program include a proposal to eliminate the existing exemption for conventional jet fuel use for flights within the state of California. This proposed change is unlikely to

result in increased SAF production, availability, or use in California, but would lead to higher jet fuel prices.³

ICF notes two things with respect to this commentary: 1) higher jet fuel prices will inherently lead to improved SAF production economics by narrowing the subsidy needed and 2) these comments are silent on the magnitude of the impact on jet fuel prices. With regard to the former, ICF takes up the issue of the incentive gap for SAF relative to renewable diesel in the next section. With regard to the latter, ICF has quantified the likely impact on jet fuel prices by making a simple assumption: Regulated parties (i.e., refiners) will pass through the compliance costs entirely to end users (e.g., airlines), and that those end users would ultimately pass along any compliance costs to consumers (i.e., airline passengers). In other words, ICF is simplifying the consideration of consumer costs by assuming that they are equal to compliance costs, though there is nothing in the LCFS program or other regulation that requires compliance costs to be passed through as consumer costs.

ICF also assumes that the compliance cost associated with regulated intrastate jet fuel would get spread over the entirety of the jet fuel pool in California, rather than exclusively on intrastate jet fuel. To our understanding, there is no clear method by which jet fuel suppliers or jet fuel users would be able to distinguish at the point of sale between regulated and exempted gallons—therefore it is likely that the transaction will likely include a line item for LCFS compliance cost as is customary for gasoline and diesel transactions.

ICF's assumption is backed in large part by the existing treatment of compliance costs and consumer costs in the diesel market in California. Although the "diesel pool" includes conventional ultra-low sulfur diesel (ULSD), renewable diesel, and biodiesel, the LCFS compliance cost is spread over each blended gallon sold statewide as a consumer cost; there is not a separate cost allocated to specific gallons based on their regulatory status. A similar convention has evolved in the gasoline pool, in which ethanol (a low carbon fuel) is blended with gasoline.⁴ The compliance costs on the gasoline portion of the blend are spread over the entire gallon of fuel and passed on as consumer costs. These examples demonstrate the impracticality of distinguishing between aspects of the fuel pool with respect to characterizing compliance costs (and how they become consumer costs). ICF expects a similar convention will emerge for intrastate jet fuel when it is regulated in 2028.

ICF developed estimated compliance costs for obligated jet fuel in several different cases. More specifically:

- ICF assumed that the jet fuel obligation begins in 2028, as proposed.
- ICF used our own internal LCFS credit price forecasting to characterize the potential compliance cost impacts on jet fuel associated with CARB's proposed elimination of the exemption for intrastate jet fuel. ICF used three different credit price cases in the analysis, with

³ See comments submitted by Airlines for America, Alaska Airlines, American Airlines, the San Francisco Chamber of Commerce, and Southwest Airlines.

⁴ More specifically, as California Reformulated Blendstock for Oxygenate Blending (CARBOB).

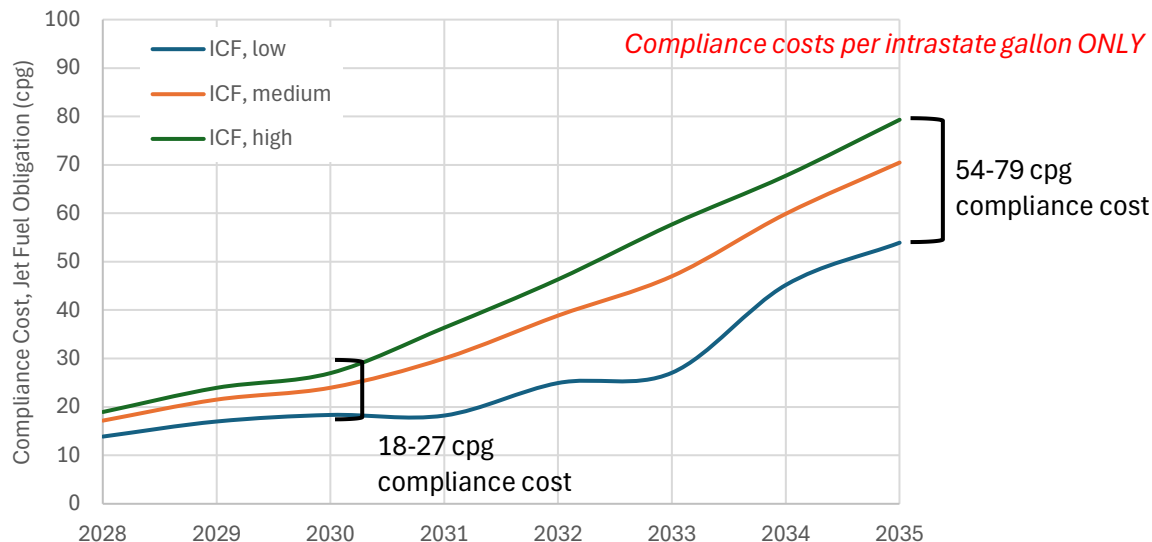
changes to assumptions regarding a) the carbon intensity (CI) step down in 2025 and b) the Automatic Acceleration Mechanism (AAM), with a focus on when it can be triggered, and how it is triggered (see table below).

Credit price case	Description
Low	<ul style="list-style-type: none"> Aligned with Staff Report from December 2023. 5% CI step down in 2030 AAM available for trigger earliest Jan 1, 2028
Medium	<ul style="list-style-type: none"> Modified case with 9% CI step down in 2030 AAM available for trigger earliest Jan 1, 2028
High	<ul style="list-style-type: none"> Modified case using ICF analysis with a 10.5% CI step down in 2025 More sensitive AAM and trigger sooner (2026, if needed)

- As noted above, the compliance cost is most likely to be spread across the entire jet fuel pool as the obligation on intrastate jet fuel comes into effect. However, for the sake of comparison, ICF has included an analysis of the compliance costs if they were concentrated on just intrastate jet fuel, which is estimated to be about 10% of the jet fuel pool.
- Accordingly, for the sake of simplicity, ICF has assumed that intrastate jet fuel that will be regulated is a constant 10% of the total jet fuel in California.

Figure 2 below shows ICF estimates for the compliance costs based on *per gallon of intrastate jet fuel* and shown in units of cents per gallon (cpg) on the y-axis. As a reminder, this implies the unlikely situation in which there will be a convoluted accounting scheme whereby sellers are able to apply the compliance costs exclusively to the obligated intrastate jet fuel gallons. ICF notes that the prices are shown in nominal terms.

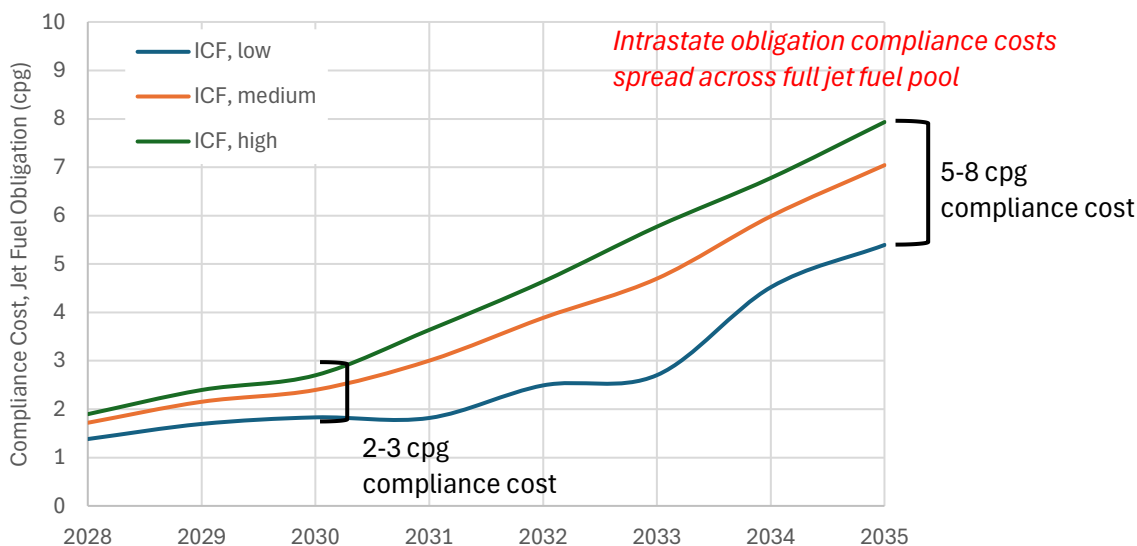
Figure 2. ICF Analysis of Jet Fuel Compliance Costs for Intrastate Gallons ONLY in the CA LCFS



This unlikely scenario yields compliance costs of 18–27 cpg in 2030 for intrastate gallons and 54–79 cpg for intrastate gallons using ICF's LCFS credit pricing forecasts. Furthermore, in this unlikely scenario, there would be no compliance cost on jet fuel for non-intrastate gallons. ICF notes that the compliance costs shown in Figure 2 are consistent with the expected compliance costs for diesel fuel moving forward.

Figure 3 below shows ICF estimates for the compliance costs associated with regulating intrastate jet fuel from 2028 to 2035 (noting that all prices are shown in nominal terms).

Figure 3. ICF Analysis of Jet Fuel Compliance Costs in the CA LCFS w/ Intrastate Jet Fuel Obligation



ICF estimates that the potential jet fuel compliance costs will increase from around 1–2 cpg in 2028 and increase to 5–8 cpg over the period of the analysis to 2035. For the sake of reference, intrastate flights burn jet fuel at a rate of about 1.8 gallons per mile traveled. Considering the flight distance between Sacramento (SMF) and Los Angeles (LAX) is about 375 miles, the implied compliance cost in 2035 is \$36 to \$54 per flight. ICF assumes that airlines would distribute these costs across both passengers and cargo according to their pricing algorithms, which presumably include customer willingness and ability to pay.

5 Value Stack: Renewable Diesel vs SAF

As noted previously, HEFA remains the most common pathway for SAF production today, with several emerging competitive SAF production pathways e.g., via AtJ or FT processing in the market. SAF production via HEFA pathways will compete directly with renewable diesel for investment and for incentive dollars—because these same technologies and facilities produce both renewable diesel and SAF, the incentive gap between the fuels will have a material impact on strategic decision making by producers. There are differing views on the production costs associated with renewable diesel and SAF production; and any production cost difference across technologies is minor. Minor production cost differences notwithstanding, the incentive value stack is the key

factor driving disproportionate supply of renewable diesel and SAF We focus here on the California LCFS market.

The table below shows the incentives available to each fuel, drawing from the information presented in Table 1 above. ICF made several assumptions to develop these values. ICF conducted the analysis for 2025, when the Blender’s Tax Credit expires and the market transitions to the CFPC for SAF and renewable diesel. ICF assumed a CI value of 30 g/MJ for both the CFPC calculation and the LCFS value calculation—we note, however, that it is highly unlikely that a fuel will have the same CI value across these two programs given the differences between the 40B SAF GREET model and the CA-GREET model. The table below includes other assumptions made in ICF’s analysis.

Table 2. Value Stack for SAF vs Renewable diesel in 2025 without intrastate obligation on jet fuel

Value Stack Component	Value to SAF \$/gal	Value to RD \$/gal	Assumptions
Commodity	\$2.42	\$2.49	June 2024 average ⁵
<i>Federal Incentives</i>			
IRA (45Z)	\$0.64	\$0.37	Assuming 30 g/MJ
RFS	\$0.80	\$0.85	\$0.50 D4 RIN
<i>State</i>			
Low carbon fuel standards	\$0.33	\$0.34	\$50/t, 9% CI stepdown
<i>Carbon compliance costs</i>			
Cap-at-Rack	--	\$0.41	\$40 CCA
LCFS compliance cost	--	\$0.16	\$50/t, 9% CI stepdown
TOTAL	\$4.19	\$4.62	

The key difference between the value stacks is linked to the carbon compliance costs shown in the table above. These are the compliance costs that refiners face because of the carbon constraining programs in California—including the LCFS program and the cap-and-trade program. Renewable diesel producers, providing a drop-in substitute for diesel, have been able to capture these “avoided compliance costs” as part of their revenue streams.⁶ Other blended biofuels, like biodiesel and ethanol, lack the same substitutability as renewable diesel and with physical blending limits have been unable to command this premium in the market. It is unclear the extent to which SAF will be able to capture the avoided carbon costs in the LCFS program—but because jet fuel is not regulated via California’s cap-and-trade, it most certainly will not capture any cap at the rack benefit shown for renewable diesel. An intrastate jet fuel obligation under the LCFS could

⁵ The commodity price listed for SAF is ICF’s analysis of daily Argus LA Spot for jet fuel. The commodity price listed for renewable diesel is the Ultra-Low Sulfur No. 2 Diesel Fuel price reported by the EIA for Los Angeles posted [here](#).

⁶ There is emerging evidence that renewable diesel providers are and will continue to have to discount their pricing via this carbon compliance costs to maintain competitiveness

248.2

help narrow the incentive gap between SAF and RD; however, it cannot do so fully. Regardless, any narrowing of the incentive gap may help shift low carbon fuel producers toward SAF production.

Spot prices and environmental commodity pricing will vary in California, the CI values will vary by feedstock, and the IRA incentives for SAF will be finalized soon. However, this view of the SAF–RD differential highlights a nearly 43 cent per gallon premium for renewable diesel, which will increase over time as compliance costs on diesel increase but remain at zero for jet fuel. ***This value stack differential will likely continue to constrain the opportunity for SAF deployment unless the incentive structure is rebalanced e.g., by including jet fuel in broader decarbonizing policies and via additional state tax incentives.***

248.2
cont.




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SUBMITTED VIA ELECTRONIC FILING

August 27, 2024

The Honorable Liane Randolph
Chair, California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Comments on the Proposed 15-Day Changes to the Proposed Amendments of the Low Carbon Fuel Standard Regulation – Released August 12, 2024

Dear Chair Randolph,

The California Renewable Transportation Alliance (CRTA) is a diverse coalition of renewable fuel producers, fleet operators, engine manufacturers, consumers, and utilities who, in long partnership with California, have invested millions of dollars in providing cost-effective, low-carbon fuel options to decarbonized California's transportation sector. We are committed to helping California meet its ambitious climate change goals and welcome the opportunity to provide these comments on the "15-Day Changes to the Proposed Amendments to the Low Carbon Fuel Standard" (15-Day Changes) released on August 12, 2024.

The Low Carbon Fuel Standard (LCFS) is internationally recognized as an effective mechanism for decarbonizing transportation fuel, reducing California's dependence on fossil fuel, and incentivizing the abatement of methane emissions from dairy operations. To date, four states (California, Oregon, New Mexico and Washington) have adopted a clean fuel standard program built off the successful LCFS model and eight other states are actively considering its adoption.

249.1 Any modifications to this program should be carefully designed and considered so not to derail California's leadership in this area. In general, we think the 15-Day Changes continues to move the program in the right direction. We appreciate the thoughtful work staff have done thus far to ensure the correct market signals are sent to incentivize continued investment in low-carbon fuel production. While we are pleased to support some of the 15-Day proposals, as mentioned below, we must, however, offer concerns with some of the proposed language.

Biomethane Production & Deliverability

249.2 We appreciate that staff has chosen to continue to value and incentivize dairy biomethane production pathways and the deliverability of renewable natural gas (RNG). The LCFS has been a key driver in capturing and reusing otherwise unabated methane emissions, particularly from dairy operations. RNG derived from this process not only helps to decarbonize internal combustion engines such as low NOx commercial vehicles but can also decarbonize battery-electric and hydrogen production.

249.2 cont. Any changes to the dairy biomethane production under the LCFS should be thoughtfully evaluated to prevent increasing uncertainty for investors and to avoid negatively impacting the nationwide adoption of LCFS-type programs.

249.3 **Crediting Period Limitation.** We have serious concerns about reducing the avoided methane crediting periods from three consecutive 10-year crediting periods to two for projects breaking ground before January 1, 2030. Projects initiated between 2024 and 2030 are crucial to meeting CARB's 2022 Scoping Plan targets for RNG use in transportation and other industry sectors. This arbitrary reduction in crediting periods undermines the certainty presumed by the increased stringency of the carbon intensity (CI) targets proposed in the 15-Day Changes and could further reduce investments. Additionally, the ambiguity surrounding the scope of this proposal and its impact on existing dairy digester projects could further deter current investments. We urge staff to remove this provision.

249.4 **Book and Claim Accounting Modification.** The proposed condition to prompt early reporting of direct flow into the pipeline is confusing, unnecessary, and potentially unreliable. Ensuring the accuracy of the data on gas flow is crucial for the gas system map to be deemed a reliable source of information. It will require a rigorous verification and validation process that will be both resource intensive and time consuming. Any discrepancies in determining non-compliance can result in significant financial penalties and loss. The LCFS needs to provide more clarity, not less to continue to attract new investments in low-carbon fuel production. Therefore, we urge staff to remove this change.

Near-Term Carbon Intensity Target

249.5 In our comment letter dated May 10, 2024, CRTA recommended that staff adopt a more ambitious CI target than the 5 percent initially proposed at the April 10, 2024 workshop. We are pleased with staff's decision to increase the target to 9 percent in 2025. However, we also recognize that credit prices remain significantly depressed. At the time of these comments, the LCFS credit market price is approximately \$54.00. When we began this discussion over 24 months ago, the price was around \$200. By the time this regulation is adopted, we may have reached a point where a single solution is insufficient to adequately address the declining market conditions. While the proposed increase is a significant step in the right direction, the worsening market conditions call for a more robust approach.

249.6 Therefore, we urge staff to increase the "step down" even further to 10-11 percent and allow the Automatic Accelerator Mechanism to be activated as early as 2025 to further adjust the curve and achieve market stability.

249.7 Similarly, we believe it is a mistake to maintain a 30 percent midterm CI target when recent studies have demonstrated that a higher target of 41-44 percent is achievable¹. Additionally, staff research has concluded that there is no direct correlation between the LCFS program and retail fuel prices in California². Implementing a more stringent curve drives greater low carbon fuel production, thereby reducing our dependency on fossil fuel at the rate necessary to achieve our carbon neutrality goals. Therefore, we urge you to adopt a mid-term target closer to the ICF-recommended 41-44 percent.

¹ Sheehy, Philip, and Fang Yan. *Analyzing Future Low Carbon Fuel Targets in California: Initial Results for Accelerated Decarbonization, Central Case*. ICF Resources, L.L.C., 2023.

² "An assessment of observed market prices shows conclusively that the LCFS program price effect at the pump is not a significant driver of retail fuel prices in California." California Air Resources Board. 2024. *LCFS Environmental Justice Advisory Committee (EJAC) Meeting Presentation, Slide 9*. March 15. [[2024.3.15 LCFS EJAC Slides final.pdf \(ca.gov\)](#)]

“True Up” & “4-to-1” Penalty

249.8

We are pleased to see the inclusion of the “True Up” provision that we raised in our May 10, 2024 comment letter. This will increase investor confidence by allowing projects to recover credits generated on the first day of operation instead of having to wait until certification is complete.

249.9

However, we were disappointed that the “4-to-1” penalty remains for verified CI exceedance and that it may be applied to the temporary pathway period. We find this penalty is excessively harsh, especially since there is no requirement to prove intentional wrongdoing. Implementing this penalty in the current context will result in overly cautious pathway estimates that could potentially diminish projected revenue recovery over time and further disincentivize future investments. This would be counterproductive to the dairy sector methane abatement goals under SB 1383 and CARB’s stated objectives for achieving these goals in the 2022 Scoping Plan, especially since dairy operations are subject to seasonal operations and temperatures. We strongly urge staff not to adopt this penalty mechanism. We support administrative reforms that streamline the process instead.

Biomass-Based Diesel Pathway Applications

249.10

We have serious reservations about the proposed authority to halt application approvals for biomass-based diesel pathways upon reaching specific zero-emission vehicle adoption milestones. This sets a troubling precedent that could be extended to other fuel pathways in the future. The pace of vehicle deployment will be determined by market forces, and technology acceptance levels will naturally evolve based on innovation trends. Consequently, we find this provision preemptive and unnecessary, and we recommend its removal.

We look forward to continued conversations with you on proposed modifications to the LCFS program. Feel free to contact me at nicolerice@ca-rta.org if you have any questions regarding our position.

Respectfully,



Nicole Rice, President
California Renewable Transportation Alliance

cc: CARB Board Members
Hazel Miranda, Chief of Staff and Policy Advisor to Chair Randolph, CARB
Rajinder Sahota, Deputy Executive Officer for Climate Change and Research, CARB
Matt Botill, Division Chief, Industrial Strategies Division, CARB
Lauren Sanchez, Senior Advisor for Climate, Office of the Governor
Jamie Callahan, Deputy Chief of Staff and Senior Counselor on Infrastructure,
Office of the Governor
Mr. Grant Mack, Deputy Legislative Secretary, Office of the Governor

Analyzing Future Low Carbon Fuel Targets in California



August 2024

*Response to Proposed 15-Day Changes
Proposed Amendments to the LCFS Regulation*

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Summary of ICF Analysis in Response to 15-Day Changes

The California Air Resources Board (CARB) staff released the Staff Report: Initial Statement of Reasons outlining many proposed amendments to the Low Carbon Fuel Standard (LCFS) program in December 2023. The Staff Report identified three key areas of change with respect to carbon intensity (CI) targets: 1) increased stringency by 2030 (from 20% to 30% carbon intensity reduction), 2) a step down of 5% in the CI reduction required in 2025 (yielding an 18.75% CI reduction requirement compared to the 13.75% reduction scheduled), and 3) the introduction of an Automatic Acceleration Mechanism (AAM). CARB staff provided additional documentation during a Low Carbon Fuel Standard Public Workshop on April 10, 2024.

CARB Staff published additional modifications for the proposed amendments (15-Day Changes) on August 12, 2024. The stringency of the program in 2030 remains unchanged at 30% and CARB did not make any proposed changes to the AAM. However, CARB staff proposed a step down of 9% in the CI reduction required in 2025 (yielding a 22.75% CI reduction requirement compared to the 13.75% reduction scheduled) and introduced several other modifications that have changed the trajectory of ICF's analysis.

Summary of Previous Work

ICF previously reported that in an Accelerated Decarbonization Central Case a carbon intensity reduction target of 41–44% for 2030 is achievable for California's Low Carbon Fuel Standard program.

ICF reached this conclusion based on expected fuel volumes and carbon intensity reductions for a wide array of low carbon fuel pathways—with market-based constraints on feedstocks (e.g., value to the producer; competition between markets, etc.) and a consistent GHG emission accounting framework over the period of the analysis (i.e., no changes to avoided methane emission counting during the time period of the analysis), and without fundamentally changing deliverability requirements of fuels (e.g., by phasing out certain pathways). More specifically, ICF's analysis showed that virgin oils will contribute about 20–33% of the total feedstock used for biodiesel and renewable diesel production over the course of our analysis.

New Analysis in Response to 15-Day Changes

The work presented here was prepared in direct response to the Staff Report, accompanying documentation published in December 2023, and new information made available during the Low Carbon Fuel Standard Public Workshop in April 2024, and the 15-Day Changes and the accompanying information published online. ICF's updated commentary focuses on a) the impact of the proposed cap on credits generated from

biomass-based diesel derived from virgin oils, b) anomalies with respect to forecasted diesel consumption, c) the “model-estimated credit prices” reported by CARB Staff in Attachment C, d) the carbon intensity step down in 2025, and e) the Automatic Acceleration Mechanism.

The proposed cap on credits generated by biomass-based diesel produced from virgin oils will likely put upward pressure on credit prices.

The 15-Day Proposed Changes include a company-wide cap on credit generation for biomass-based diesel produced from virgin oils like soybean oil and canola oil. However, rather than being implemented as a hard cap, Staff have indicated that any biomass-based diesel from virgin oils that exceeds the 20% threshold will be “assessed the carbon intensity of the applicable diesel pool benchmark for that year, or the certified carbon intensity of the applicable fuel pathway; whichever is higher.” ICF modeling has indicated that virgin oils will likely be about 20–30% of the feedstock for biomass-based diesel production for product delivered into California. Notably, this is lower than what CARB’s own analysis indicates,¹ as shown in the table below, despite claiming that the cap “avoids sending a long-term signal for virgin soy or canola oil to serve California demand.” For the sake of reference, virgin oils were about 19% of the biomass-based diesel market (by volume) in 2023.

Table 1. Share of virgin oil and waste oil feedstocks for biomass-based diesel in CARB analysis

Est Share	2025	2026	2027	2028	2029	2030
Virgin oil	38%	51%	56%	56%	56%	55%
Waste oil	62%	49%	44%	44%	44%	45%

ICF does not anticipate that product will be diverted due the proposed cap because producers need a reliable feedstock supply chain, and virgin oils can help stabilize that supply chain through price certainty and feedstock availability. Based on ICF’s analysis, the proposed cap on virgin oils and the treatment of incremental volumes is more likely to increase the LCFS credit price in the market in ways that are not reflected in CARB staff analysis.

Renewable diesel producers realize value from incentives and environmental commodity markets and their profitability is tied to considerations regarding feedstock costs, operational costs, financing, and logistics to end use markets. For the sake of simplicity, ICF

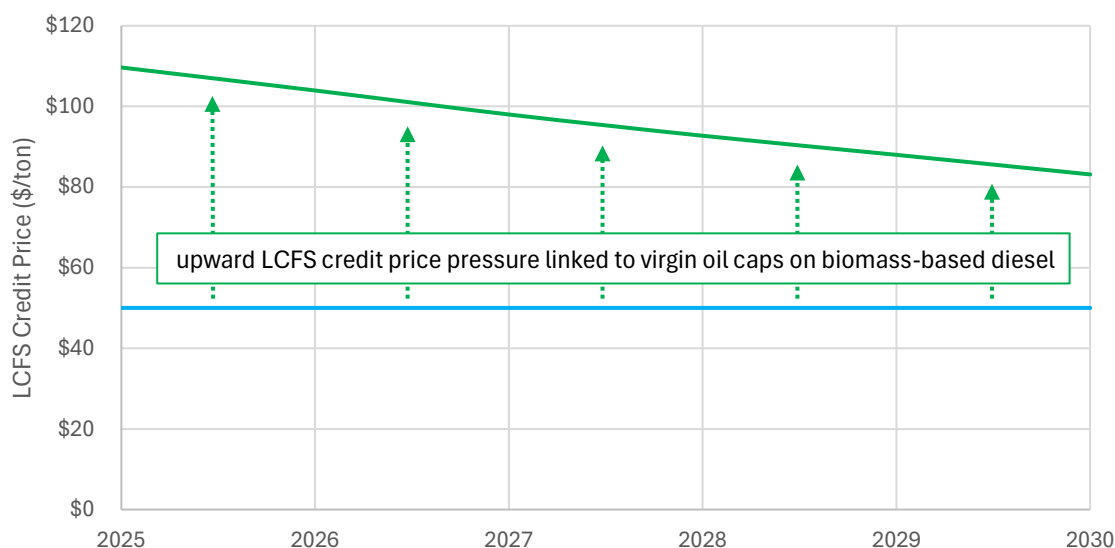
¹ ICF notes that CARB’s background data do not distinguish biodiesel or renewable diesel volumes by feedstock; however, they provide credit generation distinguished between these feedstocks and the CI values assumed in their modeling. ICF calculated the implied volumes based on these data.

has isolated in this analysis the consideration of the LCFS program and the two value streams that renewable diesel producers realize: a) avoided deficits and b) credits generated. Avoided deficits represent the value of displacing diesel with renewable diesel and is a function of the difference between the carbon intensity of diesel and the benchmark. Credits generated are based on the value of the delivered product and is a function of the difference between the benchmark and the fuel-specific CI. Renewable diesel producers capture value from both avoided deficits and credits generated today. Under the proposed virgin oil caps, however, the value stream to incremental renewable diesel gallons would only generate avoided deficits (and not credits).

250.2
cont.

Rather than divert product to other markets, many companies/producers will likely exceed the proposed cap and keep product in California. However, with the value stream constrained to avoided deficits due to the proposed cap, renewable diesel producers will look to maintain profitability, and that means higher LCFS credit prices. For illustrative purposes, ICF quantified the value stream to renewable diesel producers for a soybean oil based product with a carbon intensity of 53 g/MJ. Holding all other value streams constant, a \$50/ton LCFS credit price would yield about 35 cents per gallon (cpg) of value for both avoided deficits and credits. However, if the value stream is constrained to just the avoided deficits, then the producer will face cost pressures. The extent to which the LCFS credit price would increase is dependent on the year of interest and the associated carbon intensity benchmark. In 2025, for instance, the renewable diesel producer would need to see a credit price increase from \$50/ton to \$110/ton to maintain consistent revenue streams. Though producers may have some ability to accommodate lower returns, they will not simply accept lower net value. The figure below shows how the credit price would have to increase (green line) relative to a flat LCFS credit price (blue line) after accounting for the change in value streams to the renewable diesel producer.

Figure 1. Illustrative LCFS credit price increase due to proposed virgin oil caps



250.2
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The real-world response will likely be somewhere in between the blue line and the green line—regardless, ICF anticipates that the virgin oil caps as proposed will push credit prices up in ways that Staff has not contemplated, particularly in the near-term future.

The proposed cap on credits generated by biomass-based diesel produced from virgin oils may stall renewable diesel and renewable jet fuel investments.

250.3

Staff's proposed cap on virgin oils for biomass-based diesel is applicable to biodiesel and renewable diesel production, however, the cap does not apply to renewable jet fuel. In principle, this could help improve the prospects for renewable jet fuel, sometimes referred to as sustainable aviation fuel (SAF). However, this ignores the value streams available to SAF and renewable diesel (RD). The table below quantifies the value streams on a per gallon basis for SAF and RD, including the commodity price, incentives from the Inflation Reduction Act (IRA), the federal Renewable Fuel Standard, and state-level programs. ICF made several assumptions to develop these values. ICF conducted the analysis for 2025, when the Blender's Tax Credit expires and the market transitions to the Clean Fuel Production Credit (CFPC) from the IRA. ICF assumed a carbon intensity (CI) value of 30 g/MJ for both the CFPC calculation and the LCFS value calculation—we note, however, that it is highly unlikely that a fuel will have the same CI value across these two programs given the differences between the 4OB SAF GREET model and the CA-GREET model. The table below includes other assumptions made in ICF's analysis.

Table 2. Value stack for SAF vs RD in 2025

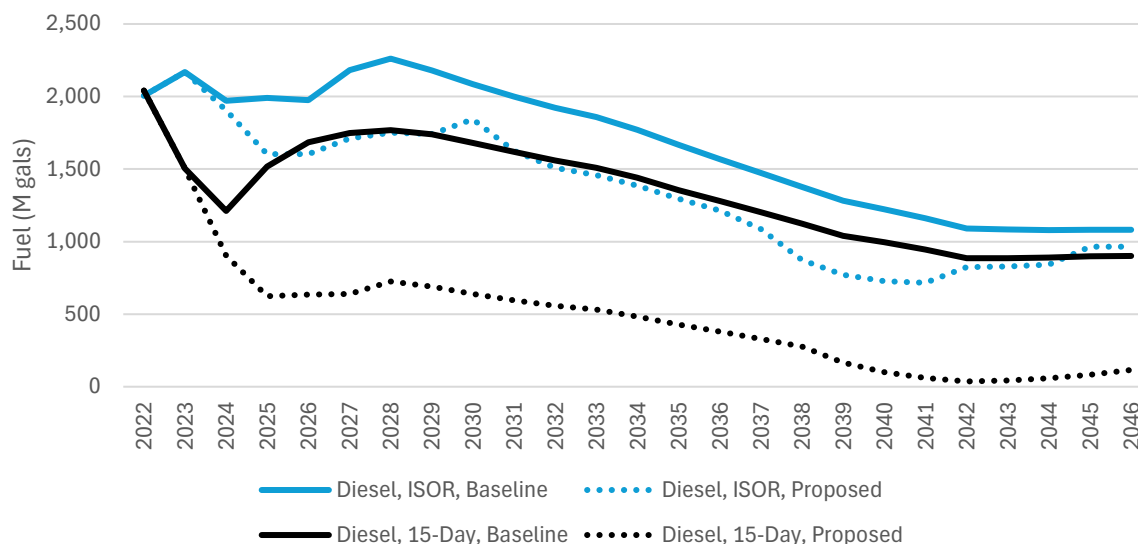
Value Stack Component	Value to SAF \$/gal	Value to RD \$/gal	Assumptions
Commodity	\$2.42	\$2.49	June 2024 average ^[1]
<i>Federal Incentives</i>			
IRA (45Z)	\$0.64	\$0.37	Assuming 30 g/MJ
RFS	\$0.80	\$0.85	\$0.50 D4 RIN
<i>State</i>			
Low carbon fuel standards	\$0.33	\$0.34	\$50/t, 9% CI stepdown
<i>Carbon compliance costs</i>			
Cap-at-Rack	--	\$0.41	\$40 CCA
LCFS compliance cost	--	\$0.16	\$50/t, 9% CI stepdown
TOTAL	\$4.19	\$4.62	

Spot prices and environmental commodity pricing will vary in California, the CI values will vary by feedstock, and the IRA incentives for SAF will be finalized soon. However, this view of the SAF–RD differential highlights a nearly 43 cpg premium for renewable diesel, which will increase over time as compliance costs on diesel increase over time. Even though it is conceivable that the virgin oil feedstock cap may help incentivize SAF production over RD, that also means that the LCFS credit price would have to increase at a much faster rate than other components of the value stack to levelized these value streams. In other words, even in this case, the virgin oil cap may put upward pressure on LCFS credit prices to narrow the incentive gap to induce SAF production at the levels contemplated by CARB staff.

ICF has reservations about the modeling assumptions related to diesel and the proposed cap on credits generated from biomass-based diesel derived from virgin oils in the Proposed 15-Day Changes.

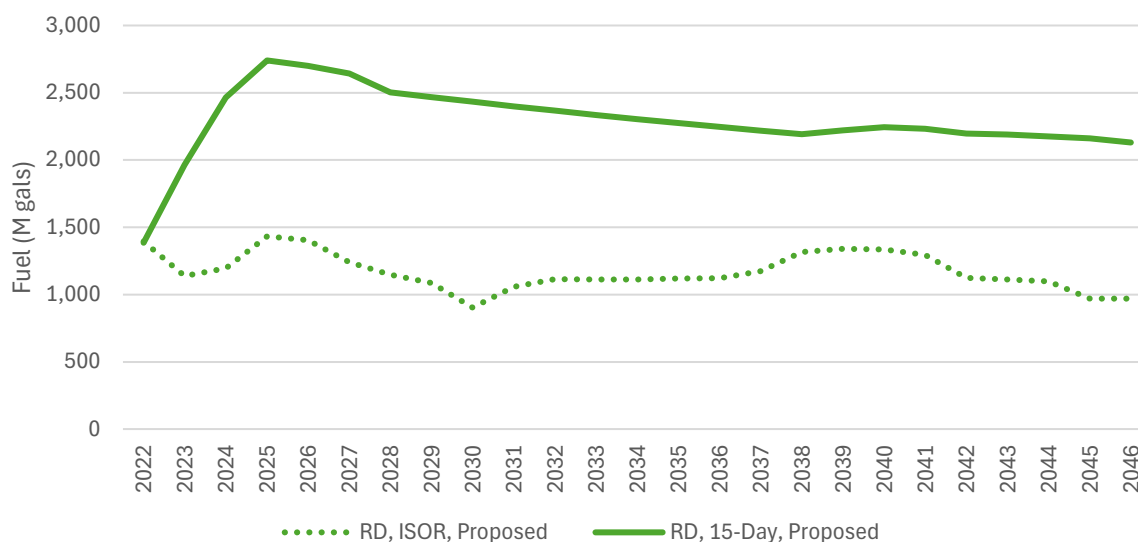
CARB staff have presented a Baseline Scenario and a Proposed Scenario as part of the Staff Report (ISOR) and the 15-Day Changes, as well as some sensitivity cases. ICF analyzed the ultra-low sulfur diesel (ULSD) volumes reported in the Baseline Scenario and Proposed Scenario for data made available and dated 04/09/2024 (linked to the Staff Report) and the same scenarios for the work dates 08/12/2024 (linked to the 15-Day Changes). ICF note that the ULSD volumes have changed considerably (see figure below).

Figure 2. ICF analysis of ULSD volumes in the Staff Report (ISOR) and the 15-Day Changes



The ULSD fuel volumes in the Baseline Scenario has decreased significantly between the April (blue line, ISOR) and August data (black line, 15-Day Changes). It appears that the 2023 ULSD volumes have been brought more in line with actual data—they were decreased from about 2.2 billion gallons to about 1.5 billion gallons. Furthermore, by 2045, CARB’s most recent analysis of the Proposed Scenario via the 15-Day changes yields ULSD volumes of about 120 million gallons compared to the previous estimates of 965 million gallons in the ISOR Proposed Scenario. It appears that CARB has increased renewable diesel consumption in its Proposed Scenario by about 1.2 billion gallons annually (see figure below).

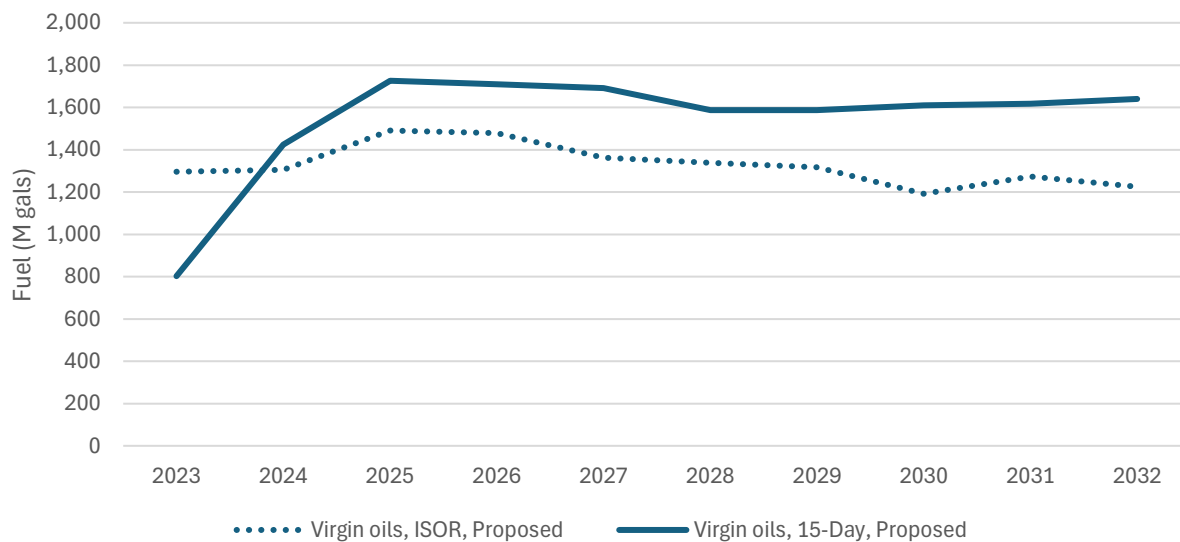
Figure 3. ICF analysis of RD volumes in the Staff Report (ISOR) and the 15-Day Changes



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It is unclear to ICF why the expected market response (i.e., via the Proposed Scenarios) has changed so much between iterations. It is also important to note that it appears, despite CARB proposing a cap on virgin oils for biomass-based diesel, that the implied volumes for biodiesel and renewable diesel derived from virgin oils increases by about 300 million gallons annually in the 15-Day Proposed Changes compared to the ISOR (see figure below).

Figure 4. ICF analysis of biomass-based diesel volumes from virgin oils in the ISOR and 15-Day Changes



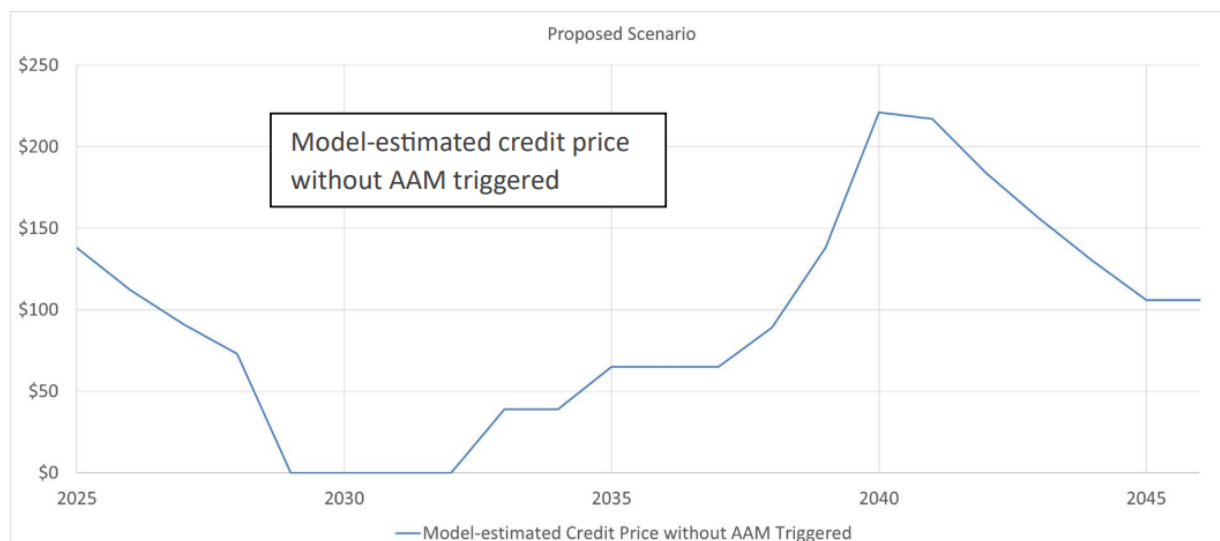
The inconsistencies between the ULSD and RD volumes in the Baseline and Proposed Scenarios for the ISOR and 15-Day Changes lead ICF to believe that one should have reservations about the modeling assumptions, and specifically as it relates to how CARB staff has considered the market response to the proposed cap on credits generated from biomass-based diesel derived from virgin oils.

250.5

The “model-estimated credit prices” reported in Attachment C undercut the credibility of the Proposed 15-Day Changes by suggesting that the credit price will go to zero over a 4-5 year period.

The model-estimated credit prices (see figure below) contrast sharply with what was presented previously as part of the ISOR analysis: CARB staff previously had credit prices at the price ceiling of about \$220/t in 2025 (with a 5% CI step down, reported on a real basis in 2023 dollars) and in the range of \$100/ton in 2030, compared to \$140/ton and \$0/ton, respectively in the current analysis.

Table 3. CARB model-estimated credit price outlook (\$/ton, in real \$2023)



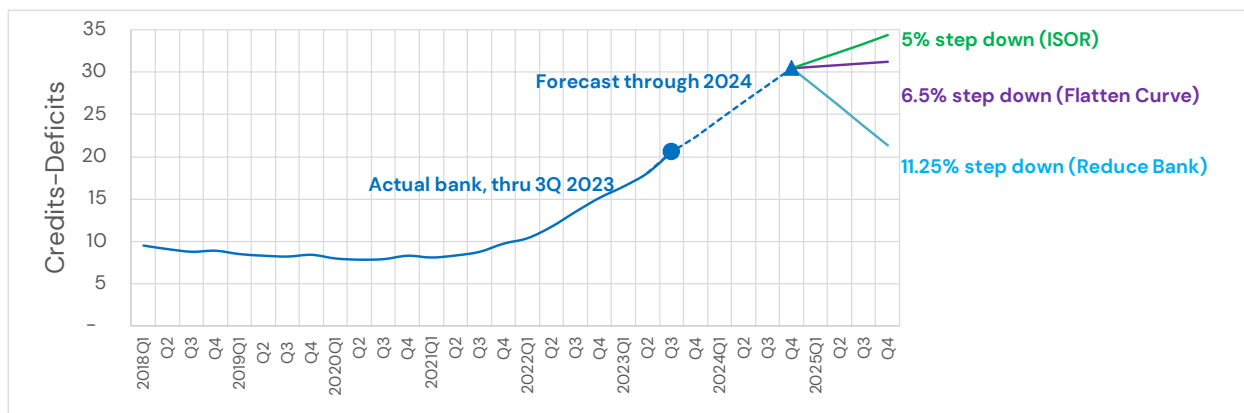
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These forecasts are difficult to understand in the context of other subsidies available to low carbon fuel producers. To date, CARB staff has not provided sufficient detail regarding the methodology to develop “model-estimated credit prices” in any of the publicly available documentation. Notably, there are two questions related to this outlook that should be answered in the context of broader market influence: 1) How can the market deliver carbon intensity reductions in the range of 28–40% over the 4–5 year period 2028/29–2032/33 at a zero-dollar credit price? 2) What was modified in the approach that changed the structure of the model-estimated credit price so significantly between iterations of the analysis? These are important questions that speak to the credibility of the analysis supporting the Proposed 15-Day Changes.

ICF continues to recommend a step down of 10.5% to 11.5% in 2025 to achieve a target credit bank equivalent of 2–3 quarters’ worth of deficits.

250.6

This level of stringency is likely what is needed to achieve the stated intent of correcting for the “near-term over-performance” of the program. ICF’s analysis indicates that the credit bank will likely continue to build significantly in 2025 if the step down is limited to 5%. ICF analysis suggests that a 6.5% step down is needed to ensure that the credit bank build is flattened in 2025.



250.6
cont.

ICF analysis indicates that the 9% step down in 2025 will decrease the credit bank. However, ICF modified our modeling to account for the additional year of credit generation via electric forklifts using the CARB-approved estimation methodology and a revised (downward) energy economy ratio (EER). After accounting for this change and others in the analysis, ICF still finds that a 2025 carbon intensity step down in the range of 10.5% to 11.5% is more appropriate than 9%, particularly to align with the clearly stated objective of reducing the credit bank to 2–3 quarters' worth of deficits.

250.7

ICF recommends that the Automatic Acceleration Mechanism be considered for implementation as soon as 2026, rather than waiting until 2028.

Delaying the implementation of the Automatic Acceleration Mechanism is unnecessary. The risk of a continuous credit bank building through 2027, thereby depressing credit prices for another 3–4 years, outweighs the risk of triggering the mechanism sooner.

250.8

ICF recommends that the Automatic Acceleration Mechanism be implemented on a four-quarter rolling basis.

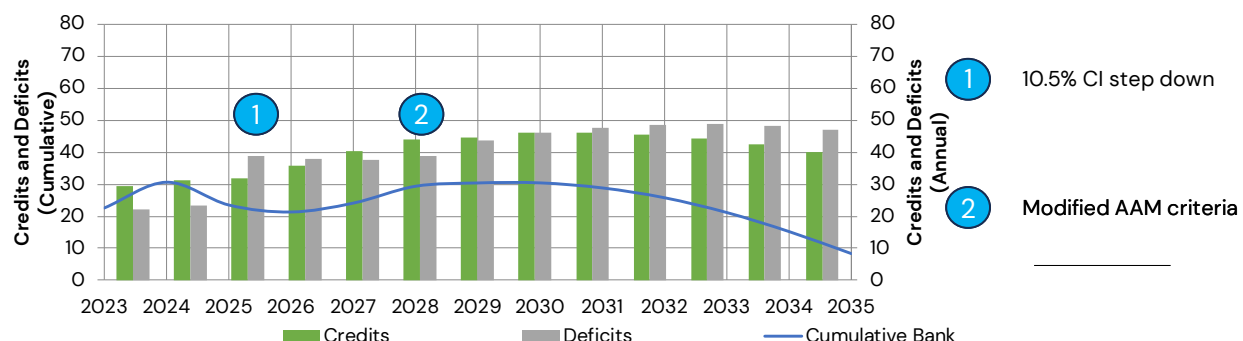
At the very least, the policy interventions proposed by the California Air Resources Board should be evaluated in the context of the current market to determine if they would have had an impact. As proposed, the Automatic Acceleration Mechanism would not have been triggered based on a review of annual data from 2022, thereby allowing the credit bank to grow during 2023 and again through 2024 with no market correction. If the Automatic Acceleration Mechanism were implemented on a four-quarter rolling basis, then the mechanism would have been triggered sooner and the credit bank build in this hypothetical scenario would have been constrained.

250.9

ICF continues to recommend that the first criteria for the Automatic Acceleration Mechanism be modified such that the mechanism is enacted when the credit bank is more than 2.5 times greater than the quarterly deficits generated on a four-quarter rolling basis.

The threshold for the first trigger proposed should be reduced from 3.0 to 2.5 (or lower). ICF disagrees with the underlying presumption that the AAM should be triggered at the proposed threshold i.e., when there are three quarters' worth of deficits in the bank.

The figure below shows the results of ICF's modeling after updating our analysis and focuses on the recommended carbon intensity step down in 2025 (at least 10.5%) and the revised Automatic Acceleration Mechanism recommended based on our analysis.



The figure above has a shape and curve that ICF thinks is more in line with a successful Low Carbon Fuel Standard program i.e., one that maintains a tighter credit-deficit balance and is flexible enough to respond to market conditions in the near-term future (pre-2030), while enabling California to achieve its long-term greenhouse gas emission reduction targets. ICF's view of the market suggests that a focus on an "ideal" credit bank from pre-2021, quantified using a threshold of three quarters worth of deficits, is misguided and may lead to a market that "swings" up and down (as measured by the credit bank) more than necessary, thereby creating market uncertainty for active and would-be participants. Major investments by regulated parties in the last several years have likely improved their respective line of sight on credit generation, thereby reducing the need to carry such a large credit bank.

Appendix

Background on ICF modeling

ICF models the CI reductions that could be achieved using the structure of the LCFS program. The modeling is driven by the demand for transportation fuel in California, which is a function of many variables including but not limited to economic growth, vehicle miles traveled (VMT), vehicle fleet turnover, and the expected compliance with complementary policies that impact transportation fuel demand. ICF's modeling is initiated using documentation associated with the Emissions FAcTors model (EMFAC)² that is publicly available for download. The EMFAC model is "developed and used by CARB to assess emissions from on-road vehicles including cars, trucks, and buses in California." The EMFAC model enables ICF to characterize top-level transportation fuel demand in California given baseline consideration of the aforementioned key factors, like VMT and fleet turnover. Although EMFAC2021 incorporates expected compliance with several regulations that decrease fossil fuel demand, like the Advanced Clean Truck (ACT) Rule and the Innovative Clean Transit (ICT) Rule, it does not include expected compliance with Advanced Clean Cars II (ACC2) or Advanced Clean Fleet, which were adopted by the Board in 2022 and 2023, respectively. ICF has modified EMFAC2021 to ensure compliance with ACC2 and ACF. ICF then pairs the fleet turnover and fuel demand functions of EMFAC with supply-cost curves for low carbon fuels, including ethanol, biodiesel, renewable diesel, and renewable natural gas (RNG).

ICF previously modeled multiple scenarios for this project and framed each as *Accelerating Decarbonization* in the transportation sector using a diverse array of low carbon fuel strategies that are viable in the timeframe contemplated. Within this framework, ICF presented a Central Case and High Case(s).

- *Accelerating Decarbonization, Central Case*: ICF's primary focus is this case, whereby we limited our consideration of low carbon fuel strategies that require expanded deployment, reasonable technological advancement, and limited, if any, substantive policy changes.
- *Accelerating Decarbonization, High Case(s)*: In these cases, ICF considered additional strategies and/or policy changes that would lead to higher deployment of low carbon fuels and/or greater CI reductions over the course of the analysis. These included but were not limited to reductions in indirect land use change (ILUC) accounting, resumption of FFV manufacturing by OEMs, and relaxation of

² ICF is using the most recent version of EMFAC, EMFAC2021 (v1.0.2) as a starting point for our modeling. The EMFAC model is available for download [online](#).

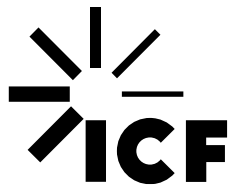
deliverability requirements for electricity used as a transportation fuel and as a processing fuel. Together, these represent a more expansive market and aggressive outlook for decarbonizing the transportation sector.

Stakeholder Outreach

ICF retains exclusive decision-making with respect to the parameters that are included in (or excluded from) the modeling in this project. However, as part of the development of our modeling, we sought (and will continue to seek) input and feedback from stakeholders that are uniquely positioned to characterize trends, constraints, and opportunities across various low carbon fuels. ICF conducted interviews with stakeholders from various low carbon fuel providers. Through these conversations, ICF introduced the broader project objectives and ICF's modeling approach to help stakeholders understand the key drivers for our analysis. ICF then led a discussion guided by the following questions:

- **Deployment.** What are expected changes in the industry that will increase or decrease the deployment of a particular fuel or fuel/vehicle combination? These generally include supply and demand considerations and should account for opportunities and barriers to the extent feasible. What is the timeframe associated with any changes?
- **Carbon intensity.** What is the current and projected carbon intensity of the fuel under consideration? Are there any California-specific policy or regulatory changes that can be accommodated to help achieve these reductions? What is the rate at which these carbon intensity changes are likely to occur?
- **Demand from Other Markets.** Where are the developments likely to occur? Are there any specific advantages or disadvantages associated with delivering these solutions to California that ICF needs to consider? To what extent will other (existing or potential) low carbon fuel markets be advantaged or disadvantaged as it relates to these solutions as a function of their corresponding geography?

Lastly, it is important to note that ICF developed the modeling framework used in this study based on publicly available tools and data—we have purposefully excluded any proprietary data or considerations as part of this analysis.



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27 August, 2024

State of California, Air Resources Board
Industrial Strategies Division, Transportation Fuels Branch
California Air Resources Board
1001 I St.
Sacramento CA, 95814

Re: Comments on Proposed Amendments to the Low Carbon Fuel Standard

Dear LCFS Team:

Thank you for the opportunity to comment on the current rulemaking to amend the Low Carbon Fuel Standard (LCFS). The University of California, Davis Institute of Transportation Studies (ITS-Davis) has been engaged in research, policy analysis, and technical assistance relating to the LCFS since it was first developed, over 15 years ago. Since then, the LCFS has become a critical part of California's climate policy portfolio and a model that has been adopted in many other jurisdictions around the world. Following the strategic vision laid out in the 2022 Scoping Plan, the LCFS would continue to support profound changes in California's transportation and energy systems in order to meet the statutory goals of a 40% reduction in greenhouse gas (GHG) below 1990 levels by 2030, and carbon neutrality by 2045.¹

The LCFS has successfully guided the evolution of California's transportation fuels for almost 15 years, supporting the deployment of low-carbon biofuels, electric vehicles, and other advanced technologies. During that time, ITS-Davis has been the preeminent academic research institution in the world on issues related to the LCFS, and has published an extensive set of peer-reviewed publications, technical reports and reviews of related topics. We appreciate the opportunity to continue our collaboration on this important subject.

We commend Staff for facilitating a robust series of workshops over the last two years, and for their willingness to engage with stakeholders on this complex issue. These comments are presented in the spirit of ITS- Davis's mission to bring science into the policy process. Neither UC Davis nor ITS-Davis seek a specific policy outcome; these comments are offered to help California meet its climate, environmental, and equity goals. We group our comments into thematic categories to allow proposed changes to be evaluated in context with related material.

¹ SB 32 ([Pavley, Chapter 249, Statutes of 2016](#)), AB 1279 ([Muratsuchi, Chapter 337, Statutes of 2022](#))



Impact of Proposed Amendments on LCFS Credit and Deficit Generation

251.1

The package of amendments and related analysis released by CARB on August 12 (hereafter referred to as the 15 Day Package) presented several changes from the amendments proposed in January 2024, several of the proposed changes follow discussions that occurred the April 10th workshop. The scope of the present rulemaking has, from the start, been limited to a narrow set of topics; predominantly (though not exclusively) those which can help address the sharp decline in LCFS credit prices over the last 3 years. We agree with the consensus interpretation that the low credit prices that have dominated the market over the last two years will make it significantly more difficult for advanced low-carbon fuel production and distribution capacity to deploy at large scale in California's market. While some lower-carbon alternative fuel technologies, e.g. crop-based biofuels, renewable natural gas, electrification of light-duty vehicles, are cost-competitive under current market conditions, several technologies that have been identified as critical to attaining California's long term GHG reduction targets, e.g. medium-duty (MD) and heavy-duty (HD) vehicle electrification, hydrogen, cellulosic biofuels, e-fuels, and carbon capture and sequestration (CCS) generally lack a pathway to large-scale, cost-effective deployment without significantly more policy support than they currently receive. For many of these technologies, the LCFS is the most appropriate policy mechanism to provide such support, in that it is already well-established, and creates a strong link between the GHG benefits from a particular fuel and the amount of incentive that fuel receives. Our research generally aligns with the sentiment that has been consistently expressed by stakeholders leading up to, and during, this rulemaking: many technologies that will likely be critical to California's progress towards carbon neutrality will struggle to deploy if current LCFS credit prices persist. It is particularly important to support commercial-scale deployment of novel, higher-cost technologies like these in the near term, to allow these technologies the time and opportunity to mature, develop robust supply chains that create economies of scale, and position themselves for large-scale, cost-effective deployment in the 2030's, creating an efficient pathway to long-term deep decarbonization.²

Many of the changes proposed in the previous LCFS amendments, as well as the 15 day package are clearly aimed at supporting a higher LCFS credit price. We have written extensively about the status of the LCFS, and the market dynamics that influence LCFS credit pricing and developed the Fuel Portfolio Scenario Model (FPSM), a scenario analysis tool based on a design first published by CARB, that we use to evaluate LCFS credit supply and demand trends across various technological, market, and policy scenarios.³ This work, which aligns with similar

²See: Brown, et al. (2021) [Driving California's Transportation Emissions to Zero](#)

³ **Initial report:** Ro, J., Murphy, C. W., & Wang, Q. (2023). Fuel Portfolio Scenario Modeling (FPSM) of 2030 and 2035 Low Carbon Fuel Standard Targets in California. *UC Office of the President: University of California Institute of Transportation Studies*. <http://dx.doi.org/10.7922/G2S46Q8C> Retrieved from <https://escholarship.org/uc/item/6f2284rg>



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251.1
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analyses published by other researchers, indicates that a variety of factors initiated the credit price decline, but the rapid growth of renewable diesel production (RD) capacity in the U.S. is primarily responsible for its depth and persistence. Renewable diesel is effectively setting the marginal cost of compliance with the LCFS, and the stabilization of LCFS credit prices in the \$50-70 range over the last 18 months offers guidance about the level of LCFS support required for RD to enter the California market. While there have been reports of declining profit margins for RD producers, and some delays announced for RD capacity expansion, the broad trend in this space still points to growth, with a recent NREL report projecting U.S. hydrotreated (RD and hydroprocessed sustainable aviation fuel) capacity to roughly double by 2030, to around 9.6 billion gallons/year.⁴ California's own capacity to produce these fuels appears poised to continue growing as well, with the expectation that projects to convert the Phillips 66 and Marathon refineries in the Bay Area from petroleum to renewable diesel and hydrotreated alternative jet fuel, will be operational at or near nameplate capacity by the end of the year.⁵ The capacity these projects provide indicate continued availability of additional RD and/or SAF to the California market, even if the national growth trend slows, or even modestly reverses.

These trends provide important context for any discussion of LCFS market dynamics or credit prices. Because RD is setting the marginal compliance cost for the LCFS, and ample capacity exists within the U.S. to allow California's growth trend to continue, it is likely that the present LCFS credit price conditions will also hold for the foreseeable future, unless a significant shift in the LCFS policy structure bring the supply and demand for LCFS credits closer to a balanced state. The amendments proposed in the 15 day package, while providing valuable support to several technologies that are important to California's sustainable transportation goals, are not likely to bring the supply and demand close enough to a balanced state to support a higher LCFS credit price. As such, if the proposed package of amendments were adopted without change, we would expect to see LCFS credit prices approximately maintain their current level, predominantly within the \$50-\$70 range for the foreseeable future.

2024 update: Murphy, C., & Ro, J. (2024). Updated Fuel Portfolio Scenario Modeling to Inform 2024 Low Carbon Fuel Standard Rulemaking. *UC Davis: Policy Institute for Energy, Environment, and the Economy*. <http://dx.doi.org/10.7922/G25719BV> <https://escholarship.org/uc/item/5wf035p8>

⁴ [Rosales Calderon, O., Tao, L., Abdullah, Z., Talmadge, M., Milbrandt, A., Smolinski, S., ... & Payne, C. \(2024\). Sustainable Aviation Fuel State-of-Industry Report: Hydroprocessed Esters and Fatty Acids Pathway \(No. NREL/TP-5100-87803\). National Renewable Energy Laboratory \(NREL\). Golden, CO \(United States\).](#)

⁵ Alternative jet fuels, especially hydrotreated esters and fatty acids (the most common form of alternative jet fuel on the market today) are often referred to as "sustainable aviation fuel" or SAF. The actual GHG footprint or sustainability profile of any form of SAF depends on factors specific to its feedstock and production process. Not all examples of so-called "SAF" are truly sustainable or lower-carbon than the petroleum fuel they displace. We adopt the SAF naming convention to align with common usage, but note this caveat in doing so.



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251.1
cont.

This prediction is informed by updated FPSM modeling of the changes described in the 15 day package. Apart from the 9% step-down and the changes to e-forklift crediting, the proposals in the 15 day package that directly impact credit balance are more likely to exacerbate the oversupply of LCFS credits than reduce it. The new light- and medium-duty (LMD) infrastructure capacity credits, and expanded credit generation for electrified fixed-guideway transit would be expected to increase credit generation, while the removal of provisions that create a deficit obligation for jet fuel used for intrastate travel would likely reduce deficit generation in the near term. While the impact of each change is relatively small, typically on the order of a few percent of total credit generation, the combined effect pushes the market farther into credit oversupply.

251.2

This result aligns with earlier modeling we presented in our letter following the April 10th workshop, where Staff discussed the possibility of 5%, 7% and 9% step-down levels. At that time, we indicated that even the 9% step-down would not bring the market back into balance, and would still likely lead to multiple Auto-Acceleration Mechanism triggering events.⁶ Below, we present results from updated FPSM modeling of the impact of proposed changes in the 15 day package, including the 9% step down. The methods used to generate these results are described in Murphy & Ro (2024), with the following exceptions:

- Electrified Fixed-Guideway transit credits are multiplied by 2.2 from their previous assumption starting in 2025, to approximate the changes in crediting methodology. This is a smaller increase than that reported in the CATS modeling released in conjunction with the 15 day package.⁷
- Total HRI and FCI credit generation from pathways described in the 15 day package assumed to peak at 2% and 1.5% of prior year deficits, respectively, in 2031 before gradually declining, along with legacy light-duty HRI and FCI credits combined peaking at 0.8% of prior-year deficits in 2026, before declining. Existing LD HRI and FCI pathways have not approached the cap on credits that they could earn, however based on public feedback and conversations with stakeholders, there are credible reasons to believe the new HD HRI and FCI provisions may be more heavily utilized. Our assumption yields significantly less total credit from HRI and FCI pathways than the CATS model runs discussed earlier, suggesting that this is a reasonably conservative estimate.
- E-forklift electricity consumption stays at 2023 levels indefinitely, due to the proposed switch to measured charging data rather than estimates.
- Intrastate jet fuel no longer generates deficits. The effect of this is relatively small, since previous FPSM runs assumed that the deficit obligation would lead to enough SAF to fully satisfy intrastate flight demands entering the CA market by 2030. Without this deficit obligation, we assume about half as much SAF enters the market, but since FPSM

6

https://ww2.arb.ca.gov/system/files/webform/public_comments/11621/UC%20Davis%20Comments%20on%20April%2010%20Workshop.pdf

⁷ https://ww2.arb.ca.gov/sites/default/files/2024-08/15Day_Proposed_9step_30_final_posted_0.xlsx



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assumes that the lowest-CI feedstocks are preferred by all biomass-based diesel and SAF producers, the lost volume comes from crop-based fuels and therefore has a comparatively small impact on net credit generation over the coming decade.

- Soy and canola pathways for SAF and biomass-based diesel capped at 500 and 400 million gasoline gallon equivalents (GGE) respectively, to approximate the 20% limit on credits from such fuels for any given producer, while still reflecting anticipated growth in the total volumes of biomass based diesel and SAF. This approach was selected because at the time of writing FPSM lacks the capacity to implement a percentage based limit on specified feedstocks. These limits imply post-2028 blend rates up to 25% for soy plus canola in the late 2020's and early 2030's, before falling back below allowable levels. This exceedance, however, would reduce aggregate credit generation compared to a strict 20% blend limit and so represents a conservative estimate of its effects. These limits imply that biomass-based diesel, and to a lesser extent electricity and RNG, will fully displace petroleum diesel from California's market by 2029; annual growth in biomass based diesel consumption is limited to no more than the observed 2022-2023 growth rate.

251.2
cont.

The graphs below summarize the projected impacts of the 15 day package on credit balances and aggregate bank volume. The top graph reports the annual LCFS credit balance (credits minus deficits), while the bottom graph reports the aggregate bank. Note that on the credit balance graph, the blue and red lines (representing the 15 day package of amendments, and the 15 day package with only a 5% step-down, respectively) overlap after 2030, with only the blue line visible. The graphs below also present projections based on the original January amendments for comparison. Auto-Acceleration Mechanism (AAM) triggering events were manually added by reviewing deficit and bank levels to determine if they met the AAM triggering criteria specified in the proposed rule text, then manually advancing subsequent compliance schedules by one year if they did.

251.3

The FPSM results presented here show that unrestricted growth of renewable diesel will likely lead to continued accumulation of banked credits through the early 2030's. The 9% step-down reduces, but does not eliminate annual credit surpluses in 2025 and 2026, but robust growth returns thereafter. AAM triggering events are predicted in 2027 and 2029, the first two opportunities, leading to higher program targets in 2028 and 2030, with a third AAM triggering event possibly occurring in 2031 or 2032.⁸ The 9% step down does result in a smaller aggregate bank of credits in 2030 compared to a 5% step-down, however this merely reduces the bank from 101 million credits (almost 2.5 times annual deficits) to 82 million (just under 2 times annual deficits). We note that adopting a cap on lipid based fuels at 2 billion GGE, approximately 2022

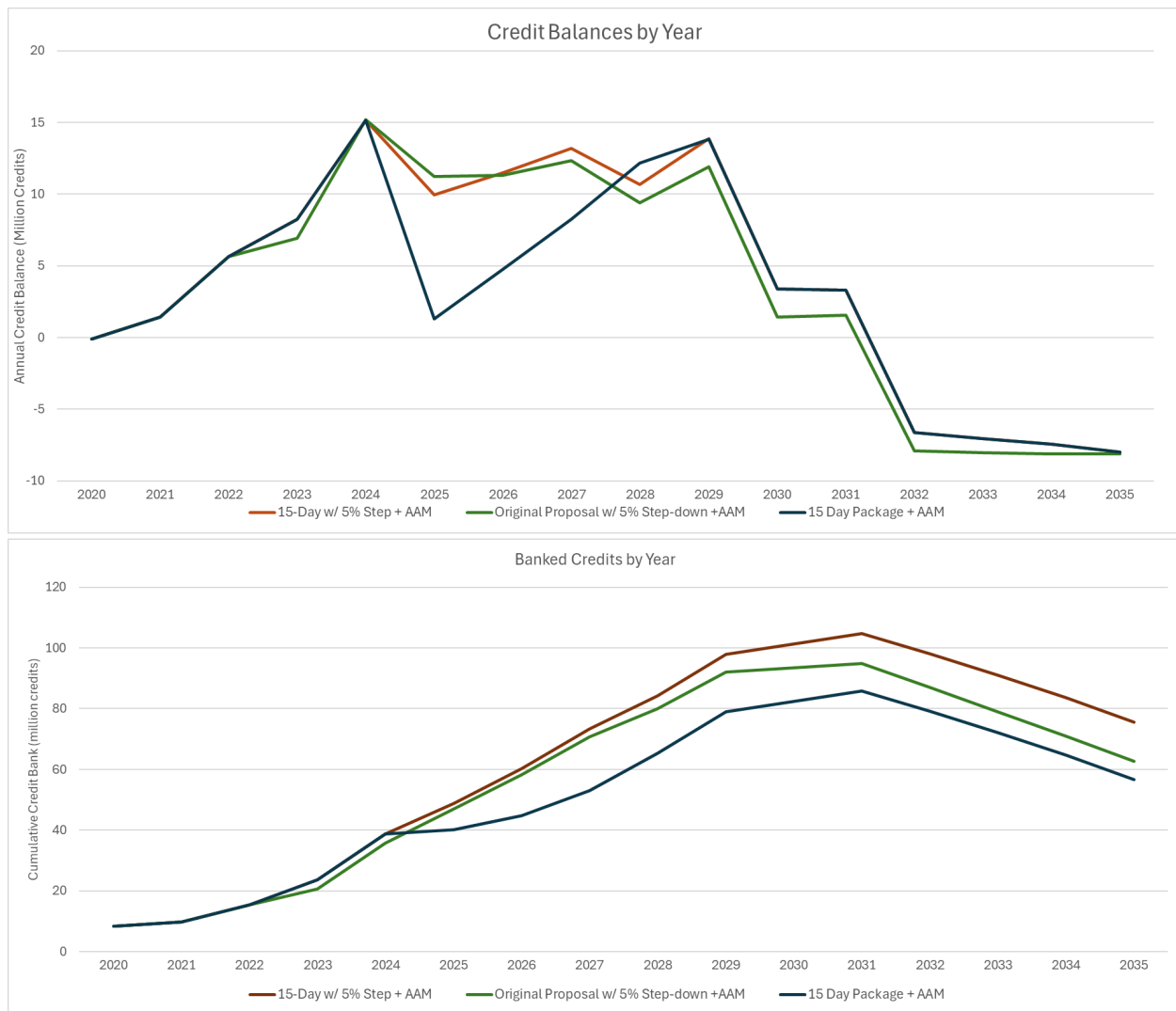
⁸ The third and final AAM triggering event meets AAM triggering conditions by a margin smaller than the uncertainty in model estimates. We interpret this as a borderline or possible-but-uncertain trigger, though it should be noted that these borderline triggering conditions persist for several years, meaning it is likely that the AAM would eventually be triggered.



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251.3
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levels, but holding all other parameters from the 15 day package the same would be projected to yield a market which would not trigger the AAM until 2031 and for which a single AAM triggering event would likely be all that is required to keep the market in a long-term balance, with conditions far more conducive to rising LCFS credit prices.



We are happy to provide more comprehensive output files, or run additional scenarios upon request.

251.4

Ultimately, FPSM modeling indicates that the amendments described in the 15 day package are unlikely to support significant increases in LCFS credit price. The bank-reducing effect of the 9% step down is partially offset by increased electrified transit, and infrastructure capacity credits,



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- 251.4 cont. as well as the reduction in near-term deficits from intrastate jet fuel. As a result, even with the 9% step down, FPSM modeling projects AAM triggering events at the first two opportunities, leading to a 39% target in 2030. A third triggering event in the early 2030's was also predicted, though with less certainty. Even with the relatively low LCFS credit prices that would be expected under such an outcome, gas price impacts to consumers may be significant, due to the higher target level, with approximately 20 to 40 cents per gallon maximum theoretical gas cost impact expected in 2030, and 30 to 60 cents per gallon expected by 2033.⁹ Adopting a volumetric cap on lipid-based fuels would allow California to remain on track to meet its long-term GHG reduction goals with lower LCFS program targets through the 2030's, thereby reducing the risk of unwanted gas price impacts.
- 251.5
- 251.6

Sustainability and ILUC Risk Mitigation Provisions*Changes to Feedstock Sustainability Certification*

- 251.7 The 15 day package proposes several changes to provisions related to feedstock sustainability and ILUC risk mitigation. § 95488.9 sets forth, among other things, requirements for biomass feedstock to pass sustainability certification. The sustainability certification requirements described in this section, especially those in § 95488.9 (g) generally align with well-accepted practices in this space and would be expected to help ensure that any feedstock used to produce fuels consumed in California would not present an unacceptable risk of direct sustainability impacts. The change in § 95488.9 (g) (1) (A) to subject all biomass feedstocks, not just crop- or forestry-based ones, to sustainability certification requirements is especially important, given the risk of crop oils being mislabeled as wastes or residues to increase the value of fuels produced from them in GHG-indexed incentive programs like the LCFS. Aligning LCFS sustainability certification requirements and certification body approvals with those used in Europe and elsewhere helps create a stable, predictable landscape for fuel producers as well as increasing the number of approved certification bodies that may be available to fuel producers.
- 251.8
- 251.9
- 251.10 While the sustainability protocols presented in § 95488.9 and elsewhere, particularly the sustainability certification requirements, offer a significant degree of protection against direct environmental or human harms, they are incapable of effectively addressing indirect or

⁹ The lower price estimates assume \$50 LCFS credit prices, upper estimates assume \$100 LCFS credits. It is important to note that these estimates reflect the maximum theoretical cost impacts from the LCFS, effectively assuming obligated parties comply solely by buying LCFS credits at prevailing market prices. Obligated parties have multiple options to reduce their deficit generation or obtain credits at below-market rates, e.g. self-producing lower-carbon fuels for blending, long-term offtake agreements, joint ventures, etc.. These theoretical costs therefore represent the maximum possible impact, with real-world impacts expected to be lower. In reality, retail gasoline prices are set by gasoline producers, distributors and retailers, based on a variety of factors; LCFS compliance costs are a small part of the total cost profile.



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251.10
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market-mediated effects, especially indirect land use change (ILUC).¹⁰ § 95488.9 (g) (1) (A) specifically requires that biomass feedstocks must be sourced from land that was cleared or cultivated prior to January 1, 2008 and has been in continuous management or fallow since then. While this provision effectively mitigates the risk that fuels will be made from feedstocks grown on recently converted land, thereby controlling for *direct* land use change risk, that same provision requires that certified feedstocks be a source of *indirect* land use change risk. Any land that was in continuous management or cultivation since 2008 will have produced a product that was sold or used to satisfy some form of demand; this is the reason for a grower to invest the time and resources entailed in management. Limiting feedstock certification to biomass sourced from historically cultivated land means it necessarily must be redirected from a previous use to biofuels. This redirected production is, by definition, the event that initiates the causal chain of events that results in ILUC. This illustrates the reason why feedstock sustainability guidelines cannot effectively mitigate ILUC risk: Eliminating direct land use change risk through feedstock sustainability guidelines requires avoiding feedstocks grown on cropland that was recently converted to cultivation. Eliminating ILUC risk through feedstock sustainability guidelines requires avoiding feedstocks grown on cropland that was historically cultivated. No land can simultaneously satisfy both conditions.

Phase-out of New RD Pathways

251.11

Proposed changes to § 95488 (d) would authorize the Executive Officer to not accept new pathway applications for biomass-based diesel if California meets specified targets for Class 3-8 (MD and HD) ZEVs. This sends a clear and helpful message to alternative fuel producers and prospective producers that biomass-based diesel's role in California's transportation system is intended to decline over time. This aligns with findings from the *Driving to Zero* report, as well as our FPSM modeling studies, that the expected transition to MD and HD ZEVs will dramatically reduce the consumption of biomass based diesel in the 2030's and 2040's. Previous FPSM studies project less than 1.5 billion gallons of liquid diesel consumption in 2040 and only around 650 million gallons in 2045. To some extent, the declining annual CI targets that are the foundation of the LCFS serve the same purpose; because few if any liquid fuels for combustion engines can meet anticipated CI targets in the late 2030's and early 2040's, there is strong pressure to switch to fuels more capable of achieving deep decarbonization.

Even with this anticipated behavior, however, the clear and explicit message sent by this proposed change serves as a helpful reinforcement of California's commitment to deep decarbonization. While the long-term signal to markets is expected to be beneficial, we anticipate that this provision will have very little tangible impact on the size or composition of California's liquid diesel pool. The provisions do not take effect until 2031 at the earliest, and

¹⁰ We have written at length about ILUC risk in previous comment letters, including those submitted on [May 9th](#) and [February 20th](#) and refer Staff to those for a deeper discussion of ILUC issues.



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while new pathways may not be accepted, existing pathways are unaffected and may not expire until the late 2030's.

251.11
cont.

There may be unintended negative consequences from the proposed structure of § 95488 that could be mitigated by some small changes, to better allow the intent of this provision to be carried through. Ceasing the acceptance of new pathways may prevent or disincentivize producers from making efficiency-improving upgrades that would normally require pathway recertification. Allowing existing pathways to be recertified to recognize the value of efficiency improvements or CI reductions without extending the duration of their certification could help prevent this unwanted outcome. Similarly, there may be forms of biomass-based diesel that achieve very low CI scores with excellent sustainability characteristics and minimal ILUC risk, e.g. that made from algae or cellulosic biomass. While we anticipate a small and rapidly declining pool of liquid diesel demand in the 2040's, several hundred million gallons of such demand are likely to remain in 2045 and beyond. If a biomass-based diesel substitute with very low CI scores were to emerge after 2030, it may be advisable to allow that fuel access to the incentives offered by the LCFS to support deployment at commercial scale. Such an exemption may be within the scope of Executive Officer authority, since the language of § 95488 is permissive rather than mandatory: "Beginning January 1, 2031, the Executive Officer *may* choose not to accept new fuel pathway applications...." (emphasis added). The clarity and transparency of this provision may be enhanced by specifying the conditions under which the Executive Officer would choose to accept new pathways, e.g. if the pathways achieved a CI score 75% below the fossil diesel benchmark, including appropriate ILUC adjustment and without the need for CCS, book-and-claim delivery of renewable energy, or indirect carbon credits like avoided methane credits.

Limits on Soybean and Canola Feedstock Content

251.12

The 15 day package proposes adding § 95482 (i), which specifies any biomass based diesel made from soy or canola feedstock in excess of twenty percent of a company's total quantity delivered to California will be credited as if it had a CI equal to the CI benchmark for that year, or the fuels assessed CI score, whichever is greater. Similar to § 95488 (d) (discussed above), this sends a clear and helpful signal to fuel markets and prospective producers that California has a clear commitment to deep decarbonization. Also similar to § 95488 (d), the effect of this provision may duplicate the expected impact of the LCFS's core design. The declining CI targets naturally mean that crop-based fuels (which are typically more carbon intensive over their life cycle than comparable waste- or residue-based ones) will cease generating LCFS credits earlier than most other options. As a result, we would typically expect crop-based fuels to make up a shrinking share of total fuels credited under the LCFS over time. Having the allowable fraction of crop-based fuels decline over time would further strengthen the message that this provision sends.



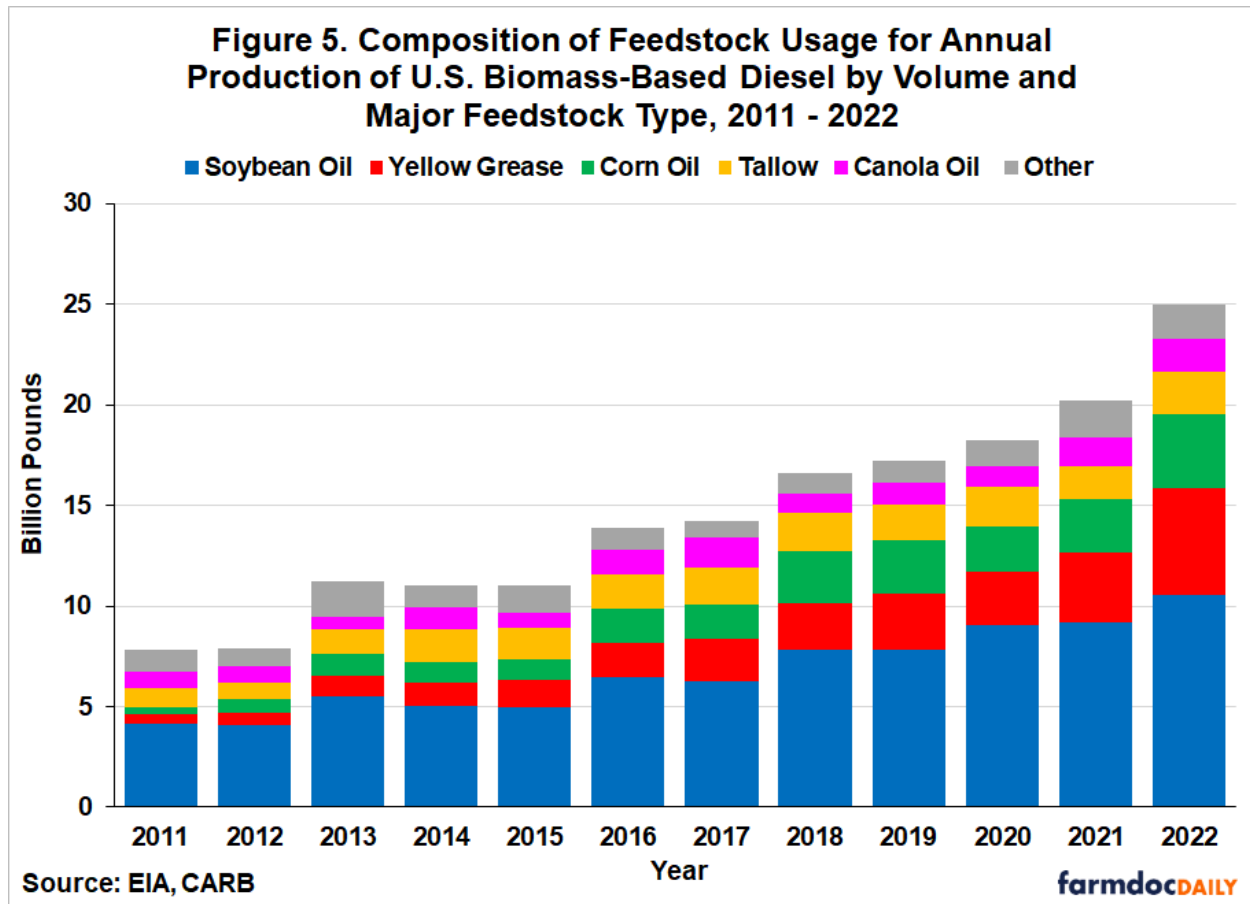
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251.13

While the proposed § 95482 (i) will send a clear and helpful message to fuel markets, it is unlikely that it will provide any significant protection against ILUC risk. The figure below shows the mix of feedstocks used for biomass-based diesel production in the U.S.¹¹ In 2022, roughly half of total biomass based diesel production used waste and residue feedstock, since then there has been significant growth in the amount of waste and residue oils imported from other countries. This suggests that ample waste and residue capacity exists for producers to comply with this 20% limitation by shuffling their production across the multiple markets that exist for such fuels in North America. California's biomass-based diesel demand can be satisfied by a portfolio of fuels that complies with the new requirements in § 95482 (i), which the remaining crop-based feedstocks can be sent to other jurisdictions, especially Canada, where rapidly expanding demand for compliance credits under the Clean Fuels Program, coupled with that program's complete lack of ILUC risk mitigation lead to it being a highly receptive market for crop-based feedstocks. In this event, the aggregate demand for biomass-based diesel feedstocks in North America will remain unchanged, even while California nominally complies with § 95482 (i). Since ILUC is caused by aggregate demand for agricultural commodities, this would lead to the same amount of ILUC risk as would have occurred had § 95482 (i) not been adopted.

¹¹ Source:

<https://farmdocdaily.illinois.edu/2024/04/fame-biodiesel-renewable-diesel-and-biomass-based-diesel-feed-stock-trends-over-2011-2023.html>



251.13
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Ultimately, § 95482 (i) will only provide a significant degree of tangible, near-term protection against ILUC or other sustainability risks if other jurisdictions in North America adopt similar provisions. Given the potential size of the Canadian market for alternative fuels in the coming decade, coupled with its lack of any meaningful ILUC risk mitigation, it is possible that their program alone could absorb enough crop-based biofuel to make company-level compliance with § 95482 (i) purely via feedstock shuffling feasible. As such, while the market signal provided by § 95482 (i) is beneficial, this provision should not be relied upon to provide any measure of ILUC or sustainability risk mitigation until more jurisdictions have adopted equivalent policies and the anticipated effects have been confirmed by modeling.

Authority for the Executive Officer to Replace Values in Table 6

251.14

The 15 day package proposes changes to § 95488.3 (d), specifically adding a sub-part authorizing the Executive Officer to substitute new, more conservative values for existing entries in Table 6 of the regulation, if the existing entries are not “conservatively representative” of a particular region/feedstock/fuel combination. The impacts of this provision depend largely on how CARB chooses to interpret the term “conservatively representative” and what evidentiary



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standard may be required for the Executive Officer to arrive at the conclusion that such a replacement is warranted. If this authority is utilized in a timely and vigorous manner, this provision could provide very strong protection against ILUC risk. As we have discussed in previous comment letters, while there has been a marked lack of investment in ILUC research and modeling over the last decade, multiple studies have indicated that the ILUC adjustment values currently in Table 6 significantly underestimate actual ILUC impact.¹² This impression is reinforced by the results of an inter-model comparison exercise the EPA conducted for ILUC models in 2023, which found a range of ILUC impacts for soybean oil based biodiesel that ranged from 11 to over 300 gCO_{2e}/MJ.¹³ While the estimate of U.S. soybean oil represented in Table 6 is within that range, it is clearly at the low end of it. The asymmetric risk dynamics involved with ILUC estimation that suggest underestimation of ILUC impact is significantly more risky than overestimation.¹⁴ As such, it may be reasonable to conclude that Table 6's value for soybean oil is not a conservatively representative estimate of ILUC risk at present.

While we focus on soybean oil for the purpose of the above discussion, it is quite possible that other values in Table 6 may not be conservatively representative of actual ILUC risk at present, however the short timeframe of this comment letter did not allow for sufficient analysis to arrive at an informed conclusion for other feedstock/region/fuel combinations. We are happy to work with CARB or other stakeholders to evaluate these in the future.

Ultimately, the proposal to allow the Executive Officer the authority to substitute values in Table 6 with more conservative ones aligns with the imperative to ground the LCFS on current science on critical issues like ILUC. The data, methods, and modeled scenarios that underpin the existing Table 6 values, while state-of-the-art at the time they were created, are outdated now and inadequately protective against ILUC risk. The values in Table 6 have not been updated since their adoption, despite the completion of multiple LCFS rulemakings; this suggests that additional authority to update these values outside of the rulemaking process may be necessary to keep the LCFS aligned with the best science. The degree to which this authority actually reduces ILUC risk depends on the timeliness and vigor with which this authority is exercised. The rapid growth of biomass-based diesel has created massive new demand for lipid

¹² E.g. Malins, *et al.* (2020) <https://www.sciencedirect.com/science/article/abs/pii/S0959652620307630> and Berry, *et al.* (2024) <https://www.arb.ca.gov/lists/com-attach/6987-lcfs2024-AXVUPQNqUWsDa1AP.pdf>. In addition, the lead investigator on the project that established the values currently in Table 6 submitted a comment on a previous public docket supporting the need to reevaluate and likely increase the values in Table 6. O'Hare (2024) *Low Carbon Fuel Standards Amendments*. https://www.arb.ca.gov/lispub/comm/iframe_bccomdisp.php?listname=lcfs2024&comment_num=7063&virt_num=380

¹³ EPA (2023) *Model Comparison Exercise Technical Document* <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockkey=P1017P9B.pdf>

¹⁴ Murphy (2023) *Making Policy In the Absence of Certainty: Risk-Aware Consideration of Indirect Land Use Change Estimates for Biofuels* 2023-08-07 | UC Davis Policy Institute - Making Policy in the Ab...



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251.14
cont.

feedstocks. Given that there is no evidence of a decline in lipid consumption in non-biofuel sectors, this demand must necessarily be met by increased lipid production, the only feasible route for which under current technology is increased production of vegetable oils. It is inconceivable that increased vegetable oil production sufficient to satisfy billions of gallons of new biofuel demand does not entail some conversion of land into new cultivation (though clearly, not all new demand is being met by expanding cultivated areas). This means that the land use change impacts California seeks to avoid are happening now. A recent California State Auditor's report concluded that state biofuel purchases are contributing to tropical deforestation globally; there is no reason to believe that the biofuels purchased by the state would have such an impact while biofuels purchased by private individuals or corporations would not.¹⁵ The proposal to allow substitution of more conservative values for existing ones in Table 6 offers one of exceedingly few ways California can mitigate its ILUC-driven GHG emissions in the near term: by adopting more risk-aware and effectively protective ILUC values at the earliest possible opportunity.

CATS Model Results

251.15

Updated results of CATS modeling were released simultaneously with the 15 day package. The results from the CATS model include some changes in direction for existing credit generators currently experiencing substantial growth – notably renewable diesel and dairy biogas. These results deserve some interpretation, as they stand at odds with recent modeling in FPSM as reported in Murphy & Ro (2024) and by Bushnell et al. (2023)¹⁶ that suggests considerable growth in renewable diesel likely to the point of liquid diesel saturation. There are also several cases where CATS model results are highly volatile year to year, such as the CI scores of electricity used for EV charging in some scenarios; this kind of discontinuity is not uncommon in optimization models even though it reflects behavior that is highly unlikely to be observed in reality, due to the prevalence of long-term contracts in fuel supply, and other sources of market inertia.

The methodological choices underpinning any model must be considered as critical context when evaluating model output; for example, the model shows a zero credit price for some periods in scenarios that lack the AAM, despite that a credit price of zero has never been observed in the LCFS and would indicate a profoundly dysfunctional market. While models like CATS and FPSM can provide valuable guidance during policy design, the strengths and weaknesses of their design must be taken into account as policymakers decide how much weight to ascribe to any given output. We provided a more extensive discussion of the methodological choices in CATS in our [May 9th letter](#) and urge CARB and LCFS stakeholders to

¹⁵ California State Auditor (2024) *Tropical Forest Risk Commodities*
<https://www.auditor.ca.gov/reports/2023-129/>

¹⁶ For the latter, see <https://haas.berkeley.edu/wp-content/uploads/WP340.pdf>



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251.15
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carefully consider the methodological limitations and inherent biases of CATS and other models (including FPSM) as they look to modeled outputs for guidance during policy design. We note that the decline in 2024 RD consumption compared to 2023 that previous CATS model runs predicted appears highly unlikely, given the continued growth of RD observed in Q1 LCFS data that were recently released.¹⁷ This error in prediction of behavior less than a year in advance is, as we discussed previously, a predictable artifact of the CATS model design. Optimization models like CATS typically provide their best predictive ability when they are evaluating markets that are in a normal functional state, operating in the middle of the range of the supply curves they draw from. The LCFS market at present is profoundly oversupplied with credits, operating at the fringes, or even completely outside of the range of conditions under which CATS is best equipped to evaluate. As such, caution is warranted when using CATS outputs as the basis for policy analysis or evaluation.

Changes to Infrastructure Capacity Crediting Provisions

The 15 day package proposes several changes to amendments related to infrastructure capacity crediting provisions, notably the separation of stations serving MD and HD vehicles into separate categories, with stations serving light duty (LD) and MD vehicles grouped into a combined LMD category. Both FCI and HRI categories are subject to a limit on aggregate credit generation, set at 2.5% of prior quarter deficits. The provisions appear to be structured to give the HD FCI and HRI pathways priority over the LMD ones for access to the pool of available HRI and FCI credits; this aligns with multiple statements of intent to prioritize policy support for HD ZEV deployment to allow California to meet its climate and air quality goals.

251.16

The implementation of this prioritization, however, appears to create a loophole through which significantly more credits to be issued via HRI and FCI pathways than the stated 2.5% limit would allow. § 95486.3 (a) (3) (A) (1) (which applies to LMD HRI pathways, though similar language exists in § 95486.3 (b) (3) (A) (1) for LMD FCI pathways) states “If estimated potential HRI credits from all approved HRI and LMD-HRI stations exceed 2.5 percent of prior quarter deficits, the Executive Officer will not approve additional HRI pathways, and will not accept additional LMD-HRI applications until estimated potential HRI credits are less than 2.5 percent of deficits”. The intent of these sections is clear: that total HRI and FCI potential credit generation should not exceed the 2.5 percent of prior quarter deficits limit.

Language in the HD HRI and FCI sections, however, establishes a slightly different test. § 95486.4 (a) (3) (A) (1) states (and equivalent language in § 95486.4 (b) (3) (A) (1) mirrors) “If If estimated potential HD-HRI credits from all approved stations exceed 2.5 percent of deficits in the most recent quarter for which data is available, the Executive Officer will not approve additional HRI pathways for HD-HRI stations and will not accept additional applications until

¹⁷ https://ww2.arb.ca.gov/sites/default/files/2024-08/quarterlysummary_Q12024.xlsx



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estimated potential HRI credits for approved HD-HRI stations are less than 2.5 percent of deficits." The critical difference between the provisions in the LMD pathways and their HD equivalents is that the HD pathways only test to see whether estimated potential credits from all approved HD stations exceed 2.5 percent of prior quarter deficits, whereas the LMD stations test to see whether the sum total of LMD and HD stations exceed the 2.5 percent threshold.

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This structure seems intended to prioritize HD stations access to the allowable pool of credits in the event that the 2.5% limit is approached or reached. However, the specific structure proposed creates a loophole that could allow this 2.5% ceiling to be broken. If, for example, in a given quarter LMD-HRI stations generate estimated potential credits equal to 1% of prior quarter deficits and HD-HRI stations generate estimated potential credits equal to 1.6% of prior quarter deficits, the Executive Officer would not approve additional LMD-HRI pathways, but would continue to approve HD-HRI pathways until they reached the 2.5% limit. If approvals of HD-HRI pathways in that quarter added additional potential credit generation equal to 0.9% of prior quarter deficits, the actual potential credit generation from HRI pathways in that quarter would be equal to 3.5% of prior quarter deficits, 2.5% from HD-HRI pathways and an additional 1% from the existing LMD-HRI pathways. This exceedance could result in significantly more credits than anticipated or nominally permitted being issued to HRI pathways in contradiction to the intent of these provisions and further exacerbating the oversupply of credits discussed earlier in this letter.

Clarification of Definitions and Intent

This section presents comparatively smaller issues with definitions and other proposed changes from the 15 day package.

Definitions

Feedstock First Gathering Point - The 15 day package proposes changes to this definition that focus it exclusively on entities that receive, aggregate, store or treat "biomass directly from farms, plantations, or forests..." This definition implies that the definition of a first gathering point is limited only to systems using purpose-grown biomass (from farms or plantations) or collected from forests, which may themselves be managed for a purpose. This seems to exclude the possibility of a first gathering point for waste or residue biomass that did not come from a forest, such as grassland, wetland, or municipal supplies. We question whether this was the intent of this definition, and if a more expansive definition would better suit the purpose.

251.17

Forest Biomass Waste - The 15 day package creates a definition meant to describe forest biomass removed for the purpose of wildfire fuel reduction or forest health enhancement, that could not be salvaged for lumber or other wood products. The intent of this definition is clear and appropriate. Staff may want to consider a reference to the California Forest Practice Manual

251.18



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cont. or relevant natural resources code that describe forest biomass waste, to better align the LCFS with existing policy.

251.19 *Public LMD-FCI Charging Site and Public LMD-HRI Station* - The definition of these stations indicates that chargers or stations must not be reservable during public hours. The intent of this definition is clear and in concept, appropriate. It may be useful, however, to allow very limited exemptions from the ban on reserving chargers or stations. If a driver in a vehicle is near a station and in need of recharging or refueling, allowing them to reserve a slot while they are en route (e.g. less than an hour away) may allow for more efficient planning and allocation of charging or refueling capacity in heavily-trafficked areas. Care must be taken to ensure that automated, speculative, or consecutive reservations do not expand this exemption beyond its limited intent.

251.20 *Renewable Gasoline* - The definition is unclear whether captured carbon that is subsequently used to produce gasoline, such as by Fischer-Tropsch synthesis powered by renewable electricity, qualifies as “renewable” for this purpose. Clarifying whether captured CO₂ qualifies and if any restrictions exist for specified sources (e.g. captured CO₂ from a fossil fuel powerplant) would help ensure that the implementation of related provisions match the intent of this definition.

Other Issues Relating to Clarity and Intent of Proposed Changes

251.21 § 95486.2 (b) (4) (F) - Proposed changes to this provision would require a station that receives FCI credits to dispense electricity in each quarter that it receives such credits. This requirement aligns with the intent of the HRI and FCI provisions, to support the deployment of critical refueling and fast charging infrastructure in advance of vehicle deployment. Requiring some actual dispensing of electricity ensures that a station must actually contribute to refueling of ZEVs in California to receive infrastructure credits. We suggest Staff consider adding a significance threshold to this requirement, to ensure that a single charging event, or isolated handful of them, cannot by themselves maintain eligibility for infrastructure capacity credits. This protects against the possibility that a fast charger operator would utilize their own charger once a quarter solely for the purpose of maintaining eligibility for FCI credits.

251.22 *Attachment 2, Credit Quantification Equations for HRI and FCI Pathways* - In our reading of this attachment, we note several areas where the subscripts on variables in credit quantification equations appear to be inconsistently used. For example, § 95486.3 (a) (3) (B) presents the following equation to quantify potential LMD-HRI credits:

$$Credits_{LMD-HRI}^{Potential} = Credits_{LMD-H}^{Prior\ qtr} \times \frac{Cap_{LMD-HRI}^{Approved}}{Cap_{LMD-H}^{Operational}}$$



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However the description of variables below lists $Credits_{LMD-HRI}^{Prior\ qtr}$ rather than $Credits_{LMD-H}^{Prior\ qtr}$. It is unclear which variable name is intended here. Careful reading and cross-referencing generally allows the intent of these provisions to be ascertained, but we suggest Staff carefully review these equations for consistency to prevent misinterpretation by stakeholders moving forward.

251.23

Attachment 2, Provisions regarding limitations on number of credits generated by HRI and FCI pathways -We observe inconsistent use of “deficits” and “prior quarter deficits” in these sections, and while the intent seems clear and discernable as written, aligning the language in these sections could reduce the possibility of future misinterpretation.

Unresolved Issues Point to Need for Additional Rulemaking in the Near Term

251.24

From the start of the workshop and engagement process that led up to this rulemaking, Staff were clear that the scope would be strictly limited in order to allow timely and efficient adoption of changes that could stabilize the LCFS credit market and help strengthen the LCFS credit price. The workshops, engagement opportunities, and discussion materials circulated since then have reflected this agenda. Given the significant decline in LCFS credit prices, this focus on corrective measures is understandable.

The limited scope, however, meant that many critical and complex structural topics that, when fully explored, might offer avenues to improve the efficiency, resilience, and effectiveness of the LCFS as decarbonization proceeds were excluded from this rulemaking. These include, but are not limited to, consideration of updated EERs, updating how the regulation addresses ILUC impacts, addressing appropriate crediting from fossil fuel displacement in a transitioning fleet, treatment of interactions or potential double-counting with other climate programs, harmonizing LCFS protocols with other jurisdictions that have similar programs in place or coming online, preparing for radical LCFS credit market shifts anticipated in the 2030's as program revenues begin declining due to reduced gasoline consumption, expanding the LCFS to cover air, water, and rail fuels, and integrating vehicle or transportation-system effects into fuel CI assessment, differentiation between so-called “bridge” fuels and those with the capacity to achieve carbon neutrality, etc. As discussed in earlier sections of this comment, several of these issues have demonstrated actual or potential capacity to negatively affect the LCFS and/or progress toward California's climate, environmental, and equity goals within the next 5-10 years. The other issues deserve careful consideration and the opportunity for public discussions in a forum that includes stakeholders from a variety of perspectives and LCFS program staff.

It is especially important in the transportation fuel space to make policy changes as early as possible, in order to avoid a situation that requires precipitous action that may create stranded assets, excessive fuel price volatility, or erode policy certainty about the LCFS market. The LCFS has in the past conducted major rulemakings following the release of the Scoping Plan; if



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past patterns hold this would imply the next significant LCFS rulemaking in 2028. By that time, failure to address some of the issues listed above could lead to another destabilization of LCFS credit markets. While many of these issues are complex and will take significant time and resources to address, most are amenable to solutions that can be gradually implemented, to minimize disruption. Waiting until a crisis emerges increases the chance that precipitous, disruptive change will be required.

CARB should commit to a follow-up LCFS rulemaking, without any limitations to its scope, at the earliest possible opportunity.

Thank you again for the opportunity to provide comments on the proposed amendment package. We appreciate the discussion this process has fostered so far and look forward to continuing our dialog through the coming year. We attach to this submission copies of the three recent reports from our research group related to research and modeling the LCFS, they are also available at the links cited in this letter. If we can offer any additional assistance or clarify any of the material in this comment, please do not hesitate to reach out to Colin Murphy by email at cwmurphy@ucdavis.edu.

Signed,

Colin Murphy, Ph.D.
Co-Director, Low Carbon Fuel Policy Research Initiative
Associate Director, Energy Futures Program
Institute of Transportation Studies
University of California, Davis, California, USA

August 27, 2024

Matthew Botill
Division Chief, Industrial Strategies Division
California Air Resources Board
1001 I Street
Sacramento, CA 95814
VIA ELECTRONIC DELIVERY

**RE: Comments on the August 12, 2024, Proposed Low Carbon Fuel Standard Amendments
(15- day changes)**

Dear Mr. Botill:

I write on behalf of U.S. Venture, and our U.S. Energy subsidiary, regarding the Proposed Low Carbon Fuel Standard (LCFS) Amendments published August 12. We generally support the amended proposal and appreciate the California Air Resources Board's (CARB's) continued efforts to balance diverse stakeholder input. In addition, we support the detailed analysis submitted by the Coalition for Renewable Natural Gas (RNGC) and the comments offered by the American Biofuels Council (ABC). Outlined below are two issues related to renewable natural gas (RNG) that warrant additional consideration before the final regulation is approved.

U.S. Venture is a 70-year-old family-owned company based in Northeast Wisconsin. Our vision is to be the very best provider of transportation products, sustainability solutions, and insight driving the world forward. Our more than 4,600 employees at 110 locations nationwide include nearly 600 employees in California. Our U.S. Energy group is nationally recognized as an innovative leader in the distribution of renewable and traditional energy products, including RNG as a drop-in replacement for fossil natural gas (with 71 California dispensing locations), for thermal applications and as a feedstock for hydrogen production. We have actively participated in the LCFS program since 2013 and commend CARB as a global leader in promoting the development and use of low carbon transportation fuels.

We would like to highlight two areas of concern cited by RNGC, ABC and others: the staff proposal to develop a "gas system map" deliverability study and the reduction of avoided methane crediting periods to two from three.

Regarding the "gas system map" deliverability study, the proposed amendments state on page 11:

"In subsection 95488.8(i)(2), staff proposes to modify deliverability requirements for book-and-claim accounting for biomethane. The modification adds a condition that if the Executive Officer approves a gas system map identifying interstate pipelines and their majority directional flow based on specified flow data by July 1, 2026, pathways for bio-CNG, bio-LNG, and bio-L-CNG combustion in vehicles would need to demonstrate physical flow to California after December 31, 2037."



Finding a better way

252.3

Although this approach is much improved over earlier proposed deliverability restrictions, it suggests future regulations based on an as-yet-defined map. Any restrictions based on mapped gas flows could arbitrarily penalize existing and in-development out-of-state projects which depend on the LCFS for economic feasibility. It would also damage CARB's position as a global leader in emissions reduction programs, and if California creates arbitrary deliverability requirements for out-of-state biomethane, other states may follow. This patchwork of disjointed policies would discourage RNG development investments – the most cost-effective, high-quality emission reduction projects – and set the country back on its goal to reduce greenhouse gases, especially short-lived climate pollutants like methane.

Regarding the avoided methane crediting period reduction, the proposed amendments state on page 12:

"In subsection 95488.9(f)(3)(A), for projects breaking ground before January 1, 2030, staff proposes to reduce the total number of crediting periods for avoided methane emissions crediting periods to two, rather than three. This proposed change aligns more closely with the end-dates for avoided methane pathways that break ground after December 31, 2029, which was proposed in the Staff Report 3, while still providing an incentive to develop methane capture projects."

252.4

While this language is also much improved from the earlier proposals to phase out avoided methane crediting, reducing the number of crediting periods will likely still lead to less investment in new methane reduction projects. We believe that methane crediting should remain a long-term tenant of the LCFS program; however, if CARB feels it must end, retaining three periods is a better approach.

In summary, U.S. Energy applauds CARB for continuing to incentivize the development of dairy digester avoided methane projects. We look forward to continuing to work with the agency to deliver the benefits of avoided methane and cleaner fuels.

Thank you for the opportunity to provide feedback on the proposed LCFS changes. If you would like any further information on the comments above, please let me know.

Sincerely,

s/Brian Casey

Brian Casey
Head of Government Affairs
U.S. Venture/U.S. Energy



August 27, 2024

Submitted electronically at <https://ww2.arb.ca.gov/lispub/comm/bclist.php>

Clerk's Office
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Twelve Benefit Corporation Comments on CARB's 15-Day Notice on the Proposed
Low Carbon Fuel Standard Amendments

Dear Sir/Madam:

Twelve Benefit Corporation (Twelve), which submitted written comments earlier this year on the California Air Resources Board's (CARB) Low Carbon Fuel Standard (LCFS) 45-day rulemaking package as well as on the April 10, 2024, LCFS workshop that CARB convened, appreciates the opportunity to provide the following comments on the 15-Day Notice and accompanying 15-Day Changes that CARB issued on August 12, 2024.¹ (Please note that Twelve is also a signatory of the comment letter submitted today on behalf of various entities with an interest in Power-to-Liquid (PtL) fuels.)

253.1

We write today concerning the proposed 15-Day revision to the LCFS Program's definition of "alternative jet fuel," which would add to the definition an explicit reference to "captured CO₂." This modification, shown on page 5 of Attachments A-1 and A-1.1, would appropriately recognize that alternative jet fuel (AJF) may be produced via the PtL pathway, which, as we detailed in our earlier comment letters, combines captured CO₂ with clean hydrogen derived from the electrolysis of water using renewable/low-carbon intensity (low-CI) electricity (e.g., solar, wind, hydropower). CARB, of course, has acknowledged in this rulemaking that "there is a growing interest in producing synthetic fuels by combining hydrogen with captured CO₂."² We emphasize in this regard that we expect to begin regularly producing our E-Jet[®] fuel (as well as E-Naphtha[™]) at our AirPlant[™] in Moses Lake, Washington by mid-2025. As previously explained, we project that our E-Jet will reduce lifecycle greenhouse gas (GHG) emissions by up to 90 percent in comparison to fossil jet fuel.

¹ Posted at <https://ww2.arb.ca.gov/rulemaking/2024/lcfs2024>. Our February 20, 2024, comment letter is available at https://www.arb.ca.gov/lispub/comm/iframe_bccomdisp.php?listname=lcfs2024&comment_num=6888&virt_num=224, a joint letter that we submitted with several other companies can be found at <https://www.arb.ca.gov/lists/com-attach/7030-lcfs2024-VD4AaQRsU25SIABf.pdf>, and our May 10, 2024, feedback on the LCFS workshop is posted at https://ww2.arb.ca.gov/system/files/webform/public_comments/11106/Twelve%20Feedback%20on%20April%2010%20LCFS%20Workshop.pdf.

² See Appendix E: Purpose and Rationale of Proposed Amendments for the Low Carbon Fuel Standard Requirements, at 59 (Jan. 2, 2024).

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While we fully support the proposed modification to the AJF definition, we cannot help but observe that it likely will be inconsequential and amount to a definitional change without any real significance or impact. That is because, based on the full contents of the 15-Day Notice and accompanying materials, it is apparent that CARB has opted not to put in place regulatory provisions that would promote rather than inhibit the production and in-state uptake of ultra-low carbon intensity PtL sustainable aviation fuel (SAF) such as Twelve's E-Jet (and potentially other PtL transportation fuels). More to the point, to our dismay, CARB has not included in the 15-Day Changes proposed language that would allow fuel producers like Twelve to use indirect accounting mechanisms (e.g., Renewable Energy Certificates) to account for the low-CI electricity that is crucial to the PtL fuel production process. What is more, while CARB has seen fit in the 15-Day materials to undo some aspects of what it had initially proposed in the 45-Day package, it has not seen fit to reverse course and at least retain the language in section 95488.8(i) that enables fuel producers to use book-and-claim accounting for low-CI electricity when the electricity is used to make hydrogen that is then used in the production of another transportation fuel (e.g., PtL SAF).

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These omissions from the 15-Day package make it quite clear that Twelve or any other PtL fuel producer keen on participating in the LCFS Program effectively has no choice but to co-locate its PtL fuel production facilities with, or otherwise ensure the facilities have a direct, behind-the-meter connection to, a renewable power source, an arrangement that is often impractical and infeasible (and in the case of hydropower, difficult or physically impossible to accomplish). As we have conveyed to our potential customers and others, the upshot of this almost certainly will be no E-Jet (or any other company's PtL SAF) flowing into California for uplift at airports there.

In short, if the 15-Day Changes (along with the initial 45-Day amendments) are finalized as proposed, PtL SAF technically would be encompassed within the Program's AJF definition, but fuel producers' inability to procure low-CI electricity via indirect accounting mechanisms would effectively mean the exclusion of PtL SAF (and other PtL transportation fuels) from the LCFS Program. This result would be in contradiction to CARB's assertion in its Initial Statement of Reasons that "the proposed amendments, and the LCFS more broadly, are structured to encourage . . . investment in . . . carbon capture [and] utilization . . . approaches."³ Rather than providing encouragement for the production and in-state use of PtL SAF (and other PtL transportation fuels, all of which constitute a prime example of carbon capture and utilization⁴), CARB would be hampering it.

In its comprehensive report earlier this year on the role of PtL fuels in decarbonizing transport, the International Energy Agency (IEA) stressed that "[g]overnments need to take bolder action

³ See Staff Report: Initial Statement of Reasons, at 80 (Dec. 19, 2023).

⁴ See, e.g., National Academies of Science, Engineering, and Medicine, *Carbon Utilization Infrastructure, Markets, and Research and Development: A Final Report* (2024), available at <https://nap.nationalacademies.org/catalog/27732/carbon-utilization-infrastructure-markets-and-research-and-development-a-final>; U.S. Department of Energy, "Clean Fuels & Products Shot™: Alternative Sources for Carbon-based Products," available at <https://www.energy.gov/eere/clean-fuels-products-shottm-alternative-sources-carbon-based-products>; European Commission, "Questions and Answers on the EU Industrial Carbon Management Strategy" (Feb. 6, 2024), available at https://ec.europa.eu/commission/presscorner/detail/en/qanda_24_586.

253.4

to stimulate demand for low-emission e-fuels.”⁵ Twelve urges CARB to heed this advice and simultaneously make the proposed AJF definitional modification a meaningful one by incorporating into the LCFS amendments package language that would enable book-and-claim accounting for the low-CI electricity that is integral to the production of PtL SAF (and other PtL transportation fuels). *With the first barrels of E-Jet slated to be produced at our Moses Lake AirPlant by this time next year, and with other companies moving forward with their own PtL SAF production facilities, now is the time, not several years down the road, for CARB to put in place regulatory provisions that will foster the production and in-state uplift of this innovative, ultra-low carbon intensity jet fuel.* By virtue of its deep lifecycle GHG emissions reductions, PtL SAF is well positioned to contribute significantly to the decarbonization of California’s aviation sector and the overarching state goal, enshrined in the California Climate Crisis Act, of achieving an 85 percent reduction in anthropogenic GHG emissions (below 1990 levels) by 2045.⁶ We respectfully request that CARB recognize this in the LCFS Program.

* * *

Thank you for your consideration of our comments. Please do not hesitate to contact me or Ira Dassa (ira.dassa@twelve.co) if you have any questions.

Sincerely yours,

Andrew Stevenson

Andy Stevenson
Vice President of Commercial
Twelve Benefit Corporation
andy.stevenson@twelve.co

⁵ IEA, *The Role of E-Fuels in Decarbonising Transport*, at 9 (Jan. 2024), available at <https://iea.blob.core.windows.net/assets/a24ed363-523f-421b-b34f-0df6a58b2e12/TheRoleofE-fuelsinDecarbonisingTransport.pdf>. More recently, the Alliance for Renewable Clean Hydrogen Energy Systems, a/k/a ARCHES, which the Governor’s Office of Business and Economic Development co-founded almost two years ago, has called for “incentivizing the use of low-carbon hydrogen as an input to liquid SAF production” See ARCHES, *White Paper Overview*, at 23 (Aug. 8, 2024), available at <https://archesh2.org/wp-content/uploads/2024/08/ARCHES-White-Papers-Overview-8.8.24.pdf>.

⁶ See Health & Safety Code, section 38562.2(c).