

California Air Resources Board

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

## **Final Statement of Reasons for Rulemaking**

### **Appendix B Summary of Comments and Agency Response**

*Public Hearing Date: November 8, 2024*

*Agenda Item No.: 24-6-2*

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## U. Combustion

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### U-1 Multiple Comments: *Invest in Non-Combustion Technologies*

**Comment:** Historically, every year, California has spent 80% of the Low Carbon Fuel Standard's three- to four-billion dollars on combustion technology. This money should be spent, instead, on non-combustion technologies, to speed the state's transition to a zero-emissions future.

California cannot meet its clean air and climate goals without bringing the Low Carbon Fuel Standard's several billion-dollar program in line with those goals.

I trust, therefore, that you will reject the proposed amendments and overhaul the program accordingly. (45d-002.1)

**Comment:** Subsidizing and supporting combustible fuels is not a compatible strategy that will meet these goals for clear air.

Stick with the plan. Make air quality standards the priority at any and all turns. (45d-003.1)

**Comment:** Exclude polluting fuels like biogas, biofuels, and factory farm gas from the LCFS and any other definition of clean, renewable, and/or zero-carbon energy. (45d-200.5)

**Comment:** 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. (45d-364.1)

**Comment: In contrast to California's groundbreaking regulations designed to accelerate zero emissions transportation options, the LCFS continues to favor combustion-based biofuels and biogas that contribute to pollution.**

Over 75% of credits in the program flow towards biofuels and biogas (falsely characterized as "carbon negative") flooding the credit market with fuels that end up combusted, while dampening the LCFS's ability to support zero-emissions transportation, even as critical regulations like the Advanced Clean Trucks and Advanced Clean Fleets rule are poised to come into effect. (45d-379.1)

**Comment:** We are therefore alarmed that, unless major modifications are made, the Staff Proposal would further entrench LCFS subsidies for combustion fuel pathways that exacerbate climate and environmental injustices. The Proposal's combustion focus is a significant aberration from CARB's clear and full-throated mission to achieve health-based air quality standards by accelerating the transition from combustion to zero-emissions—a mission that the California Energy Commission (CEC), the California Public Utilities Commission (CPUC), the California Legislature, and Governor Newsom have joined.<sup>1</sup> We are not aware of any environmental or environmental justice organization that endorses continued LCFS subsidies for combustion fuels, paid for by California drivers. Instead, combustion fuel subsidies are most prominently championed by out-of-state combustion fuel producers, multi-national agribusiness corporations, commodities traders and financiers, and even oil and gas companies.

<sup>1</sup> These state actions include but are not limited to the following: CARB's regulatory actions on mobile sources are focused on eliminating air pollution and advancing the transition to zero emissions, including Advanced Clean Cars (ACC) II, Advanced Clean Fleets, and Advanced Clean Trucks; CARB's Mobile Source Strategy,

which identifies even faster electrification needed to meet attainment; CPUC's denial of utilities' requests to purchase natural gas trucks, recognizing that "California's express policy is to meet [the State's GHG reduction] goal through widespread transportation electrification;" CPUC's eliminating gas line subsidies for methane refueling stations; CEC's 2022-2023 Investment Plan Update for the Clean Transportation Program allocating 95% of its investment toward ZEVs; The State Legislature's clear intent in Senate Bill ("SB") 350 has been to achieve rapid decarbonization through widespread transportation electrification, and; Executive Order N-79-20 calls for an end to the sale of internal combustion engine vehicles by 2035, and that by 2045, all vehicles on the road are zero-emission everywhere feasible.

(45d-383.6)

**Comment:** Fortunately, as Earthjustice, our partners, and multiple academic experts have explained, reigning in subsidies to outdated, combustion pathways is not only necessary and workable, but can also stabilize LCFS credit prices to support an equitable ZEV transition and protect against runaway increases in gas prices. (45d-383.7)

**Comment: The LCFS offers far greater subsidies for methane-burning trucks than for ZEVs.** Contrary to the State's clear direction to achieve widespread deployment of ZE technology—embodied in CARB's recent approval of the State Implementation Plan—Staff's Proposal would continue preferencing methane-burning vehicles and misdirect fleets to invest in combustion technology and infrastructure. As Earthjustice has explained in multiple comments, relying on CARB's own research and statements, methane-burning trucks are not a clean air solution.<sup>44</sup> Yet the LCFS sends the signal that methane-burning trucks are a far more valuable strategy for displacing diesel in the transportation sector than zero-emissions trucks powered by renewable energy. A fleet that replaces one diesel truck with a single methane-burning truck can generate more value from the LCFS than a fleet that replaces 3 diesel trucks with battery electric trucks powered by entirely renewable electricity.

<sup>44</sup> See, Earthjustice, Comments on February 22, 2023 Workshop (Mar. 15, 2023) at 14, <https://www.arb.ca.gov/lists/com-attach/159-lcfs-wkshp-feb23-ws-Wz5VMIwvVXIeagRu.pdf>.

(45d-383.29)

**Comment:** 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. (45d-399.1)

**Comment:** STOP YOUR STUPID DAMN F'ING PROPOSED AMENDMENTS TO CALIFORNIA'S LOW CARBON FUEL AND THE DAMN COMBUSTION FUELS SUBSIDIES NOW, IMBECILES! (45d-1614.3)

**Comment:** PLEASE TURN OFF THE FOSSIL FUNDING, INCLUDING HYDROGEN!!! If so-called green hydrogen needs renewable energy to make it so, why not just fund greening up the grid so that all appliances and transportation can plug in to clean, renewable energy instead of wasting the whole step of hydrogen which stalls the transition (45d-4069.3)

**Comment:** Use the money that would subsidize big old and carbon burning tech and put it directly into zero emissions public transit and free rides for teen and college students and transforming California into a place where people can have access to, afford and can rely on public transit. (45d-4893.1)

**Comment:** Biofuels are not renewable. Let's invest in solar, wind, geothermal and wave energy production instead. (45d-6447.1)

**Comment:** 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. (15d1-007.1)

**Comment:** 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. (15d1-011.4)

**Comment:** 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.<sup>1</sup> 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.<sup>2</sup>

<sup>1</sup> See Earthjustice Comments on ISOR (Feb. 20, 2024), <https://www.arb.ca.gov/lists/com-attach/7077-lcfs2024-Wz4BZgd0BCNVOWJo.pdf>.

<sup>2</sup> The People's Workshop materials are also available at <https://www.fixlcfs.com/the-peoples-workshop>.

(15d1-222.1)

**Comment:** 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. (15d1-222.11)

**Comment:** Please reject the current staff recommendation, go back to work and come up with a better regulation. We support the EJAC's recommendations and many EJ, environmental and health groups who have identified specific changes and improvements. Save lives! Listen to Senator Flores! Vote No! (BH-060.3)

**Comment:** The LCFS's tragic preference for combustion fuels is unscientific, outdated and harmful to all of us. (BH-051.14)

**Comment:** The crucial bad assumption in the LCFS is that fuels created from sources of recent biological origin do not harm the climate and are thus sustainable. This fallacy is easily exposed by the fact that the atmosphere does not know if a specific CO<sub>2</sub> molecule comes from

a plant that died a million years ago or just last week. It still has an atmospheric lifetime of 100 years. LCFS crediting for dairy manure digester gas (DMG) and renewable diesel (RD) are two examples of this fallacy. While CARBOB has a CI of 100 g CO<sub>2</sub>e/MJ, RD has a CI=50, DMG CI=-150 while wind and solar electricity have CI=10 while generating no CO<sub>2</sub> during operation. How can a technology that generates no CO<sub>2</sub> be worse for the climate than DMG which generates the same amount of CO<sub>2</sub>/MJ as fossil natural gas when burned?

As we heard in the CARB presentation today, we cannot solve the climate crisis by continuing to combust carbon. LCFS must quickly phase out all credits for carbonaceous fuels and reserve future credits only for electric transportation based on wind and solar PV electricity. CARB staff has done a lot of good work here, but these two issues require them to go back to the drawing board. I urge the Board to reject this proposal. Thank you. (BH-058.1)

**Agency Response:** No changes were made to directly in response to these comments. But please see Response N-1 for a brief explanation of how the Proposed Amendments do align with an overall thematic commenter recommendation to provide significant support for zero emission fueling and lower CI-electricity. CARB values the input it receives from all stakeholders on its regulations. The best actionable input is constructive and supported by underlying data. We also believe we should engage in respectful debates on the issues and not devolve into personal attacks.

To support California achieving carbon neutrality by 2045 as directed by law, the Board-approved 2022 Scoping Plan Update identifies the need for an aggressive reduction of fossil fuel use, as well as building on and accelerating greenhouse gas reduction programs that have been in place for a decade and a half, including our Low Carbon Fuel Standard (LCFS). This means rapidly moving to zero-emission 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 greenhouse gas (GHG) emissions of 85% below 1990 levels by 2045 and meeting federal air quality standards 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 to meet ongoing consumer demand and continue expansion of low-carbon fuel production in ways that use existing infrastructure where possible, such as transitioning refineries to clean fuel production. In addition, staff's modeling suggests that zero emission vehicles are expected to become the dominant credit generators in the program in the coming decades as combustion engine vehicles are replaced by zero emission technologies.

The LCFS is designed to credit low carbon fuels of all types and 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 system of declining benchmarks that is used to calculate credits and

deficits associated with fuels supplied and used in California, 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.

## **V. Jet Fuel**

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### **V-1 Multiple Comments: Support Inclusion of Fossil Jet Fuel in LCFS as a Deficit Generator and Recommend Policy Change to Inclusion of Jet Fuel**

**Comment:** Consider the inclusion of intrastate jet fuel and marine fuels as a deficit generator and provide analysis of this option as part of the LCFS. (45d-001.8)

**Comment:** The incentivization of SAF in the Inflation Reduction Act has encouraged significant deployment of SAF facilities and alternative Jet fuel generating credits in the LCFS market since 2019. Fidelis encourages California to continue leading the deployment of alternative jet fuel (SAF) at scale by making conventional Jet Fuel a deficit generating fuel when used on intrastate flights. This amendment will directly incentive the utilization of alternative jet fuel at scale, resulting in decreased greenhouse gas emissions and improved air quality. (45d-045.8)

**Comment:** The ABC would also like to extend its support for CARB's proposal of eliminating the exemption for intrastate fossil jet fuel from the program starting in 2028. This will allow for continued and increased momentum for AJF production and use and will help drive down GHG emissions in the aviation sector. Furthermore, the 2022 update to the Scoping Plan calls for 80% of aviation fuel demand in 2045 to be met by AJF.<sup>6</sup> The growth of AJF use is a new market opportunity for biomethane as it can be an important input for the fuel, helping it achieve lower CI's.

<sup>6</sup> California Air Resources Board, *2022 Scoping Plan Update*, page 73.  
<https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>

(45d-096.14)

**Comment:** 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. (45d-101.4)

**Comment:** Include intrastate jet fuel as a deficit generator and include California's share of the fuel used in interstate and international flights. (45d-134.6; 45d-137.6; 45d-163.6, 45d-372.8)

**Comment:** Inclusion of fossil jet in the LCFS is a first step in recognizing the impact of aviation on the state's GHG emissions and the benefits of SAF for the state's climate ambitions. Given current technologies and feedstocks, SAF represents a major opportunity to decarbonize this hard-to-abate sector. With the encouraging language in the proposed rule, SkyNRG further encourages CARB to expand the scope of fossil jet regulation to include interstate flights.

Current regulations under the LCFS are already regulating interstate fossil fuel for on-road vehicles refueling in California before leaving the state. It was through this scheme that the

state has benefited from immense growth in liquid fuel innovation and the current boom in RD production and end use. This major paradigm shift in fuel technology was due in part to visionary leadership by CARB staff. By expanding the scope of fossil jet regulation in the LCFS, the state could further benefit from similar growth in the SAF sector. Furthermore, by regulating all fossil jet fuel uplifted in California, CARB would benefit from a streamlined regulatory process and reduced risk of legal challenge. (45d-155.6)

**Comment:** Additionally, we support accelerating the obligation to 2025 instead of 2028. CARB states that the proposal to delay the elimination of the exemption for fossil jet fuel until 2028 is meant to provide “sufficient time for potential producers of alternative jet fuel to add capacity for the anticipated increased demand of alternative jet fuel.” However, such a delay is unnecessary, and we urge CARB to consider an earlier implementation date. We note that British Columbia has already added an obligation for all fossil jet fuel beginning in 2026, coupled with a volumetric SAF mandate beginning in 2028. Given that CARB is only proposing an obligation for jet fuel and not an actual SAF requirement, consistent with the LCFS, there is technically no need for lead time to increase SAF production capacity because the structure of the LCFS program allows for compliance via credits generated outside of aviation, credits which are readily available today. In addition, CARB has already provided a five-year window for growth since making SAF an opt-in credit generator in 2019, during which time SAF volumes recorded under the LCFS have increased five-fold, despite a global pandemic and the continued regulatory disadvantages for SAF producers under both the LCFS and the Cap-and-Trade program. Nevertheless, SAF continues to lag far behind similar ground transportation fuels under the LCFS. This gap should not be misinterpreted as a signal that the SAF market or SAF technologies are insufficiently mature to support an obligation for aviation, but rather should serve as evidence that the lack of an LCFS obligation for aviation has steered producers toward more lucrative opportunities serving road transportation. (45d-155.7)

**Comment:** ABFC is strongly supportive of CARB’s proposal to remove the exemption for intrastate fossil jet fuel use under the LCFS. Including intrastate jet fuel as a debit-generating fuel under the regulation is an important step towards encouraging more Alternative Jet Fuel (AJF) use in California. (45d-162.1)

**Comment:** ABFC suggests that California expand its ambition towards jet fuel and, to the extent possible, 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. (45d-162.2)

**Comment:** Addressing aviation emissions should be a strong area of regional collaboration under the Pacific Coast Collaborative. ABFC recognizes that California and British Columbia are members of the Pacific Coast Collaborative and are leading LCFS jurisdictions in North America. Aligning on clear and stringent approaches to addressing emissions from petroleum jet fuel is an opportune area of continued policy collaboration. (45d-162.3)

**Comment:** Roeslein Alternative Energy would also like to extend its support for CARB’s proposal of eliminating the exemption for intrastate fossil jet fuel from the program starting in 2028. This will allow for continued and increased momentum for AJF production and use and will help drive down GHG emissions in the aviation sector. (45d-168.16)



**Comment:** Strengthening the carbon intensity benchmarks throughout 2045 and including fossil jet fuel are necessary steps to ensure continued reductions in GHG emissions while providing industry with the regulatory certainty required to develop and grow low carbon fuel alternatives. (45d-176.2)

**Comment:** EcoEngineers recommends that CARB provide clarity as to the stackability of CORSIA and LCFS credits. Similar to US Renewable Fuel Standard RINs, CORSIA credits in conjunction with LCFS credits would help facilitate uptake of SAF. This will also provide industry with additional clarity as they develop capital intensive SAF projects. (45d-176.4)

**Comment: CARB Should Add Conventional Jet Fuel as a Deficit-Generator but Add Strong Guardrails on Crop-Based Biofuels.**

CARB is proposing to add conventional jet fuel (“CJF”) for intrastate flights as a deficit-generator, as opposed to its current status as an opt-in fuel.<sup>41</sup> In including aviation emissions in the LCFS, the Board must walk a fine line between eliminating the exemption for dirty jet fuel while not incentivizing the use of crop-based biofuels, which damage ecosystems and communities.<sup>42</sup>

<sup>41</sup> CARB, Staff Report: Initial Statement of Reasons (Dec. 19, 2023), p. 26, *available at*: <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>

<sup>42</sup> These are referred to as Alternative Jet Fuel in the program.

First, we note that the current language on this issue is weaker than staff had previously suggested, which will delay the potential benefits achieved through this change. The current proposal includes only fuel from intrastate flights, rather than all fuel that is combusted in and over California by all flights, including interstate and international. And it delays implementation until 2028.<sup>43</sup> These limiting factors will needlessly slow the benefits that may come from a transition to a more sustainable aviation industry. CARB should explore whether it can accelerate the implementation of this change and include fuel combusted from international and interstate flights for the portion of their trips that occur within the state’s boundaries. If the Board chooses not to explore these avenues in this rulemaking, it should revisit these options at its next opportunity.

<sup>43</sup> ISOR at p. 26.

Second, 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.<sup>44</sup> Commercial airlines are also exempt from the excise tax for jet fuel, a tax break that costs the state about \$23 million each year.<sup>45</sup> The carveout in the Low Carbon Fuel Standard for conventional jet fuel saves the airlines an estimated \$110 to \$360 million each year<sup>46</sup> on the cost of that fuel.

<sup>44</sup> 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>.

<sup>45</sup> CA Dept. of Finance, Tax Expenditure Reports 2021-22, at p. 11, *available at* <https://dof.ca.gov/wpcontent/uploads/sites/352/Forecasting/Economics/Documents/2021-22-Tax-Expenditure-Report.pdf>.

<sup>46</sup> 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.

Relatedly, the industry continues to push the false solution of so-called Sustainable Aviation Fuels. 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 become enamored with false solutions like carbon offsets or flawed, short-term answers like SAFs. Many sources of SAF feedstock are likely unable to scale up to the industry-wide demand, and particularly problematic sources of biofuel feedstock like palm oil may create even more problems than they solve. Therefore, CARB should carefully regulate the feedstocks that receive credit for contributing to SAFs.

Third, while ending the exemption for CJF is a welcome first step, it needs to be paired with complementary policies that strictly limit the use of crop-based biofuels, as described above in Part III. The inclusion of CJF in the program at this juncture provides the Board an opportunity to ensure that included fuels meet true sustainability criteria going forward. 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. The Board should therefore choose to allow only feedstocks that have little to no land use effects or indirect emissions, such as municipal solid waste.

In short, the promotion and subsidization of SAFs, without adequate regard for the lifecycle impact and other ecological consequences of different feedstocks, threatens to substitute one problem for a host of others. California should not be in the business of subsidizing an industry's transition to fuels that promote deforestation in other parts of the country and world. Because crop-based biofuels are simply not sustainable, CARB should only incentivize fuels that meet strict and transparent sustainability criteria—a goal the Board has not reached in its current proposal.<sup>47</sup>

<sup>47</sup> See *infra*, Part III.

(45d-210.12)

**Comment:** Advancing the repeal of the exemption to January 1, 2025 would offer essential support urgently needed to transition the aviation sector toward cleaner, more sustainable practices. (45d-211.2)

**Comment:** We advocate for exempting the obligation on all jet fuel, not solely intrastate, as continuing reliance on petroleum jet fuel amidst cleaner alternatives is entirely unnecessary, especially for years 2025, 2026, and 2027 when our joint venture alone could fulfill the entire SAF obligation for all three years. (45d-211.3)

**Comment:** Obligate jet fuel consumed within the California airspace starting in 2025, with a cap on lipid-based fuels crediting. (45d-213.3)

**Comment:** CARB has proposed obligating jet kerosene as a deficit-generating fuel beginning in 2028. This will increase crediting opportunities for sustainable aviation fuel (SAF) and encourage economic growth in a budding California SAF market. (45d-213.26)

**Comment:** Without expanding the obligation scope to cover all inter-state jet fuel, it will also require that other transport sectors continue to shoulder the burden of decarbonizing the

state's aviation emissions. If LCFS amendments do not incentivize sufficient quantities of SAF, the aviation sector can source credits from sectors that over-comply with their annual CI reduction targets to meet annual compliance. (45d-213.27)

**Comment:** California has signaled stronger support for SAF in earlier proposals that are notably less ambitious in the ISOR. In 2021, California legislature passed AB 1322 that set a 20% SAF blending target by 2030, approximately 1.5 billion gallons.<sup>60</sup> This bill was later vetoed by Governor Newsom on the grounds that the LCFS was already an effective policy lever to meet these goals.<sup>61</sup> Absent any proposed amendments, ICCT research has found that the LCFS alone is an insufficient tool to promote SAF uptake in California.<sup>62</sup> Study authors found that obligating intra-state aviation would only expand the LCFS program by 5% based on the quantity of deficits generated on intra-state flights. Pavlenko and Mukhopadhyaya estimate that fuel consumed on intra-state flights accounts for roughly 6% of jet fuel uplifted in California.<sup>63</sup> At a maximum, that level of obligation would deliver a maximum of approximately 113 million gallons of SAF production by 2030 assuming that aviation obligations are met in-sector rather than through out-of-sector credits from renewable diesel or electric vehicle charger.

<sup>60</sup> [https://leginfo.ca.gov/faces/billTextClient.xhtml?bill\\_id=202120220AB1322](https://leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB1322)

<sup>61</sup> <https://www.gov.ca.gov/wp-content/uploads/2022/09/AB-1322-VETO.pdf?emrc=7598b6>

<sup>62</sup> <https://theicct.org/wp-content/uploads/2023/01/ca-aviation-decarbonization-jan23.pdf>

<sup>63</sup> Ibid.

In comparison, CATS modeling suggests that jet fuel deficits will make up 1.8% of total deficits (0.76 million tonnes CO<sub>2</sub>e) in 2030 under a 30% CI reduction target. Jet fuel makes up approximately 0.7% of deficits (0.23 Mt CO<sub>2</sub>e) under the baseline 20% CI reduction target. If jet fuel was obligated at an earlier date, this could generate an additional 2.6 million tonnes in CO<sub>2</sub>e deficits between 2025 and 2027 under the proposed scenario. This corresponds to approximately 500 million gallons of cumulative SAF production, based on the average carbon intensity of SAF consumed in California in 2021.

If California were to obligate the entirety of jet fuel consumed over its airspace, this could motivate SAF production even further. We analyze what this obligation might look like based on routing data from California airports, using an updated version of the Global Aviation Carbon Assessment (GACA) model developed by Graver et al. (2020).<sup>64</sup> Jet fuel consumed over the California airspace is approximately 3 times the magnitude of fuel consumed on intra-state flights (i.e., those that begin and end in California). We source jet fuel deficit quantities directly from the CATS model and calculate SAF production assuming a conversion ratio of 0.005 tonnes of offset CO<sub>2</sub>e per gallon. Our estimates likely overstate SAF production by assuming that SAF credits fully offset the quantity of jet kerosene deficits. In practice, the quantity of SAF would be lower due to the relatively lower cost of using out-of-sector credits.

<sup>64</sup> <https://theicct.org/publication/co2-emissions-from-commercial-aviation-2013-2018-and-2019/>

We review results from the August 2023 CATS model under a baseline (20% CI reduction, proposed (30% CI reduction), and proposed with expanded obligation the entire CA airspace scenario in Figure 5. These scenarios assume that jet fuel is obligated beginning in 2025, 3 years ahead of the published ISOR proposal. We find that near-term SAF production is significant under the proposed scenario (30% CI reduction) and increases to 198 million gallons in 2030 while SAF production gradually increases to 49 million gallons under the baseline scenario (20% CI reduction). Obligating the entirety of the CA airspace would result in

far higher SAF production. We this obligation could result in 1.1 billion gallons of new SAF production in 2030.

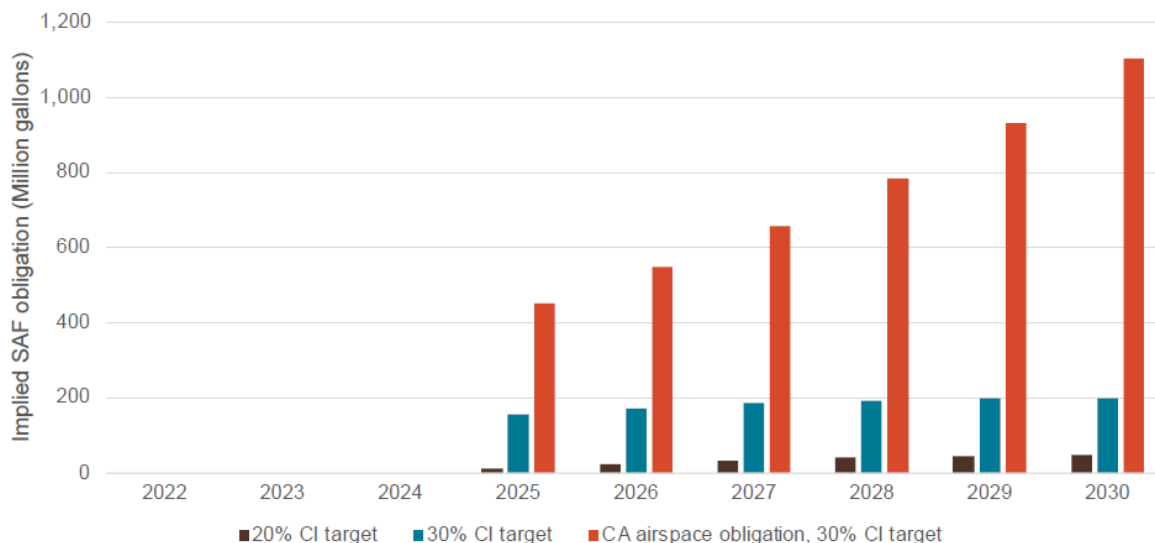


Figure 5. Estimated SAF production to offset jet kerosene deficit generation under three LCFS scenarios

Obligating jet fuel demand could help incentivize SAF production in California but would fall short of the legislative intent of AB 1322 across all scenarios. If CARB waits until 2028 to implement this obligation, this will reduce the cumulative production of SAF by 500 million gallons based on the proposed scenario and 1.66 billion gallons, assuming an obligation of the entire CA airspace.

While an increase in SAF can deliver public health and emissions reduction benefits, it is important that this growing fuel market does not exacerbate upstream emissions impacts from other transport sectors. SAF is often co-produced with renewable diesel at bio-refineries and thus is sourced from the same waste and virgin vegetable oil feedstocks. This increases demand for lipids that are already in limited supply and could exacerbate unintended emissions consequences associated with biofuel production. These risks include ILUC, plummeting RIN prices, and waste oil fraud as discussed above. (45d-213.28)

**Comment:** Thus, we recommend that CARB obligate jet fuel consumed over the entire CA airspace to spur growth in nascent SAF 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. (45d-213.29)

**Comment:** Air Products is supportive of actions to further the state's decarbonization goals and stimulate additional credit demand in the LCFS program. To this end, we are supportive of including intrastate jet fuel as an obligation-generating fuel. (45d-214.31)

**Comment:** MPC opposes assigning the producer or importer of jet fuel as the First Fuel Reporting Entity and strongly recommends the position holder of the fuel in the tanks at an airport be the First Fuel Reporting Entity. This would allow those closest to the use of the fuel,

the airports, airlines, and position holders, to work together and determine the most appropriate accounting and tracking method for reporting fuels with an obligation. (45d-217.9)

**Comment:** CARB could establish a percentage based system, based on the volume of diesel and aviation fuels sold in the state, such that only a certain percentage of credits may come from biolipid feedstocks. (45d-226.2)

**Comment:** *Accelerating the Use of Sustainable Aviation Fuel (SAF)*

As producers of one of the most scalable feedstocks for SAF production, we appreciate the Board's attention to development of this key market through its proposal to remove the exemption for intrastate jet fuel. 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. (45d-243.13)

**Comment:** We also applaud CARB for including a CI target for jet fuel in the amendments. Sustainable Aviation Fuel (SAF) is a growing opportunity to support the decarbonization of air travel. Mandating a CI reduction for intrastate jet fuel is an important first step to encourage more production and consumption of SAF. (45d-253.7)

**Comment:** We request that CARB reconsider whether a two- or even a -one-year delay in implementation would better serve the state of California's overarching objective of reducing the carbon emissions from the aviation sector while still providing sufficient time for new and existing regulated parties to adjust to their obligations. (45d-255.1)

**Comment:** Besides the timing for implementation, we believe there are more targeted measures that CARB could take to support the rapid development and deployment of SAF. The proposed changes would, at best, only create indirect demand for SAF. Regulated parties for non-exempt conventional jet fuel would be under no compulsion to actually buy or blend SAF; they could simply purchase LCFS credits generated for wholly unrelated fuels to satisfy their newly created annual deficit obligations. Spurring investment and making a market for an emergent fuel requires policies with concrete obligations. The European Union and British Columbia have both recognized this in their respective renewable and low carbon fuel programs, each recently adopting a form of direct blending mandate for SAF. Consequently, we have over the last few months begun seeing a tremendous push from our offtakers and other market participants to ensure that SAF will be eligible in each jurisdiction. If California is to compete on even terms with these programs over the long term, CARB must keep the LCFS incentives structure on par. Even if CARB is unable to directly adopt a blending mandate within its current legal framework, it could achieve similar results by requiring regulated parties for conventional jet fuel to satisfy a percentage of their annual deficits via LCFS credits generated for SAF. (45d-255.2)

**Comment:** CARB should review and align aspects of the LCFS regulatory framework to better allow producers to optimize the production of SAF (and therefore help defray its higher production cost on average compared to renewable diesel). To this end, we believe that CARB's final rule should address the allocation of commingled feedstocks to multiple product outputs from a production facility. (45d-255.3)

## **Comment: Alternative Jet Fuel**

ASA applauds CARB's desire to add intrastate flights to the LCFS program. Leaving some forms of transportation out of the program while leaving others in has financially incentivized switching to the unobligated modes. The proposal would help put air travel and ground travel on the same playing field. We also believe that it could help spur the adoption of new technologies to reduce air emissions such as sustainable aviation fuel. (45d-269.3)

**Comment:** While SFO respects the bold decarbonization vision that CARB outlined in its 2022 Scoping Plan Update, we write today to humbly request that CARB team with key members of our aviation industry, as AB 1322 requested, to develop a far broader play book than that proposed in this 2024 Low Carbon Fuel Standard (LCFS) Rulemaking to ensure the state meets Governor Newsom's 20% clean fuels adoption for the aviation sector, estimated at 1.5 billion gallons of SAF by 2030.

California and CARB must model a complete program that addresses the greenhouse gas and criteria air emissions across all sectors. Aviation efforts are falling short of our European counterparts. SFO aligns with our industry peers to urge CARB to align LCFS policy across both hydrogen and SAF to allow for book and claim accounting for low-CI electricity and RNG inputs via the use of Power Purchase Agreements (PPAs). SAF and hydrogen are both nascent industries and the state should equally allow the indirect accounting for both technologies.

SFO continues to encourage CARB to consider LCFS and other levers that can materialize new markets to recognize SAF's non-CO2 benefits, as outlined in previous communications with CARB, the California Natural Resources Agency (CNRA), the Bay Area Air Quality Management District, and GoBiz. These positive externalities include improvements to air quality, economic development through green jobs, and wildfire risk reduction, and are detailed in industry studies and should be represented in the LCFS, Scoping Plan, further CARB Rulemaking, GoBiz programs and/or CNRA incentive structures. A recent Airport Cooperative Research Program (ACRP), administered by the Transport Research Board of the U.S. National Academies of Sciences, found that a 50% SAF blend could reduce by nearly 40% oxides of sulfur and PM reductions of up to 65%. A more recent measurement campaign found that SAF produced via the alcohol-to-jet pathway could reduce non-volatile PM by up to 97%.

The California aviation sector utilizes four billion gallons of conventional jet fuel annually. By creating new programs that enable airlines to switch to SAF, California can reduce aviation GHG emissions by 50-80% on a lifecycle basis. If aircraft in California uplifted just 5% SAF by 2025, greenhouse gas emissions avoided from those flights would total up to 2 million metric tons of CO2. Without growing AJF use, aviation sector emissions are expected to grow to over 25% of California's emissions by 2040, as other sectors (e.g., buildings, road transport) have full decarbonization pathways.

SFO has set a goal of expanding SAF use by its airlines to 5% by 2025. And while we are on our way, hitting 1 % last year, achieving this goal will require 200 million gallons of SAF per year (MGY) by 2025, or 16 new SAF plants. As this goal of 200 MGY represents only about one-third of California's 2019 renewable diesel supply, it requires a rapid scaling of SAF production to be achieved.

SAF is being commercialized and is scalable, but volumes are currently small, with roughly 15 million gallons used exclusively in California last year, compared to 2.5 billion gallons of biodiesel and renewable diesel consumption. The key factor limiting SAF growth is the total monetary value that SAF producers receive when compared to that available to producers of alternative fuels to serve the on-road market. This has been quantified and detailed in a 2020 submittal by Graham Noyes ("Cap and Rack Cost"+ LCFS cost) and is recognized by the industry to be approximately \$0.40 per gallon. To that end, we request that CARB further review LCFS through its Public Workshops and consider revising the regulations to overcome the disparity in policies between the production of renewable diesel and SAF. Doing so will send the price signal producers need to secure investment capital to expand their facilities and increase supply to airlines uplifting SAF in California. It also offers a lifeline to renewable diesel fuel producers that exclusively serve the on-road sector, which is now obligated to increasingly electrify through State Executive Order and regulation to retrofit and retool plants for a future of aviation fueled by SAF.

With quotas and targeted SAF incentives announced and growing in Canada, the United Kingdom, Sweden, Norway, and the European Union, we hope that CARB will consider expanding the LCFS credit for SAF. Doing so will help power aviation's contribution to California's continued post-COVID and wildfire recovery in a way that keeps our state climate-competitive and fuels our industry's energy transition. While other states are starting to develop more robust SAF tax credits and incentive programs, CARB must grow SAF's LCFS credit value, or pursue other programs that can scale (not hinder) SAF as a key waypoint in California's climate emergency response planning and create a lasting legacy for our state. (45d-273.1, 45d-321.1)

**Comment:** We support the proposed expansion of eligibility for alternative jet fuels to include intra-state travel. We also encourage the board to further expand credit eligibility to aviation and shipping sector projects utilizing zero-emission technologies. (45d-277.5)

**Comment:** CARB is proposing to require intrastate fossil jet fuel to comply with the LCFS Program starting in 2028. This would be an important change as the state's aviation sector contributes nearly 38 million tons of carbon dioxide—equivalent per year, an amount which exceeds that of all the oil refineries in the state. Biomass waste will be an important feedstock for generating alternative jet fuel, as there are few feasible alternatives for producing low-carbon and carbon-negative aviation fuels. This is a needed step towards aligning California's aviation decarbonization efforts with national sustainable aviation fuel goals. (45d-286.4)

**Comment: Intrastate Jet Fuel Exemption:**

In analyzing CARB's proposal to eliminate the exemption for intrastate jet fuel, in combination with other measures already discussed in these comments, it is likely to help bring stability to the credit market and help correct the current imbalance. Neste believes that the proposal will also drive continued growth in SAF demand and production, as well as potentially for other renewable fuels. We see such proposals as important to continue driving investments in the production of SAF, and enhancing its viability as an alternative to fossil jet fuel to provide significant GHG and air pollution reduction benefits. We agree with CARB that SAF is the only viable way to decarbonize emissions on a large scale from the hard-to-carbonize aviation

sector. The current proposal allows for multiple options for obligated parties to comply. These options can be in addition to, in combination with, or even instead of using SAF.

Neste recognizes that the aviation sector has concerns with the proposal. Since this is the first proposal of its kind, we encourage CARB and all stakeholders to continue working to identify enhancements, additional options for implementation, or alternative approaches to advance the publicly stated emissions reductions goals of the aviation sector. (45d-295.6)

**Comment:** I support the elimination exemption for Intrastate FF jet fuel. (45d-297.14)

**Comment:** Expanding the scope of the Low Carbon Fuel Standard (LCFS) program to include aviation fuels beyond the existing voluntary opt-ins for alternative jet fuels<sup>28</sup> 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.

<sup>28</sup> 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.

...

*All fossil jet fuel provided in California should generate deficits under the LCFS, not only intrastate flight fuel burn.*

We respectfully encourage CARB to extend a reformed LCFS beyond the proposed amendment of CCR §95482(c)(1)(2), and instead, cover all fossil jet fuel uplifted in California to ensure the greatest degree of climate benefits. Whereas the modified text makes conventional fossil jet fuel subject to LCFS regulation only for intrastate flights, we recommend instead that CARB delete altogether the exemption §95482(c)(1)(2), "Conventional jet fuel or aviation gasoline."

The broader coverage of all flights – whether intrastate, interstate, or international – is consistent with the generally applicable language of Gov. Schwarzenegger's Executive Order S-01-07 establishing the LCFS applicable to all transportation fuel providers in California. It is also consistent with the authority CARB exercised in the 2018 LCFS reform when it included alternative jet fuel as an opt-in fuel entitled to generate credits, providing the necessary steppingstone towards more comprehensive action now.

Furthermore, an amended LCFS covering only intrastate flights could pose a serious risk of invalidation under federal law. CARB could easily sidestep this risk by removing the exemption language and thus treating fossil jet fuel as part of the general suite of transport fuels subject to LCFS regulation.

On this front, CARB needs to act now – and act prudently. Postponing the effective start date until 2028 would be a missed opportunity we cannot afford. Planning for intrastate-only aviation coverage – and with such a long delay - would be neither legally viable in the face of federal preemption nor commensurate with the climate emergency.



In terms of emissions quantities, intrastate flights represent a mere 10% of emissions from jet fuel uplifted in California, or around 6% of the total aviation emissions from flights to and from California.<sup>29</sup> In a scenario of LCFS coverage limited to intrastate flights, Governor Newsom's requested "aggressive 20% clean fuels target for the aviation sector" in 2030 translates to emissions reductions on the order of 1% of California's aviation emissions.<sup>30</sup> This is far too small a quantity to achieve meaningful benefits for climate action or for human health.

<sup>29</sup> Based on 2020 inventory data available at:

[https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/ghg\\_inventory\\_scopingplan\\_sum\\_2000-20.pdf](https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/ghg_inventory_scopingplan_sum_2000-20.pdf)

<sup>30</sup> <https://www.gov.ca.gov/wp-content/uploads/2022/07/07.22.2022-Governors-Letter-to-CARB.pdf?emrc=1054d6>

(45d-327.13)

**Comment:** *CARB must protect workers' and airport-adjacent communities' health by regulating jet fuels' aromatic content and thus mitigating particulate matter pollution.*

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.<sup>31</sup>

<sup>31</sup> For a more detailed description, a literature review, and an overview of options on how to tackle PM<sub>2.5</sub> emissions from aviation see EDF's letter to the U.S. Environmental Protection Agency from April 4, 2022: [https://downloads.regulations.gov/EPA-HQ-OAR-2019-0660-0207/attachment\\_1.pdf](https://downloads.regulations.gov/EPA-HQ-OAR-2019-0660-0207/attachment_1.pdf)

While alternative aviation fuel blends have the potential to reduce harmful aviation emissions by reducing aromatic content, such an outcome will not happen unless additional regulations are enforced. Furthermore, the gradual scale-up of alternative aviation fuels 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 not only extend the scope of LCFS-covered jet fuel but, California should also undertake complementary action to regulate jet fuel composition. Jet fuel aromatic content could be reduced by hydrotreating conventional jet fuel while tapping on IRA's generous clean hydrogen subsidies to cushion price impacts and GHG emissions penalties.<sup>32</sup> This is a near-term measure that could slash PM<sub>2.5</sub> emissions without adversely affecting safety, i.e., in a manner that would be fully compatible with existing federal airworthiness certifications.

<sup>32</sup> In recent filings, EDF has underscored the vital importance of reducing climate and health harming pollution from hydrogen production. See: <https://www.edf.org/sites/default/files/2023-09/Petition%20for%20Rulemaking%20-%20Hydrogen%20Production%20Facilities%20-%20CAA%20111%20and%20112%20-%20EDF%20et%20al.pdf>

(45d-327.14)

**Comment:** Leverage the LCFS to achieve a zero-emissions future for all Californians by... Following through with the inclusion of intrastate jet fuel as a deficit generator and starting to analyze the path toward including California's share of the fuel used in interstate and international flights. (45d-337.5)

**Comment:** Include all fossil jet fuel as a deficit generator under the LCFS.

...

The current proposal to remove the exemption only for intrastate jet fuel is an important step in the right direction but is far from sufficient to meet state goals for the aviation sector. Removing the exemption for intrastate jet fuel SAF will help by partially eliminating the LCFS rack fee benefit that currently applies to replacements for obligated fuels but not for SAF, thereby increasing the market signal for SAF production.<sup>7</sup> However, an obligation on roughly 10% of the jet fuel pool cannot be expected to close the gap between current uptake and the state's goals. Indeed, CARB's own modeling suggests that SAF blending could reach about 100 million gallons in 2030 and about 200 million in 2045 as a result of the current proposal.<sup>8</sup> While these volumes represent encouraging growth from today's volumes, they still fall far short of state goals, which would require roughly 800 million gallons of SAF to meet Gov. Newsom's 20% clean fuels adoption target, 1.5 billion gallons in 2030 to meet the AB 1322 goal, and 3.2 billion gallons by 2045 to meet the 2022 Scoping Plan target. As noted by the International Council on Clean Transportation (ICCT), obligating only intrastate jet fuel would have "a minimal impact on the program due to the small size of this fuel pool and would fail to meaningfully promote aviation decarbonization."<sup>9</sup>

<sup>7</sup> SAF credit generation under the LCFS has consistently been less than 1% of credit generation for very similar renewable diesel. This is in part because of regulatory disincentives to SAF, such as the LCFS rack fee and the state Cap-at-the-Rack cost under the Cap-and-Trade program, both of which increase the cost of fossil diesel, and the federal RFS program which awards 1.7 RINs per gallon of renewable diesel compared to just 1.6 per gallon of SAF. While the total size of the incentive gap varies, the BAAQMD analysis estimated it in 2020 at about \$0.42 per gallon advantage for producing renewable diesel versus SAF, of which the LCFS represented about \$0.14. An obligation only on intrastate jet fuel—a small fraction of the total pool—would reduce the LCFS disparity only marginally. New federal incentives under the Inflation Reduction Act, such as the SAF Blender's Tax Credit (40B) and the Clean Fuels Production Credit (45Z) can in theory make up much of that difference, but given that those expire in 2025 and 2027, respectively, they do not send a robust investment signal for needed SAF production. See CA LCFS Data Dashboard, Figure 2 at <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>; See also Bay Area Air Quality Management District (BAAQMD), Sustainable Aviation Fuel: Greenhouse Gas Reductions from Bay Area Commercial Aircraft. October 2020. available at <https://www.baaqmd.gov/news-and-events/page-resources/2020-news/121120-saf-report>.

<sup>8</sup> CARB, Appendix C-1 Standardized Regulatory Impact Assessment, September 2023.

<https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/appc-1.pdf>. Figure 4, page 18.

<sup>9</sup> Stephanie Searle, International Council on Clean Transportation Comments on the November 2022 LCFS Workshop. December 21, 2022. <https://www.arb.ca.gov/lists/com-attach/84-lcfs-wkshp-nov22-ws-B2IQOVAnVVkEMAc3.pdf>.

To boost the impact of the aviation provisions and put California on a path to achieving its aviation decarbonization goals, we encourage CARB to remove the exemption for all jet fuel uplifted in California. While anything that closes the incentive gap under the LCFS between jet and diesel substitutes (including obligating only a portion of jet fuel as proposed) will be directionally helpful in increasing SAF supply by reducing the opportunity cost for producers who choose to make SAF, obligating all jet fuel uplifted in CA will have a much more significant impact in sending an investment signal for SAF and driving SAF use in the state.

If CARB maintains a focus on obligating only intrastate jet fuel use, we suggest that CARB obligate all jet fuel combusted in California, as outlined in the September 20, 2023 Board meeting, when CARB staff stated that intrastate jet fuel would include not only flights within California, but also the portion of jet fuel combusted in California from other flights that start or

end in California. Such a provision need not be overly precise or require direct regulation of or reporting from aircraft operators. Rather, existing data and tools could be used to develop a rough estimation of intrastate fuel use.<sup>10</sup>

<sup>10</sup> See Graver, Rutherford, and Zheng, CO2 Emissions from Commercial Aviation. ICCT, 2020. <https://theicct.org/wpcontent/uploads/2021/06/CO2-commercial-aviation-oct2020.pdf>. The methods used by Graver et al. could be extended with a simple additional calculation to attribute fuel burn from either takeoff or landing (whichever occurs in California) plus a fraction of the cruising fuel burn equal to the fraction of the route's distance that lies within the state.

(45d-343.1)

**Comment Summary:** Accelerate the obligation to begin in 2025, rather than 2028.

...

CARB states that the proposal to delay the elimination of the exemption for fossil fuel jet fuel until 2028 is meant to provide “sufficient time for potential producers of alternative jet fuel to add capacity for the anticipated increased demand of alternative jet fuel”<sup>11</sup> However, such a delay is unnecessary, and we urge CARB to consider an earlier implementation date. We note that British Columbia has already added an obligation for all fossil jet fuel beginning in 2026, coupled with a volumetric SAF mandate beginning in 2028.<sup>12</sup> In addition, the proposal trails the ambition of both the ReFuel EU SAF mandate beginning in 2025 as well as the recently announced SAF mandate in Singapore beginning in 2026.<sup>13</sup>

<sup>11</sup> See CARB, Appendix E: Purpose and Rationale for Low Carbon Fuel Standards Amendments. January 2, 2024. [https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/lcfs\\_appe.pdf](https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/lcfs_appe.pdf). Page 12.

<sup>12</sup> See [https://www.bclaws.gov.bc.ca/civix/document/id/oic/oic\\_cur/0699\\_2023](https://www.bclaws.gov.bc.ca/civix/document/id/oic/oic_cur/0699_2023).

<sup>13</sup> See <https://www.consilium.europa.eu/en/press/press-releases/2023/10/09/refueu-aviation-initiative-council-adopts-new-law-to-decarbonise-the-aviation-sector>; See also <https://www.reuters.com/sustainability/singapore-require-departing-flights-use-sustainable-fuel-2026-2024-02-19/>

Given that CARB is only proposing an obligation for jet fuel and not an actual SAF requirement, consistent with the LCFS, there is technically no need for lead time to increase SAF production capacity because the structure of the LCFS program allows for compliance via credits generated outside of aviation—credits which are readily available today.<sup>14</sup> In addition, CARB has already provided a five-year window for growth since making SAF an opt-in credit generator in 2019, during which time SAF volumes recorded under the LCFS have increased five-fold, despite a global pandemic and the continued regulatory disadvantages for SAF producers under both the LCFS and the Cap and Trade program.<sup>15</sup> Nevertheless, SAF continues to lag far behind similar ground transportation fuels under the LCFS. This gap should not be misinterpreted as a signal that the SAF market or SAF technologies are insufficiently mature to support an obligation for aviation, but rather should serve as evidence that the lack of an LCFS obligation for aviation has steered producers toward more lucrative opportunities serving road transportation.<sup>16</sup>

<sup>14</sup> As further detailed in Section 5 below, the ability to comply by means other than SAF further demonstrates that CA is not preempted from obligating jet fuel under the LCFS.

<sup>15</sup> See CA LCFS Data Dashboard, Figure 2 at <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>

<sup>16</sup> On regulatory disincentives, see footnote 8. On technology and market maturity, several SAF pathways have already been commercialized. A total of 8 pathways for SAF production have been approved under

ASTM 7566, and 3 additional coprocessing pathways have been approved under ASTM D1655. See [https://www.caafi.org/focus\\_areas/fuel\\_qualification.html](https://www.caafi.org/focus_areas/fuel_qualification.html).

In any event, our organizations are confident that there will be enough production capacity to meet demand beginning in 2025. In the last year alone, global SAF capacity has increased by over 300 million gallons from a single producer and the International Air Transport Association estimates 2024 SAF production to triple to over 500 million gallons, or 1.5 million metric tonnes.<sup>17</sup> In the U.S., SAF production capacity has expanded by at least 70 million gallons, with new facilities including LanzaJet's Freedom Pine Fuels<sup>18</sup> and Montana Renewables Great Falls plant<sup>19</sup> coming online. Additional expansions are in the pipeline, including concrete, near-term plans for expansions from Diamond Green Diesel,<sup>20</sup> Montana Renewables,<sup>21</sup> and California's own World Energy.<sup>22</sup> Most importantly, there are roughly 3 billion gallons of renewable diesel consumed in the U.S. each year, 80% of which is produced domestically,<sup>23</sup> and half of which could easily be transitioned to SAF production—where it would produce additional benefits to both climate and local air quality— if additional policy incentives were put in place under the LCFS to level the playing field for SAF. In sum, there is sufficient SAF production capacity and CARB need only send an appropriate market signal.

<sup>17</sup> See <https://www.neste.com/products-and-innovation/sustainable-aviation/questions-and-answers-about-saf> ; <https://www.iata.org/en/pressroom/2023-releases/2023-12-06-02/>

<sup>18</sup> See <https://www.prnewswire.com/news-releases/lanzajet-celebrates-grand-opening-of-the-worlds-first-ethanol-to-sustainable-aviation-fuel-production-facility-302052431.html>.

<sup>19</sup> See <https://www.prnewswire.com/news-releases/montana-renewables-begins-sustainable-aviation-fuel-deliveries-to-shell-301820679.html>.

<sup>20</sup> See <https://worldbiomarketinsights.com/valero-energy-and-darling-ingredients-on-time-with-saf-plant-intexas/#:~:text=Valero%20Energy%20and%20Darling%20Ingredients%20on%2Dtime%20with%20SAF%20plant%20in%20Texas,-by%20Daniela%20Castim&text=Valero%20Energy%20and%20Darling%20Ingredients%20have%20announced%20that%20their%20joint,the%20first%20quarter%20of%202025>.

<sup>21</sup> See <https://www.ogj.com/energy-transition/article/14296189/calumet-provides-operational-update-on-montana-renewables-great-falls-plant>.

<sup>22</sup> See <https://www.prnewswire.com/news-releases/world-energy-secures-permits-will-completely-convert-its-southern-calif-refinery-to-create-north-americas-largest-worlds-most-advanced-sustainable-aviation-fuel-hub-301531135.html>.

<sup>23</sup> See <https://ethanolproducer.com/articles/epa-2375-billion-rins-generated-in-2023>. RIN data, which measure consumption of renewable diesel, underestimate domestic production capacity because a fraction of domestically produced fuels are exported.

We urge CARB to maintain its role as a leader in LCFS policy by accelerating its fossil jet fuel obligation to 2025. (45d-343.2, 45d-346.3)

**Comment:** Utilize the LCFS to encourage long term adoption of SAF in the aviation sector by adopting provisions that will help realize the additional air quality and climate benefits SAF can provide the state, including by developing mechanisms to credit the non-CO<sub>2</sub> climate benefits of SAF.

...

We applaud CARB for thinking dynamically about alternative fuels and their impacts on climate, environment, and society. We urge CARB to acknowledge the additional, uncounted positive externalities that come from substituting fossil jet fuel with SAF and consider ways to better account for them under the LCFS.

First, while both light and medium/heavy-duty transportation are expected to electrify over the coming decades (although on different timetables), aviation will take much longer to transition to decarbonize, and SAF is expected to be the chief decarbonization lever for the foreseeable futures. The 2022 Scoping Plan scenario envisions 100% sales of zero emissions vehicles for light duty transport by 2035 and for medium/heavy duty transport by 2040, but for aviation sees only 20% alternative propulsion by 2045.<sup>25</sup>

<sup>25</sup> See CARB, 2022 Scoping Plan for Achieving Carbon Neutrality. December 2022. [https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp\\_1.pdf](https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp_1.pdf). Page 72-73.

Second, SAF provides additional air quality benefits that have not been fully considered by CARB. CARB notes that the current proposal would result in reductions in oxides of nitrogen (NOx) and fine particulate matter (PM 2.5).<sup>26</sup> In addition, a recent synthesis of emissions measurement campaigns by the Airport Cooperative Research Program (ACRP), administered by the Transport Research Board of the U.S. National Academies of Sciences, found that a 50% SAF blend could reduce by nearly 40% oxides of sulfur,<sup>27</sup> which are known to have significant negative effects on exposed populations, and which are present in greater proportions in fossil jet fuel than other transportation fuels like diesel. Additionally, other studies have found greater reductions in PM than the 55% cited in the SRIA. The ACRP study found PM reductions of up to 65%, and a more recent measurement campaign found that SAF produced via the alcohol-to-jet pathway could reduce non-volatile particulate matter by up to 97%.<sup>28</sup>

<sup>26</sup> See CARB, Staff Report: Initial Statement of Reasons (ISOR). December 19, 2023. <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>. Page 57.

<sup>27</sup> Airport Cooperative Research Program, Alternative Jet Fuels Emissions Quantification Methods Creation and Validation Report. August 2019. Page 10. Available at <http://www.trb.org/Publications/Blurbs/179509.aspx>

<sup>28</sup> Tran, Brown and Olfert. Comparison of Particle Number Emissions from In-Flight Aircraft Fueled with Jet A1, JP-5 and an Alcohol-to-Jet Fuel Blend. *Energy Fuels* 34, 6, 7218–7222 (2020). <https://doi.org/10.1021/acs.energyfuels.0c00260>.

Third, California’s environmental justice communities have explicitly asked CARB to support displacement fossil jet fuel with SAF, both in the formal recommendations to CARB of the Environmental Justice Advisory Committee<sup>29</sup> and in person, at the September 28th, 2023 Board meeting. Communities that live near and work at airports are some of the most vulnerable in California — of the ten busiest airports in the state, four are located within SB 535 designated disadvantaged communities, and another four are immediately adjacent.<sup>30</sup> These communities have long borne the disproportionate health impacts of unmitigated fossil jet fuel combustion.

<sup>29</sup> See AB 32 EJAC DRAFT Recommendations to the CARB on the Low Carbon Fuel Standard Regulation Updates. August 24, 2023. <https://ww2.arb.ca.gov/sites/default/files/2023-08/EJAC%20Low%20Carbon%20Fuel%20Standard%20Recommendations%20Version%201%20082423.pdf> and EJAC, Environmental Justice Advisory Committee 2022 Scoping Plan Recommendations: NF54. Page 16. September 30, 2022. <https://ww2.arb.ca.gov/sites/default/files/barcu/board/books/2022/090122/finalejacrecs.pdf>.

<sup>30</sup> See <https://oehha.ca.gov/calenviroscreen/sb535>. LAX, OAK, BUR, and ONT are within disadvantaged communities. SFO, SMF, SNA, and LGB are adjacent.

Fourth, jet fuel causes unique contributions to global climate change that are unrecognized by the LCFS—harms that SAF can mitigate. Emerging research indicates that particulate matter reductions from SAF reduce aviation’s non-CO<sub>2</sub> climate impact, specifically the climate forcing

from “contrail cirrus” impacts (the combined warming from contrails and contrail-induced cirrus). The current best estimate from the most recent comprehensive study is that the climate impact from contrail cirrus is nearly twice the impact from CO<sub>2</sub>.<sup>31</sup> Even the low end of current estimates—which show that contrail cirrus causes roughly half the total warming of CO<sub>2</sub>—warrants consideration of potential mitigation opportunities from SAF.<sup>32</sup> One recent study cited found that a 50% SAF blend could reduce contrail cirrus climate impacts by over 20%. An eventual shift to 100% SAF could reduce the climate impact of contrail cirrus by 50%.<sup>33</sup> While continued scientific uncertainty around the size of the non-CO<sub>2</sub> climate impacts makes them difficult to precisely quantify, the direction of those impacts—less warming when SAF is used—is known.

<sup>31</sup> D.S. Lee, et al. The contribution of global aviation to anthropogenic climate forcing for 2000 to 2018. *Atmospheric Environment* 244, 117834 (2021). <https://doi.org/10.1016/j.atmosenv.2020.117834>.

<sup>32</sup> *Id.*

<sup>33</sup> See European Union Aviation Safety Agency, Updated Analysis of the non-CO<sub>2</sub> Climate Impacts of Aviation and the Potential Policy Measures Pursuant to EU Emissions Trading System Directive Article 30(4) (synthesizing research on SAF non-CO<sub>2</sub> climate benefits and suggesting further consideration of SAF policy measures to mitigate aviation climate impacts); *available at* [https://www.easa.europa.eu/sites/default/files/dfu/201119\\_report\\_com\\_ep\\_council\\_updated\\_analysis\\_non\\_co2\\_climate\\_impacts\\_aviation.pdf](https://www.easa.europa.eu/sites/default/files/dfu/201119_report_com_ep_council_updated_analysis_non_co2_climate_impacts_aviation.pdf).

We strongly believe that these additional benefits—which align closely with state goals and priorities and accrue only to SAF—justify action by CARB to prioritize the use of SAF. And as CARB has noted, transitioning fuels to other sectors in the long term requires that market signals transition first.<sup>34</sup> Under the current proposal, the market signal improves marginally, but is not likely to be enough to meet the state’s goals. Accordingly, we encourage CARB to consider additional measures to credit those benefits. For example, CARB should consider applying a credit multiplier for SAF on the basis of the most conservative estimates of non-CO<sub>2</sub> climate benefits of SAF. (The European RED II program, currently provides a multiplier of 1.2x for SAF.) Alternatively, CARB might develop a “CO<sub>2</sub> equivalent” metric to account for these benefits in terms of carbon intensity and incorporate them into the CA-GREET model, as has been suggested by the European Commission in its recent study on how to address the non-CO<sub>2</sub> climate impacts of aviation.<sup>35</sup>

<sup>34</sup> See CARB, Staff Report: Initial Statement of Reasons (ISOR). December 19, 2023. <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>. Page 30.

<sup>35</sup> See European Union Aviation Safety Agency, Updated Analysis of the non-CO<sub>2</sub> Climate Impacts of Aviation and the Potential Policy Measures Pursuant to EU Emissions Trading System Directive Article 30(4) (synthesizing research on SAF non-CO<sub>2</sub> climate benefits and suggesting further consideration of SAF policy measures to mitigate aviation climate impacts); *available at* [https://www.easa.europa.eu/sites/default/files/dfu/201119\\_report\\_com\\_ep\\_council\\_updated\\_analysis\\_non\\_co2\\_climate\\_impacts\\_aviation.pdf](https://www.easa.europa.eu/sites/default/files/dfu/201119_report_com_ep_council_updated_analysis_non_co2_climate_impacts_aviation.pdf).

(45d-343.4)

**Comment:** Finally, we offer new legal analysis, attached, to show that California enjoys ample authority to obligate all jet fuel uplifted in California, in line with its treatment of other transportation fuels<sup>6</sup>

<sup>6</sup> See Attachment to our comments (Attachment\_Legal Analysis\_CARB LCFS Authority to Obligate Jet Fuel.pdf)

...

While some stakeholders have long asserted that CARB does not have legal authority to include jet fuel as an obligated fuel due to unarticulated claims of federal preemption in the sector, this claim has to date not been addressed on the merits and we hope this proposal catalyzes more detailed understanding among stakeholders of the scope of CARB's authority over aviation. As further outlined in the attached legal analysis and summarized below, it is clear that CARB enjoys ample authority to obligate both intrastate and all jet fuel uplifted in California (interstate and international) under the LCFS program.<sup>36</sup> None of the statutes that have been cited by stakeholders—the Clean Air Act, the Federal Aviation Act, or the Airline Deregulation Act, serve as a source of preemption or a barrier to CARB promulgating an aviation obligation that is commensurate with the state's goals in the aviation sector.

<sup>36</sup> We note that, in the Canadian context, British Columbia has determined that any jet fuel sold in the province is subject to provincial regulation.

Here, we address each of those statutes in turn.

#### a) Clean Air Act

The Clean Air Act does not preempt an obligation on jet fuel under the CA LCFS, whether applied to intrastate jet fuel use or to all fossil jet fuel uplifted in the state. Importantly, courts analyzing preemption are “highly deferential to state law in areas traditionally regulated by the states” such as air pollution prevention and related public health measures.<sup>37</sup>

<sup>37</sup> 14 Exxon Mobil Corp. v. United States EPA, 217 F.3d 1246, 1255 (9th Cir. 2000).

While Section 233 of the Clean Air Act does give EPA explicit preemptive authority on the regulation of emissions **from aircraft engines**, this provision is simply not relevant to the regulation of fuels.<sup>38</sup> Notably, the Ninth Circuit interprets the preemptive scope to cover only regulation of aircraft or aircraft engines, and has not extended preemption beyond that scope to include the regulation of jet fuel.<sup>39</sup> Indeed, a reading that Section 233 preempts regulation of jet fuel would be contrary to the plain meaning of the statute, the structure of the Clean Air Act, and EPA's longstanding interpretation of its authority over aviation. By its terms, section 233 refers to engine and aircraft standards promulgated under Section 231, not to fuel standards. And the underlying structure of the Clean Air Act certainly distinguishes between engine and fuel standards, with separate provisions for engine/vehicle standards under Sections 202 (on road vehicles/engines), 213 (nonroad vehicles/engines) and Section 211 (fuels for use in on road and nonroad vehicles/engines). To read Section 233's preemption provisions as somehow applying to aircraft fuels would be wholly inconsistent with this statutory structure.

<sup>38</sup> See 42 U.S.C. § 7573 (stating that “No State or political subdivision thereof may adopt or attempt to enforce any standard respecting emissions of any air pollutant from any aircraft or engine thereof unless such standard is identical to a standard applicable to such aircraft under this part.”)

<sup>39</sup> See *California v. Department of Navy*, 624 F.2d 885, 888 (9th Cir. 1980); *California ex rel. State Air Resources Bd. v. Department Navy*, 431 F. Supp. 1271, 1285 (N.D. Cal. 1977) (narrowly interpreting the “field” regulated as the “structure or performance of aircraft engines”).

Such an interpretation would also be inconsistent with EPA's long-held interpretation of its authority as extending only to aircraft/engine standards, with the Federal Aviation Administration (FAA) then having authority to promulgate fuel standards for any pollutant for which EPA has made an endangerment finding under Section 231 of the Clean Air Act.<sup>40</sup> Indeed, just last year the EPA reiterated this position, noting in its final endangerment finding for leaded aircraft fuels that EPA's only role was to make an endangerment finding and

promulgate an engine standard for lead. Aviation fuel standards, EPA reiterated, were left to FAA.<sup>41</sup> Simply put, the Clean Air Act cannot preempt California from issuing fuel standards for aviation that EPA itself lacks the authority to issue.

<sup>40</sup> See EPA, Advance Notice of Proposed Rulemaking on Lead emissions From Piston-Engine Aircraft Using Leaded Aviation Gasoline, 75 Fed. Reg. 22445-22446 (April 28, 2010) (explaining in EPA rulemaking that although EPA has authority under the Clean Air Act to regulate fuels used in motor vehicles and nonroad vehicles, fuels used exclusively in aircraft engines are regulated by FAA); see also EPA, Advance Notice of Proposed Rulemaking on Regulating Greenhouse Gas Emissions Under the Clean Air Act, 73 Fed. Reg. 44434 (July 30, 2008) (“Section 211(c) authorizes regulation of vehicle fuels and fuel additives (excluding aircraft fuel)...”).

<sup>41</sup> See EPA, Finding That Lead Emissions From Aircraft Engines That Operate on Leaded Fuel Cause or Contribute to Air Pollution That May Reasonably Be Anticipated To Endanger Public Health and Welfare, 88 Fed. Reg. 72372-72404 (October 20, 2023). (EPA states, “pursuant to 49 U.S.C. 44714, the FAA has a statutory mandate to prescribe standards for the composition or chemical or physical properties of an aircraft fuel or fuel additive to control or eliminate aircraft emissions which the EPA has found endanger public health or welfare under section 231(a) of the Clean Air Act.”)

Further, even if EPA theoretically had authority to regulate jet fuel, the proposal does not run afoul of the preemption provisions under Section 233 of the Clean Air Act because the LCFS is not an “emission standard” applicable to aircraft and aircraft engines. Under the U.S. Supreme Court’s definition of emission standard, the LCFS is not an emission standard because it does not restrict how much of a given pollutant an engine may emit, it does not require equipment of a certain pollution control device, or mandate emission control design features.<sup>42</sup> Further, as reinforced in a recent order from the U.S. District Court for the Central District of California, the LCFS is not an aviation emission standard because regulated entities (fuel suppliers) can comply by taking action unrelated to the purchase of SAF and the LCFS does not serve as an attempt to compel the purchase of SAF.<sup>43</sup>

<sup>42</sup> See *Engine Mfrs. Ass’n v. S. Coast Air Quality Mgmt Dist.*, 541 U.S. 246, 253 (2004).

<sup>43</sup> See Order re: Plaintiff’s Motion for Summary Judgment as to Plaintiff’s Complaint for Declaratory Judgment and Injunctive Relief [Dkt. 65]; and Plaintiff-Intervenor Airlines for America’s Motion for Summary Judgment [Dkt. 73], Docket No. 162 (holding that South Coast’s Warehouse Indirect Source Rule is not a Clean Air Act emission standard because regulated entities may comply by taking actions unrelated to the purchase of zero emission trucks.)

## b) Federal Aviation Act

The Federal Aviation Act grants broad authority to the FAA that has been generally held to “preempt the field” of aviation safety and airspace management.<sup>44</sup> However, the preemptive scope of the FAA Act is not limitless, and courts have determined that states may still regulate certain aspects of aviation operations that do not directly intrude on the FAA’s domain.<sup>45</sup> With respect to fuels, the FAA’s domain includes both the general authority to approve aviation fuels<sup>46</sup> and the specific statutory authority, under Section 44714<sup>47</sup>, to prescribe “standards for the composition or chemical or physical properties of an aircraft fuel or fuel additive to control or eliminate aircraft emissions” which the Environmental Protection Agency (EPA) has determined endanger public health or welfare.<sup>48</sup>

<sup>44</sup> See *Montalvo v. Spirit Airlines*, 508 F.3d 464, 471-74 (9th Cir. 2007).

<sup>45</sup> See *Goodspeed Airport LLC v. East Haddam Inland Wetlands & Watercourses Comm’n*, F.3d 206, 209-12 (2d Cir. 2011); *Martin v. Midwest Express Holdings*, 555 F.3d 806, 812 (9th Cir. 2009); *Med-Trans Corp. v. Benton*, 581 F. Supp. 2d 721, 740 (E.D.N.C. 2008) (“Although the FAA has preemptive control of aviation safety measures, regulations regarding [emergency medical services] related equipment would not intrude on



its domain.... [O]nly those regulations governing equipment or training directly related to aviation safety are preempted.”).

<sup>46</sup> See 14 C.F.R. § 33.7 (engine operating limitations for fuel)

<sup>47</sup> 49 U.S.C. § 44714.

<sup>48</sup> EPA endangerment findings are authorized under Section 231 of the Clean Air Act (42 U.S.C. 7571)

The inclusion of jet fuel as an obligated fuel under the CA LCFS would not intrude on the FAA’s regulatory domain. While the CA LCFS would establish standards for the lifecycle carbon intensity of jet fuel and incentivize the use of some fuels approved by FAA over others, it would **not mandate or prohibit the use of any particular jet fuel approved by the FAA**, nor would it set any of its own requirements on the composition of fuels. The FAA could—and should—exercise its own authority under Section 44714 to set a federal emissions standard on fossil jet fuel,<sup>49</sup> with which the LCFS obligation on fossil jet fuel would work in tandem.<sup>50</sup>

<sup>49</sup> See Third Way, FAA’s Existing Authority to Create a Low Carbon Aviation Fuel Standard, at 4 (June 2023), <https://thirdway.imgix.net/Existing-Authority-for-a-Federal-LCFS.pdf>.

<sup>50</sup> See *Rocky Mountain Farmers Union v. Corey*, 258 F. Supp. 3d 1134, 1152-53 (E.D. Cal. 2017) (holding LCFS was not preempted where and state efforts to reduce GHG emissions complemented and supported the EPA’s efforts).

Importantly, an obligation on jet fuel is not equivalent to a mandate for SAF, and obligated upstream fuel providers are free to comply with LCFS credits from numerous sources. While we believe an obligation on fossil jet fuel—particularly all fossil jet fuel uplifted in the state—will meaningfully increase the market signal for SAF production and use in the state, the ultimate means of compliance with the LCFS is up to obligated parties, and aircraft operators will not be required to use SAF under the proposal.

### c) Airline Deregulation Act (ADA)

Finally, some stakeholders have claimed that the ADA preempts California from obligating fossil jet fuel under the LCFS. The ADA expressly prohibits states from enacting or enforcing “a law, regulation, or other provision having the force and effect of law related to a price, route, or service of an air carrier that may provide air transportation . . . .”<sup>51</sup> However, although obligating jet fuel as a deficit generator under the LCFS may increase the cost of fuel uplifted by an airline, those impacts are likely outside the scope of ADA preemption,<sup>52</sup> impose such a tenuous burden on an air carrier’s price or services that it would not trigger preemption,<sup>53</sup> or are simply too difficult to link causally to changes in carrier prices, routes or services, given the complexity of airline ticket and fuel pricing. Fundamentally, an LCFS obligation on jet fuel would not entail any specific regulation of price, routes, or services, and is therefore not preempted by the ADA. Notably, the Central District of California recently held that the South Coast Air Quality Management District’s Warehouse Indirect Source Rule does not run afoul of the ADA because it only has an indirect connection to carrier prices, services, or routes.<sup>54</sup>

<sup>51</sup> 49 U.S.C. § 44713(b)(1). The exceptions do not apply to the proposal to include jet fuel in the LCFS

<sup>52</sup> 17 See *Nat’l Federation of the Blind v. United Airlines, Inc.*, 813 F.3d 718, 727-28 (9th Cir. 2016) (noting that the Ninth Circuit has narrowly interpreted “service” to mean an air carrier’s transportation service).

<sup>53</sup> *Supra*. Note 15

<sup>54</sup> *Supra*. Note 43 (noting that the rule is not preempted because it applies to all warehouses and not only air carrier warehouses, that potential increased costs for air carriers are not sufficient as increased costs do not interfere with the air carrier/customer relationship, and that the rule does not require specific prices or fundamentally differ from other generally applicable regulation that affects an air carrier’s cost of compliance.)

To further insulate the aviation provisions from potential legal challenge, we recommend that CARB designate jet fuel suppliers as the reporting entity—as currently proposed. Designating fuel suppliers as the reporting entity aligns with existing LCFS precedent for other fuel types and merely ensures that upstream aviation fuel suppliers are treated in the same fashion as all other transportation fuel suppliers in the California economy. This is significant, as case law around aviation preemption distinguishes between regulations targeted specifically at aviation and regulations that merely apply to upstream “inputs” to many sectors of the economy, including aviation.

#### d) Dormant Commerce Clause

In addition to preemption challenges, another potential challenge to the LCFS that could arise is the “dormant Commerce Clause” of the U.S. Constitution, which limits the state’s authority to enact or enforce laws that burden interstate commerce. However, the LCFS has already been upheld against dormant Commerce Clause challenges.<sup>55</sup> Because the burden on jet fuel providers would not seem appreciably different from the burden imposed by the LCFS on other fuel providers, a court may be hard pressed to reach a different result if a dormant Commerce Clause challenge to the Proposal were brought.

<sup>55</sup> Rocky Mountain Farmers Union v. Corey, 730 F.3d 1070, 1107 (9th Cir. 2013); Rocky Mountain Farmers Union v. Corey, 913 F.3d 940, 948-54 (9th Cir. 2019).

Finally, we emphasize that CARBs attempt to avoid conflict with federal laws by isolating intrastate jet fuel is unnecessary. When Congress determines that a uniform national standard is needed, federal law preempts state regulation everywhere—including regulations internal to a state, such as obligating intrastate jet fuel under the LCFS. The proposal’s limitation to intrastate jet fuel use offers only marginal protection from challenges, while dramatically weakening the impact of the obligation and threatening the achievement of the state’s aviation decarbonization goals. Accordingly, we strongly suggest that CARB eliminate the distinction between intrastate and interstate jet fuel and obligate all jet fuel uplifted in California under the LCFS. (45d-343.5)

**Comment:** Include all fossil jet fuel as a deficit generator under the LCFS.

...

The current proposal to remove the exemption only for intrastate jet fuel is an important step in the right direction, but far from sufficient to meet state goals for the aviation sector. Currently, the LCFS provides a “rack fee” benefit that accrues to replacements for obligated fuels, like renewable diesel, but not to SAF.<sup>7</sup> This benefit, in conjunction with other state and federal regulatory rules, systematically disincentivizes SAF production, leading SAF credit generation under the LCFS to be consistently less than 1% of credit generation for very similar renewable diesel.<sup>8</sup> While removing the exemption for intrastate jet fuel SAF will help by partially eliminating the LCFS rack fee benefit, an obligation on roughly 10% of the jet fuel pool cannot be expected to fully close the gap nor to substantially increase the market signal for SAF production. Indeed, CARB’s own modeling suggests that SAF blending could reach about 100 million gallons in 2030 and about 200 million in 2045 as a result of the current proposal.<sup>9</sup> While these volumes represent encouraging growth from today’s volumes, they still fall far short of state goals, which would require roughly 800 million gallons of SAF to meet Gov. Newsom’s 20% clean fuels adoption target, 1.5 billion gallons in 2030 to meet the AB 1322

goal, and 3.2 billion gallons by 2045 to meet the 2022 Scoping Plan target. As noted by the International Council on Clean Transportation (ICCT), obligating only intrastate jet fuel would have “a minimal impact on the program due to the small size of this fuel pool and would fail to meaningfully promote aviation decarbonization”.<sup>10</sup>

<sup>7</sup> Under the LCFS, suppliers of obligated fuels like diesel face a compliance cost, part of which they pass through to purchasers of fuel “at the rack”. This rack fee narrows the gap between the cost of fossil and renewable fuels, increasing the willingness to pay for the latter.

<sup>8</sup> Besides the LCFS rack fee, additional regulatory disincentives to SAF include the state Cap-at-the-Rack cost under the Cap-and-Trade program, which similarly narrows the price gap between fossil and renewable diesel, and the federal Renewable Fuel Standard (RFS) program which awards 1.7 RINs per gallon of renewable diesel compared to just 1.6 per gallon of SAF. While the total size of the incentive gap varies, the BAAQMD analysis estimated it in 2020 at about \$0.42 per gallon advantage for producing renewable diesel versus SAF, of which the LCFS represented about \$0.14. An obligation only on intrastate jet fuel—a small fraction of the total pool—would reduce the LCFS disparity only marginally. New federal incentives under the Inflation Reduction Act, such as the SAF Blender’s Tax Credit (40B) and the Clean Fuels Production Credit (45Z) can in theory make up much of that difference, but given that those expire in 2025 and 2027, respectively, they do not send a robust investment signal for needed SAF production. See CA LCFS Data Dashboard, Figure 2 at <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>; See also Bay Area Air Quality Management District (BAAQMD), Sustainable Aviation Fuel: Greenhouse Gas Reductions from Bay Area Commercial Aircraft. October 2020. available at <https://www.baaqmd.gov/news-and-events/page-resources/2020-news/121120-saf-report>.

<sup>9</sup> CARB, Appendix C-1 Standardized Regulatory Impact Assessment, September 2023.

<https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/appc-1.pdf>. Figure 4, page 18.

<sup>10</sup> Stephanie Searle, International Council on Clean Transportation Comments on the November 2022 LCFS Workshop. December 21, 2022. <https://www.arb.ca.gov/lists/com-attach/84-lcfs-wkshp-nov22-ws-B2IQOVAnVVkEMAc3.pdf>.

To boost the impact of the aviation provisions and put California on a path to achieving its aviation decarbonization goals, we encourage CARB to remove the exemption for all jet fuel uplifted in California. While anything that closes the LCFS incentive gap between jet and diesel substitutes (including obligating only a portion of jet fuel as proposed) will be directionally helpful in increasing SAF supply, obligating all jet fuel uplifted in CA will have a much more significant impact in sending an investment signal for SAF and driving SAF use in the state.

If CARB maintains a focus on obligating only intrastate jet fuel use, we suggest that CARB obligate all jet fuel combusted in California, as outlined in the September 20, 2023 Board meeting, when CARB staff stated that intrastate jet fuel would include not only flights within California, but also the portion of jet fuel combusted in California from other flights that start or end in California. Such a provision need not be overly precise or require direct regulation of or reporting from aircraft operators. Rather, existing data and tools could be used to develop a rough estimation of intrastate fuel use.<sup>11</sup>

<sup>11</sup> See Graver, Rutherford, and Zheng, CO<sub>2</sub> Emissions from Commercial Aviation. ICCT, 2020.

<https://theicct.org/wpcontent/uploads/2021/06/CO2-commercial-aviation-oct2020.pdf>. The methods used by Graver et al. could be extended with a simple additional calculation to attribute fuel burn from either take-off or landing (whichever occurs in California) plus a fraction of the cruising fuel burn equal to the fraction of the route’s distance that lies within the state.

(45d-346.2)

**Comment:** Utilize the LCFS to encourage long term transition of biofuels into hard-to-decarbonize sectors like aviation

...

We applaud CARB for thinking dynamically about existing biofuel resources, and considering ways to encourage diversions into sectors where they will be most needed to meet 2022 Scoping Plan goals. A key example of this type of thinking is CARB's proposals aimed at pivoting biomethane from its current end-use as a road transportation fuel into hard-to-decarbonize applications like industry and flexible power generation.<sup>30</sup> We strongly urge CARB to apply the same thinking to the aviation sector and use the LCFS to encourage the diversion of biofuels from road transport—including both renewable diesel and ethanol—to aviation.

<sup>30</sup> See CARB, Staff Report: Initial Statement of Reasons (ISOR). December 19, 2023.

<https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>. Page 33.

We believe there is ample justification for CARB to prioritize a long-term transition of biofuel resources to SAF:

First, while both light and medium/heavy-duty transportation are expected to electrify over the coming decades (although on different timetables), aviation will take much longer to transition to decarbonize, and SAF is expected to be the chief decarbonization lever for the foreseeable futures. The 2022 Scoping Plan scenario envisions 100% sales of zero emissions vehicles for light duty transport by 2035 and for medium/heavy duty transport by 2040, but for aviation sees only 20% alternative propulsion (hydrogen or electric) possible by 2045.<sup>31</sup> In short, SAF is California—and the world's—only viable option for meaningful decarbonization in the aviation sector before mid-century.

<sup>31</sup> See CARB, 2022 Scoping Plan for Achieving Carbon Neutrality. December 2022.

[https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp\\_1.pdf](https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp_1.pdf). Page 72-73.

Second, SAF provides additional air quality benefits that have not been fully considered by CARB. CARB notes that the current proposal would result in reductions in oxides of nitrogen (NOx) and fine particulate matter (PM 2.5).<sup>32</sup> In addition, a recent synthesis of emissions measurement campaigns by the Airport Cooperative Research Program (ACRP), administered by the Transport Research Board of the U.S. National Academies of Sciences, found that a 50% SAF blend could reduce by nearly 40% oxides of sulfur,<sup>33</sup> which are known to have significant negative effects on exposed populations, and which are present in greater proportions in fossil jet fuel than other transportation fuels like diesel. Additionally, other studies have found greater reductions in PM than the 55% cited in the SRIA. The ACRP study found PM reductions of up to 65%, and a more recent measurement campaign found that SAF produced via the alcohol-to-jet pathway could reduce non-volatile particulate matter by up to 97%.<sup>34</sup>

<sup>32</sup> See CARB, Staff Report: Initial Statement of Reasons (ISOR). December 19, 2023.

<https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>. Page 57.

<sup>33</sup> Airport Cooperative Research Program, Alternative Jet Fuels Emissions Quantification Methods Creation and Validation Report. August 2019. Page 10. Available at <http://www.trb.org/Publications/Blurbs/179509.aspx>

<sup>34</sup> Tran, Brown and Olfert. Comparison of Particle Number Emissions from In-Flight Aircraft Fueled with Jet A1, JP-5 and an Alcohol-to-Jet Fuel Blend. *Energy Fuels* 34, 6, 7218–7222 (2020). <https://doi.org/10.1021/acs.energyfuels.0c00260>.

Third, California's environmental justice communities have explicitly asked CARB to support displacement of fossil jet fuel with SAF, both in the formal recommendations to CARB of the Environmental Justice Advisory Committee<sup>35</sup> and in person, at the September 28th, 2023,

Board meeting. Communities that live near and work at airports are some of the most vulnerable in California: of the ten busiest airports in the state, four are located within SB 535 designated disadvantaged communities, and another four are immediately adjacent.<sup>36</sup> These communities have long borne the disproportionate health impacts of unmitigated fossil jet fuel combustion.

<sup>35</sup> See AB 32 EJAC DRAFT Recommendations to the CARB on the Low Carbon Fuel Standard Regulation Updates. August 24, 2023. <https://ww2.arb.ca.gov/sites/default/files/2023-08/EJAC%20Low%20Carbon%20Fuel%20Standard%20Recommendations%20Version%201%20082423.pdf> and EJAC, Environmental Justice Advisory Committee 2022 Scoping Plan Recommendations: NF54. Page 16. September 30, 2022.

<https://ww2.arb.ca.gov/sites/default/files/barcu/board/books/2022/090122/finalejacrecs.pdf>.

<sup>36</sup> See <https://oehha.ca.gov/calenviroscreen/sb535>. LAX, OAK, BUR, and ONT are within disadvantaged communities. SFO, SMF, SNA, and LGB are adjacent.

Fourth, jet fuel causes unique contributions to global climate change that are unrecognized by the LCFS—harms that SAF can mitigate. Emerging research indicates that particulate matter reductions from SAF reduce aviation’s non-CO<sub>2</sub> climate impact, specifically the climate forcing from “contrail cirrus” impacts (the combined warming from contrails and contrail-induced cirrus). The current best estimate from the most recent comprehensive study is that the climate impact from contrail cirrus is nearly twice the impact from CO<sub>2</sub>.<sup>37</sup> Even the low end of current estimates—which show that contrail cirrus causes roughly half the total warming of CO<sub>2</sub>—warrants consideration of potential mitigation opportunities from SAF.<sup>38</sup> One recent study cited found that a 50% SAF blend could reduce contrail cirrus climate impacts by over 20%. An eventual shift to 100% SAF could reduce the climate impact of contrail cirrus by 50%.<sup>39</sup> While continued scientific uncertainty around the size of the non-CO<sub>2</sub> climate impacts makes them difficult to precisely quantify, the direction of those impacts—less warming when SAF is used—is known.

<sup>37</sup> D.S. Lee, et al. The contribution of global aviation to anthropogenic climate forcing for 2000 to 2018. *Atmospheric Environment* 244, 117834 (2021). <https://doi.org/10.1016/j.atmosenv.2020.117834>.

<sup>38</sup> *Id.*

<sup>39</sup> See European Union Aviation Safety Agency, Updated Analysis of the non-CO<sub>2</sub> Climate Impacts of Aviation and the Potential Policy Measures Pursuant to EU Emissions Trading System Directive Article 30(4) (synthesizing research on SAF non-CO<sub>2</sub> climate benefits and suggesting further consideration of SAF policy measures to mitigate aviation climate impacts); *available at* [https://www.easa.europa.eu/sites/default/files/dfu/201119\\_report\\_com\\_ep\\_council\\_updated\\_analysis\\_non\\_co2\\_climate\\_impacts\\_aviation.pdf](https://www.easa.europa.eu/sites/default/files/dfu/201119_report_com_ep_council_updated_analysis_non_co2_climate_impacts_aviation.pdf).

We strongly believe that these additional benefits—which align closely with state goals and priorities and accrue only to SAF—justify action by CARB to prioritize the production and use of SAF. As CARB has noted, transitioning fuels to other sectors in the long term requires that market signals transition first.<sup>40</sup> Under the current proposal, the market signal for SAF would improve marginally, but not nearly enough to overcome existing disincentives and pivot biofuel production toward SAF. Therefore, we encourage CARB to consider additional measures to credit the additional climate and air quality benefits. For example, CARB should consider applying a credit multiplier for SAF based on the most conservative estimates of non-CO<sub>2</sub> climate benefits of SAF. (The European RED II program, currently provides a multiplier of 1.2x for SAF.) Alternatively, CARB might develop a “CO<sub>2</sub> equivalent” metric to account for these benefits in terms of carbon intensity and incorporate them into the CA-GREET model, as has

been suggested by the European Commission in its recent study on how to address the non-CO<sub>2</sub> climate impacts of aviation.<sup>41</sup>

<sup>40</sup>See CARB, Staff Report: Initial Statement of Reasons (ISOR). December 19, 2023. <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>. Page 30.

<sup>41</sup> See European Union Aviation Safety Agency, Updated Analysis of the non-CO<sub>2</sub> Climate Impacts of Aviation and the Potential Policy Measures Pursuant to EU Emissions Trading System Directive Article 30(4) (synthesizing research on SAF non-CO<sub>2</sub> climate benefits and suggesting further consideration of SAF policy measures to mitigate aviation climate impacts); *available at* [https://www.easa.europa.eu/sites/default/files/dfu/201119\\_report\\_com\\_ep\\_council\\_updated\\_analysis\\_non\\_co2\\_climate\\_impacts\\_aviation.pdf](https://www.easa.europa.eu/sites/default/files/dfu/201119_report_com_ep_council_updated_analysis_non_co2_climate_impacts_aviation.pdf).

(45d-346.9)

**Comment:** It is for these reasons that we are excited to see CARB taking steps to decarbonize aviation by finally ending the industry exemption and incorporating conventional jet fuel (CJF) into the Low Carbon Fuel Standard. This is long overdue: Sustainable Aviation Fuel (SAF)<sup>1</sup> has been a credit-generating fuel under the LCFS for years, but it's difficult to imagine airlines prioritizing a meaningful transition to more sustainable fuels while their older, polluting fuels continue to draw hundreds of millions of dollars worth of subsidies and savings from the state.

<sup>1</sup> Called "Alternative Jet Fuel" under the program

The carveout for CJF saves the airlines an estimated \$110 to \$360 million each year on the cost of that fuel.<sup>2</sup> The exemption from sales & use taxes for fuel used in international flights cost state and local governments nearly \$300 million last year<sup>3</sup>, and the jet fuel exemption from excise taxes saves airlines about \$29 million a year.<sup>4</sup>

<sup>2</sup> 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

<sup>3</sup> CA Dept. of Tax and Fee Administration, Aircraft Jet Fuel - Frequently Asked Questions; CA Dept. of Finance, Tax Expenditure Reports, 2023-24

<sup>4</sup> CA Dept. of Finance, Tax Expenditure Reports, 2023-24

This heavily subsidized, minimally regulated dynamic for aviation will have to be changed in order to transition to a sustainable industry and meet California's ambitious climate goals. It's simply a matter of when and how. (45d-349.1)

**Comment:** SEIU USWW is encouraged to see CARB continuing to move forward on a proposal to subject conventional jet fuel to the LCFS standards - a direction that our union has been on the record in support of for years now.<sup>5</sup> We know that the agency has been exploring the concept since at least 2021,<sup>6</sup> and are happy to see this idea move toward implementation. This is a great first step, but we do want to emphasize that it can't be the last one. The latest proposal will only cover fuel used in intrastate flights - flights that represent an extremely small portion of overall emissions from aviation activity: just 3% of emissions nationally, and less than 6% in California.

<sup>5</sup> SEIU USWW, "Re: CARB Draft 2022 Climate Change Scoping Plan Update," 6/23/2022

<sup>6</sup> CARB, Public Workshop: Potential Future Changes to the LCFS Program, 12/7/2021

California's aviation sector accounted for about 34 million metric tonnes of CO<sub>2</sub> emissions in 2018, and only about 2 million were the result of intrastate flights.<sup>7</sup> Nationally, intrastate flights make up only about 3% of CO<sub>2</sub> emissions in the United States. Nearly two-thirds of domestic aviation's CO<sub>2</sub> emissions – 112 million metric tonnes in 2019 - come from domestic flights, but of that, only 6 million comes from intrastate flights.

<sup>7</sup> Zheng & Rutherford, ICCT, “Reducing aircraft CO2 emissions: The role of U.S. federal, state, and local policies,” February 2021

We view any progress toward reckoning with aviation’s climate impact on California residents and communities as both welcome and overdue, but this should be the beginning of a much more comprehensive effort that California is uniquely positioned to lead on. Intrastate flights are a drop in the bucket (though still a very important departure from the status quo), and ending there runs the risk of greenwashing the industry’s outsized climate impact by focusing our state policy solutions for aviation on such a small fraction of fuel and emissions.

CARB needs to set a clear path toward bringing jet fuel used in any flights combusted over California into the LCFS, not just the flights that begin and end in our state. A policy that stops short of that needs to also include some kind of commitment toward obligating more of the fossil jet fuel as time goes on. Ongoing analysis of the supply of SAF and growth in the aviation sector needs to take place so that CARB can increase the obligated fuel beyond this current rulemaking. Without a plan to take on more than just intrastate flights, growth in overall aviation activity stands to outpace any gains made in discouraging the continued use of fossil jet fuel. (45d-349.2)

**Comment:** Currently, CARB is proposing a 2028 implementation date for the obligation of intrastate jet fuel under the LCFS.<sup>8</sup> Given that the proposal has been scaled back significantly to just fuel used in intrastate flights, we feel that this kind of delay is excessive and unnecessary. The intrastate limitation means that over 90% of the industry’s fossil jet fuel is still exempt from the LCFS, four years of additional grace period for the small share of fuel that will be obligated by the latest proposal is gratuitous. By 2028, SAF will have been eligible for LCFS credits for nearly a full decade - it is clear at this point that significant and urgent action is needed in order to encourage the industry to take their transition away from fossil fuels much more seriously.

<sup>8</sup> CARB, Staff Report: Initial Statement of Reasons, 12/19/2023

Just a few years ago, the industry and the Biden administration both committed to SAF production goals of at least 3 billion gallons a year by 2030 - a figure that would total not even 7% of US jet fuel consumption in 2023, and stands to amount to an even smaller proportion of what that total would be in 2030.<sup>9</sup> If the scope of the LCFS’ jet fuel obligation does not expand beyond intrastate flights, a delay to 2028 is unjustified. A policy that is no more ambitious than the industry’s own plans and projections will do little to actually encourage a shift away from fossil fuels that wouldn’t have occurred already.

<sup>9</sup> US DoT, Bureau of Transportation Statistics, Fuel Cost and Consumption, CY 2023

(45d-349.3)

**Comment:** Given how far out we are from truly zero-emission solutions at commercial scale in aviation, the industry will have to rely on Sustainable Aviation Fuel in the near term. But as supply ramps up, smart policy is necessary to ensure that this short-term bridge fuel doesn’t create long-term problems. The industry has consistently worked to dilute sustainability standards for SAF<sup>10</sup>, and there is a real possibility of the market being flooded with SAF that fails to significantly reduce lifecycle greenhouse gas emissions. Taking on SAF as a bridge fuel only makes sense when paired with strong guardrails. A cap on crop-based feedstock would be ideal, as well as a strong framework for assessing the sustainability of SAF feedstock. Even

now, the industry has been pushing for changes at the federal level that would undermine the ways in which the overall emissions impacts of SAF are assessed.<sup>11</sup> CARB's evolving policies on aviation must ensure that we are not simply trading problematic fossil fuels for problematic SAF.

<sup>10</sup> *InfluenceMap*, "US Sustainable Aviation Fuel (SAF) Policies and Corporate Engagement," July 2023

<sup>11</sup> *International Council on Clean Transportation*, "How the long shadow of model inputs could dilute the ambition of the Biden Administration's SAF Grand Challenge," 11/6/2023

(45d-349.4)

**Comment:** At SEIU USWW we strongly support efforts to incorporate conventional jet fuel into the LCFS program and will continue to advocate for this kind of policy - though we believe that CARB can and should still include the fuels used in interstate and international flights in current proposals. Falling short of that, CARB should reopen the LCFS rulemaking a couple years from now to chart that path. Within the current rulemaking though, we find the proposed 2028 implementation date excessively generous given the minimal share of flights affected by limiting the program's obligations to intrastate flights only, and are calling for this to be pulled back to 2025 or removed entirely. Finally, we believe a cap on crop-based SAF feedstock is warranted, and as clarity increases with respect to the supply chain for Sustainable Aviation Fuel we hope to see stronger sustainability criteria for SAF feedstock within the LCFS. It should be an ongoing concern for CARB to fight the industry's efforts to undermine the ways in which the emissions impact of different feedstock is assessed. (45d-349.5)

**Comment:** Clean Fuels and CABA believe that prior to the availability of sustainable aviation fuel (SAF), exempting jet fuel from the LCFS program seemed logical. However, the landscape has dramatically shifted with new facilities coming online in the very near future. In light of this evolving reality, it is perplexing that the proposed amendments continue to exempt intrastate jet fuel until January 1, 2028. Such a delay would be severely counterproductive since urgent market signals are crucial for capitalizing on the momentum the industry is currently experiencing.

**Request:** The Board should direct CARB staff to advance the repeal of the exemption to January 1, 2025. This would offer essential support urgently needed to transition the aviation sector toward cleaner, more sustainable practices. Furthermore, we advocate for removing the exemption of all jet fuel, not solely intrastate, as continuing reliance on petroleum jet fuel amidst cleaner alternatives is entirely unnecessary, especially for years 2025, 2026, and 2027 when the industry has already announced projects that could fulfill the entire SAF obligation for all three years. (45d-354.12)

**Comment:** Eliminate the exemption for intrastate fossil jet fuel starting in 2025 instead of 2028. (45d-376.3)

**Comment:** We greatly appreciate the tremendous amount of work that staff has put into the amendments, including proposing the important step of eliminating the current aviation fuel exemption for intrastate fossil jet fuel from the standard. (45d-377.1)

**Comment: Expand and Expedite Rules Making Aviation Fuels Deficit Generators.** CARB should expedite the transition of aviation fuel to a deficit generating fuel. Additionally,



California's share of fuel from interstate and international flights should be included in the LCFS. (45d-379.21)

**Comment:** Eliminating the exemption for domestic fossil jet fuel (both intrastate and interstate) appears to be more beneficial than eliminating it for intrastate only. (386.2-UCB)

**Comment:** Jet fuel elasticity significantly influences the outcomes, highlighting its importance in policy formulation. (45d-386.3)

**Comment:** Since the LCFS has been held not to be discriminatory against out-of-state businesses, the question would be whether the state interests it promotes offset the burden it places on interstate commerce. There is ample precedent that controlling global warming is a legitimate state interest, which increases the possibility that an LCFS that applies to all domestic flights would survive a DCC challenge. (45d-386.4)

**Comment:** Given the lack of alternatives to liquid fuels to decarbonize aviation, and the lack of commercially-deployed alternatives to HEFA within the SAF market at present, prioritizing SAF over RD may be a defensible choice. We adopt that mindset in FPSM via the prioritization of fuels during allocation of preferred waste and residue lipid resources, where SAF demand (assumed to be equivalent to projected intrastate jet fuel demand) is satisfied before RD. We project growth in total volumes of SAF consumption until intrastate demand is satisfied in 2028. This means that when the SAF deficit obligation becomes active in 2028, it has already been integrated into California's total demand for alternative fuels over the preceding years; this explains why no obvious inflection points in the credit balance or bank trend lines are visible in 2028. This approach effectively shifts the deficits that would accrue to SAF into the diesel pool in scenarios where total lipid consumption is capped below total liquid diesel consumption plus intrastate jet fuel consumption. This approach ultimately yields comparatively little difference in FPSM estimates of LCFS crediting trends or estimated emissions between scenarios in which SAF is preferred to RD or ones in which the opposite is true. In reality, there are small but significant distinctions between the production of SAF and RD that would yield different credit and GHG outcomes depending on which feedstocks ultimately went into which fuels. These distinctions are outside the scope of FPSM's ability to effectively characterize or project; additional research into this area is recommended to better understand the trade-offs involved. (45d-391.10)

**Comment:** §95500 (c)(1)(A)8. - Proposed LCFS amendments would add fossil jet fuel used for intrastate travel to the LCFS as an obligated, deficit-generating fuel starting in 2028. Recordkeeping for aircraft entails several additional considerations compared to ground-based transport. Aircraft operators may fuel aircraft with more fuel than required while in jurisdictions that do not regulate or tax fuel, in order to reduce costs. Carrying the extra fuel over a full leg of a flight entails extra weight on the aircraft, and therefore, higher fuel burn. Preventing this behavior, known as "tankering," therefore not only helps ensure that the regulatory intent is fully executed, but also reduces emissions. Tankering may be a strategy used by some aircraft operators to minimize costs associated with jet fuel deficit obligations under the LCFS. To mitigate this risk, the ReFuel EU protocol, for example, requires that at least 90% of fuel needed for all intrastate routes be loaded in the EU otherwise additional deficits to achieve 90% equivalence will be assigned. Adopting this approach, or similar ones may require additional fuel transaction records. Recordkeeping requirements as specified in this, or other

provisions, should ensure adequate recordkeeping and transparency to allow effective action to prevent tankering. (45d-391.74)

**Comment:** Finally, we support CARB's initiatives to foster the sustainable aviation fuel (SAF) market, essential for decarbonizing the aviation sector. We encourage ongoing collaboration with SAF stakeholders to expedite the adoption of these crucial fuels. (Apr-033.6)

**Comment:** As producers of one of the most scalable feedstocks for SAF production, we appreciate the Board's attention to development of this key market through its proposal to remove the exemption for intrastate jet fuel.

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 (Apr-035.11, Apr-096.5)

**Comment: Remove the exemption for aviation fuel by 2026 for both intrastate and interstate flights.**

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. (Apr-039.3)

**Comment:** We commend CARB staff for recognizing the importance of folding in jet fuel into the LCFS. As California is the largest consumer of jet fuel in the country, it's crucial to expand our decarbonization efforts to this sector of transportation. Intrastate flights are the logical starting point, however as noted in the ISOR this only includes 10% of flights which account for 2% of the state's overall transportation sector emissions. We urge CARB to move forward with this, however CARB should consider the greater emissions benefits of interstate and international flights where possible. (Apr-055.1)

**Comment:** Several commenters indicated that the use of Alternative Jet Fuel (AJF) for intrastate flights as currently proposed is insufficient, representing a mere 10% of jet fuel emissions in California. Other commenters insisted that the airlines will not take action unless forced to do so. Eliminating the exemption for intrastate flights only is simply not enough when the bulk of emissions are produced by interstate flights. CARB staff should look to the International Civil Aviation Organization (ICAO) and the U.S. Department of Energy (DOE) as resources to determine how best to deploy and monitor such measures. (Apr-079.19)

**Comment:** It is also important that CARB initiate a rulemaking process to implement its aviation goals. (Apr-106.2)

**Comment:** Including intrastate fossil jet fuel in the LCFS is an important policy signal for decarbonizing the aviation sector, but the current proposal will further increase demand for vegetable-oil based fuels, given that refining and hydrotreating bio-oils is currently the only commercially viable alternative to fossil jet fuel at scale; and ... (Apr-117.4)

**Comment:** Fidelis Supports Adopting Intrastate Jet Fuel as Deficit Generator (Apr-122.2)

**Comment:** SAF is an essential contributor to achieving Governor Newsom’s goal of 20% clean fuels for the aviation sector by 2030. 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 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. (Apr-131.1)

**Comment:** 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 California’s recently stated goals of obligating jet fuel within the LCFS. (Apr-131.9)

**Comment:** Furthermore, we are disturbed that CARB staff appear to be moving away from including intrastate jet fuel in the LCFS instead of expanding the scope of coverage to include interstate and international flights. (Apr-159.2)

**Comment: Recent Federal SAF Policy Developments Support SAF Expansion**

Based on very recent federal policy developments, the SAF Producer Group perceives a new and critical opportunity in this LCFS rulemaking for California to maintain its lead on state-level SAF policy and to maximize alignment with emerging federal SAF policy. Specifically, CARB can address electricity-related LCFS crediting in a way that optimizes opportunities to achieve the greenhouse gas (“GHG”) emissions reductions that the State seeks to meet its goals.

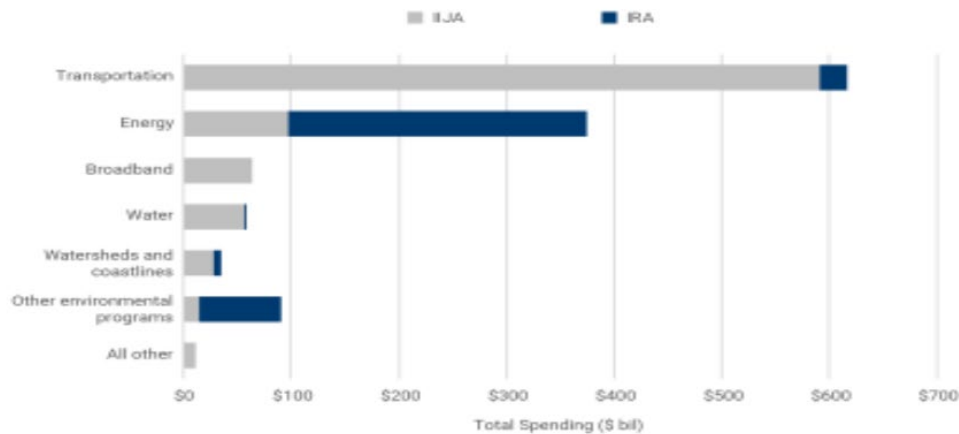
Through this regulatory strategy, CARB will also achieve upstream emission reductions and stimulate expansion of Low-CI power generation capacity, storage and transmission during the peak spending period of Inflation Reduction Act (“IRA”) and Infrastructure Investment and Jobs Act (“IIJA”). As stated in a Brookings Institute Report issued on February 1, 2023:

*Between the Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act (IRA), the 117th Congress invested \$1.25 trillion across the transportation, energy, water resources, and broadband sectors for the next five to 10 years. It’s now the Biden administration’s responsibility to get that historic amount of money out the door—yet the bulk of it is still sitting in federal coffers or unrealized tax credits on the federal balance sheet. (...)*

*After years of false starts and empty promises from Congress, the IRA is the first major federal spending response to climate change.(...) Using the same methodology as our Federal Infrastructure Hub, we can see the combined reach of the two bills.(...)<sup>2</sup>*

<sup>2</sup> Adie Tomer, Caroline George and Joseph W. Kane for Brookings Research, “The start of America’s infrastructure decade: How macroeconomic factors may shape local strategies,” at <https://www.brookings.edu/articles/the-start-of-americas-infrastructure-decade-how-macroeconomic-factors-may-shape-local-strategies/>

FIGURE 1  
Projected federal spending from IIJA and IRA



**Note:** Projected spending includes advance appropriations, budget impacts of IRA tax credits as estimated by the CBO, and a small number of authorized programs.  
**Source:** Brookings analysis of Infrastructure Investment and Jobs Act, Inflation Reduction Act, and CBO data.

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## **The Need for LCFS Support for SAF Deployment**

The IRA’s SAF tax credits (40B and 45Z in the IRA) provide a helpful financial signal to enable fulfillment of California’s ambitious goals for SAF expansion and displacement of fossil jet fuel. Governor Newsom has targeted 20% clean fuels adoption in the aviation sector.<sup>3</sup> The Legislature has estimated a need for at least 1.5 billion gallons of SAF blending by 2030.<sup>4</sup> Moreover, in order to fulfill California’s goal of achieving carbon neutrality by 2045, the 2022 CARB Scoping Plan states that 80% of all aviation fuel demand will need to come from SAF by 2045.<sup>5</sup>

<sup>3</sup> See 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>

<sup>4</sup> See AB1322 (Rivas) available at

[https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill\\_id=202120220AB1322](https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB1322). AB 1322 was passed by the California assembly in 2022 and later vetoed by Governor Newsom, who, in his veto letter, supported the legislature’s intent with the bill and ordered CARB to develop a “plan to reduce greenhouse gas emissions through the production and use of sustainable aviation fuels by July 1, 2024”. Governor Newsom’s veto letter available at <https://www.gov.ca.gov/wp-content/uploads/2022/09/AB-1322-VETO.pdf?emrc=7598b6>

<sup>5</sup> See CARB, 2022 Scoping Plan for Achieving Carbon Neutrality. December 2022.

[https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp\\_1.pdf](https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp_1.pdf). Page 73. The Scoping Plan scenario envisions 20% of aviation fuel demand met by electricity (batteries) or hydrogen (fuel cells) in 2045, with sustainable aviation fuel meeting the remaining 80%.

For California to realize the full potential value of the federal SAF tax credits to fuel SAF expansion, the approach to accounting for and crediting electricity-related emissions set forth in the U.S. government’s recently released guidance on the 40B SAF tax credit is instructive and should be incorporated into the LCFS program, as discussed below.

We would like to emphasize, however, that the IRA SAF tax credits should not be viewed as sufficient to enable the fulfillment of either the California goals summarized above or the federal SAF Grand Challenge goal of three billion gallons per year by 2030.<sup>6</sup> The rapid

development of SAF production capacity requires long-term durable policy support to attract sufficient capital to a nascent industry. Regrettably, both the 40B and 45Z tax credits are of limited duration so further policy long-term support at the state and federal level for remains essential to SAF industry expansion. While outside the scope of this LCFS rulemaking, we think it appropriate to recognize the additive value of state-level tax credits for SAF that have recently been established in Colorado, Illinois, Nebraska and Washington. We encourage CARB to continue to engage with the SAF Producer Group, the airlines, the California airports, labor unions, and other stakeholders to support additional state-level policy development.

<sup>6</sup> See U.S. Department of Energy Bioenergy Technologies Office, Sustainable Aviation Fuel Grand Challenge, at <https://www.energy.gov/eere/bioenergy/sustainable-aviation-fuel-grand-challenge>.

(Apr-176.2)

**Comment:** LCFS significantly impacts California's efforts to decarbonize the aviation sector and any proposed programmatic changes warrant thorough consideration. Expanding the scope of the Low Carbon Fuel Standard (LCFS) program to include aviation fuels beyond the existing voluntary opt-ins for alternative jet fuels<sup>4</sup> 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.

<sup>4</sup> 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.

*In light of federal preemption risks associated with intrastate flights, CARB should consider a "fall-off provision" with alternative coverage.*

We are pleased to see CARB taking steps to sustainably transition from uptake of conventional fossil jet fuel to uptake of alternative jet fuel in California. However, the emphasis on intrastate flight coverage may trigger a legal dispute on the grounds of federal preemption, posing a tangible risk of invalidating CARB's intrastate aviation provisions. Therefore, EDF encourages CARB to consider proactively addressing this potential scenario by incorporating a "fall-off provision" to ensure at least an alternative measure applies in case the intrastate provisions are invalidated. This approach would increase the likelihood of successfully safeguarding CARB's efforts to regulate aviation emissions.

The following amendments to § 95482(b) provide an illustrative fall-off provision. The amendments, denoted by the red text, constrain the ability of alternative jet fuels to opt-in when their volumes exceed 500 million gallons of gasoline in a calendar year. If all provisions related to intrastate flights are invalidated, *all* fossil jet fuel and alternative jet fuel uplifted in California would be subject to the LCFS. To avoid changing the overall ambition of the program, a follow-up condition would ensure the intensity benchmarks for gasoline, diesel, and jet fuel are updated to target, in the aggregate, the same total absolute reductions that would have been achieved with the annual carbon intensity benchmarks set forth in sections 95484(d) through(f).

**Section § 95482(b)** *"Opt-In Fuels. Each of the following alternative fuels ("opt-in fuels") is presumed to have a full fuel cycle, carbon intensity that meets the compliance schedules set*

forth in sections 95484-~~(b)~~ (d) through ~~(d)~~(f) through December 31, ~~2030~~2045. A fuel provider for an alternative fuel listed below may generate LCFS credits for that fuel only by electing to opt into the LCFS as an opt-in fuel reporting entity pursuant to section 95483.1 and meeting the requirements of this regulation:

(1) Electricity;

(2) Bio-CNG;

(3) Bio-LNG;

(4) Bio-L-CNG;

(5) Alternative Jet Fuel, unless the volume of alternative jet fuel that opts-in is greater than 500 million gasoline gallon equivalent, in which case an updated set of annual carbon intensity benchmarks will be posted on May 15 of the following year the Executive Officer announces that that condition has been triggered. The updated intensity benchmarks for gasoline and fuels used as a substitute for gasoline, for diesel fuel and fuels used as a substitute for diesel fuel, and fossil jet fuel and fuels used as a substitute for fossil jet fuel will target in the aggregate the same total absolute reductions that would have been achieved with the annual carbon intensity benchmarks set forth in sections 95484(d) through(f); and

(6) Renewable Propane.

Finally, 95484(f) needs to be corrected to include both fossil jet fuel and fuels used as a substitute for fossil jet fuel. (Apr-190.6)

**Comment:** 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 (15d1-005.1)

**Comment Summary:** Unlike previous versions of the LCFS, the new proposal does not require airlines to take any responsibility for the combustion of fossil-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. (15d1-010.4, 15d1-010a.4, 15d1-010b.4, 15d1-023.3, 15d1-068.4)

**Comment:** And the latest proposal leaves airlines off the hook for combustion of jet fuel. (15d1-011.3)

**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. (15d1-012.1)

**Comment:** 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, NO<sub>x</sub>, and SO<sub>x</sub>. If Governor Newsom's goal of 20% SAF uptake is to be achieved, we believe additional measures are necessary<sup>3</sup>. Fortunately, policy options are available, and we hope to work with CARB to explore and potentially implement those strategies. (15d1-033.2)

**Comment:** 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.<sup>32</sup> Commercial airlines are also exempt from the excise tax for jet fuel, a tax break that costs the state about \$23 million each year.<sup>33</sup> The carveout in the Low Carbon Fuel Standard for conventional jet fuel saves the airlines an estimated \$110 to \$360 million each year<sup>34</sup> on the cost of that fuel.

<sup>32</sup> 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> .

<sup>33</sup> CA Dept. of Finance, Tax Expenditure Reports 2021-22, at p. 11, *available at* <https://dof.ca.gov/wpcontent/uploads/sites/352/Forecasting/Economics/Documents/2021-22-Tax-Expenditure-Report.pdf>.

<sup>34</sup> 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.

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.

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.”<sup>35</sup> 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.

<sup>35</sup> Proposed LCFS Amendments (August 12, 2024), p. 3.

(15d1-038.6)

**Comment:** 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 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 states<sup>5</sup> and the European Union<sup>6</sup> in adopting incentives or requirements for air carriers to adopt SAF.**

<sup>5</sup> From Legislation to Lift-Off: State Support Powers Sustainable Aviation Fuel Growth (twelve.co)

<sup>6</sup> European Union Aerospace and Defense Sustainable Aviation Fuel Regulation (trade.gov)

(15d1-045.7)

**Comment:** 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. (15d1-059.2)

**Comment:** *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. (15d1-067.4)

**Comment:** *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 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. (15d1-067.5)

**Comment:** 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 CO<sub>2</sub>) 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. (15d1-070.5)

**Comment:** These new proposed amendments no longer obligate jet fuel as par tof 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 payor 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. (15d1-089.1)

**Comment:** 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. (15d1-096.4)

**Comment:** Impact of Removing Fossil Jet Fuel as a Deficit Generator

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. (15d1-106.5)

**Comment: 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 (CO<sub>2</sub>) and non-CO<sub>2</sub> 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,<sup>2</sup> 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.<sup>3</sup> The result: in 2023, 2 billion gallons of renewable diesel were registered by the program but only 23 million gallons of SAF.<sup>4</sup> It remains unclear what differences exist between aviation and on-road fuels that justify continuation of uneven supportive policies.

<sup>4</sup> CARB Data Dashboard available at <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>

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. (15d1-111.1)

**Comment:** 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 CO<sub>2</sub> and non-CO<sub>2</sub> emissions from aviation and there is a growing body of data that SAF offers this in both cases. <sup>5</sup>

<sup>5</sup> <https://www.dlr.de/en/vt/research-transfer/faq/faq-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](https://www.who.int/health-topics/cardiovascular-diseases#tab=tab_1)

(15d1-111.3)

**Comment:** 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 proposal<sup>7</sup>, 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."<sup>8</sup> 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.

<sup>7</sup> Proposed Low Carbon Fuel Standard Amendments, CA Air Resources Board, 8/12/24

<sup>8</sup> 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>

(15d1-129.1)

**Comment:** 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.<sup>9</sup> 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.<sup>10</sup> 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.

<sup>9</sup> GHG Inventory by Sector, California Air Resources Board, 2023

<sup>10</sup> CARB, CA GHG Inventory for 2000-2020 - by Sector and Activity, 10/26/22

The FAA forecasts that aviation activity in California will increase by at least two-thirds by 2044.<sup>11</sup> NO<sub>x</sub> 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.

<sup>11</sup> FY2024-2044 FAA Aerospace Forecast, Federal Aviation Administration

(15d1-129.2)

**Comment:** CARB must do the following:

- Reinstate 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. (15d1-129.3)

**Comment: 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.**

- 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. (15d1-132.3)

**Comment: 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. (15d1-139.9)

**Comment: Elimination of Intrastate Sustainable Aviation Fuel from Consideration for Deficit Generation**

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. (15d1-144.8)

**Comment:** 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.)

...

**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.<sup>17</sup> 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.

<sup>17</sup> 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.”)

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.<sup>18</sup>

<sup>18</sup> 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.”)

**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 and renewable diesel.”<sup>19</sup> 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.<sup>20</sup> 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.

<sup>19</sup> 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.”)

<sup>20</sup> 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).

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.<sup>21</sup> 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.<sup>22</sup>

<sup>21</sup> 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>.

<sup>22</sup> See United States Environmental Protection Agency, “Fast Facts on Transportation Greenhouse Gas Emissions,” <https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions>.

*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.<sup>23</sup>

<sup>23</sup> 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.”<sup>24</sup>

<sup>24</sup> *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-

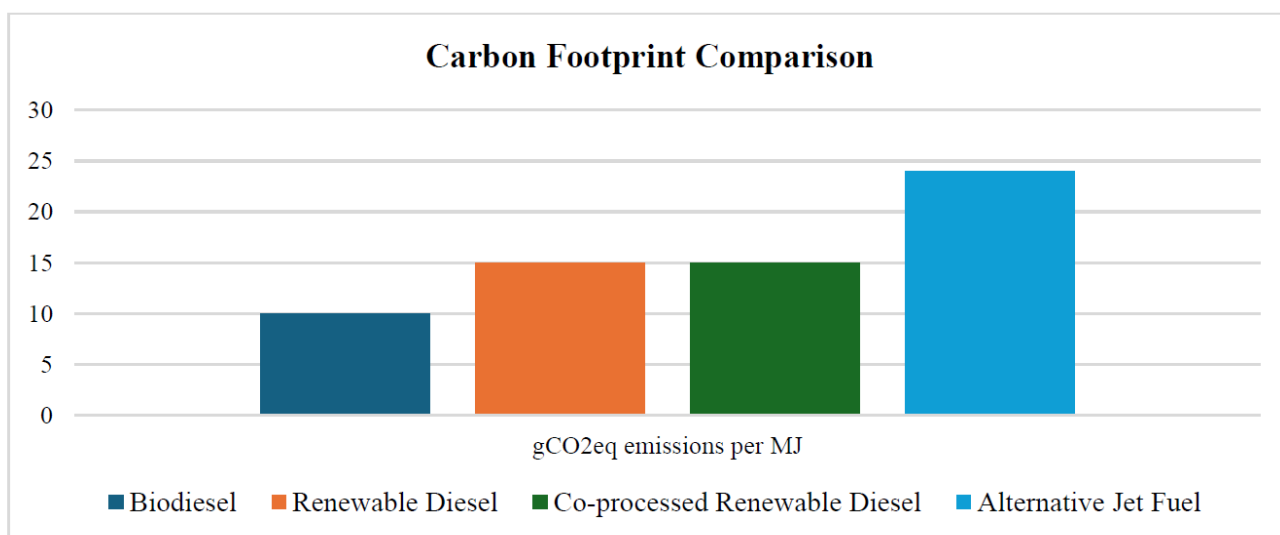


road transport, alternative jet fuel consumption will be concentrated at a relatively low number of airports compared to the refueling network for heavy-duty trucking.

The cost of saving one kilogram of carbon dioxide (“CO<sub>2</sub>”) is higher for alternative jet fuel than it is for renewable diesel. Every gallon of alternative jet fuel delivers lower CO<sub>2</sub> savings than every gallon of renewable diesel; the displacement of one megajoule (“MJ”) of fossil *jet fuel* avoids less CO<sub>2</sub> 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.”<sup>25</sup>

<sup>25</sup> 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](https://www.studiogearup.com/wp-content/uploads/2021/03/2021_sGU_EWABA-and-MVaK_Options-for-the-deployment-of-UCO.pdf).

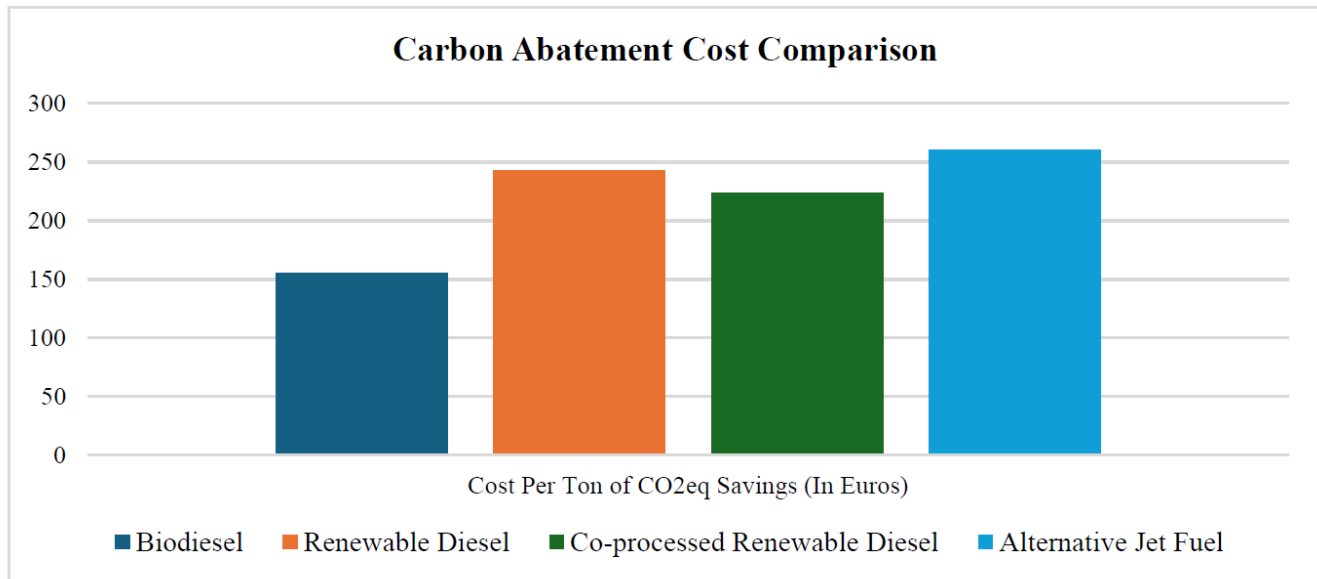
The study determined that, of all the end-uses, biodiesel has the lowest production costs, the highest feedstock efficiency, the highest emission reduction performance and, consequently, the lowest carbon abatement costs. From the perspective of overall climate mitigation, the use of UCO feedstocks for alternative jet fuel production achieves less emission reduction at higher abatement costs, compared to using UCO for road transport fuels.



Biodiesel achieves 10 gCO<sub>2</sub>eq/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.<sup>26</sup> 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.<sup>27</sup>

<sup>26</sup> Id.

<sup>27</sup> Id.



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.<sup>28</sup> 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.”<sup>29</sup>

<sup>28</sup> Id.

<sup>29</sup> Id.

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.”<sup>30</sup>

<sup>30</sup> 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 (“NO<sub>x</sub>”) 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 NO<sub>x</sub> emissions to improve air quality.<sup>31</sup>

<sup>31</sup> See LMC International, *Comparative Economic Analysis of Renewable Jet Fuel and Renewable Diesel* (Sep. 2021).

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.<sup>32</sup>

<sup>32</sup> 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).

(15d1-149.3)

**Comment:** *Removal of Fossil Jet Deficits Necessitates More Ambitious Percentage Numbers to Achieve the Same Demand for Low Carbon Fuels*

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. (15d1-167.2)

**Comment:** 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.<sup>1</sup> Governor Newsom has indicated a desire to support SAF,<sup>2</sup> including via the LCFS program<sup>3</sup>. 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.

<sup>1</sup> Waypoint 2050: Aviation: Benefits Beyond Borders ([aviationbenefits.org](http://aviationbenefits.org))

<sup>2</sup> Governor Newsom Calls for Bold Actions to Move Faster Toward Climate Goals | Governor of California calling for 20% SAF target.

<sup>3</sup> See <https://www.gov.ca.gov/wp-content/uploads/2022/09/AB-1322-VETO.pdf?emrc=7598b6>

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.<sup>4</sup> 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.

<sup>4</sup> See 2022 Scoping Plan Update (ca.gov) assuming SAF would represent 80% of aviation fuel in 2045.

As outlined in previous comments,<sup>5</sup> 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,<sup>6</sup> 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.<sup>7</sup> The result: in 2023, 2 billion gallons of renewable diesel were registered by the program but only 23 million gallons of SAF.<sup>8</sup> It remains unclear what differences exist between aviation and on-road fuels that justify continuation of uneven supportive policies.

<sup>5</sup> See <https://www.arb.ca.gov/lists/com-attach/7031-lcfs2024-Wyhco1A3Ag5RMAV3.zip>

<sup>6</sup> 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.

<sup>7</sup> 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/>.

<sup>8</sup> CARB Data Dashboard *available at* <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>

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 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.**

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.<sup>9</sup> 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.<sup>10</sup> 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.

<sup>9</sup> 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.

<sup>10</sup> See ICF Report, Sustainable Aviation Fuel in California's Low Carbon Fuel Standard, August 2024 (attached)

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<sub>x</sub>, PM 2.5, and SO<sub>x</sub>) 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 gCO<sub>2</sub>e/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. (15d1-215.1)

**Comment:** 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. (15d1-215.4)

**Comment:** Restore the originally proposed obligation on intrastate jet fuel. (15d1-219.7)

**Comment:** 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.<sup>41</sup> ICCT supports these complementary activities to reduce the direct air quality impacts of aviation.

<sup>41</sup> [https://ww2.arb.ca.gov/sites/default/files/2024-](https://ww2.arb.ca.gov/sites/default/files/2024-08/California%20Aircraft%20and%20Airports%20Fact%20Sheet%20-%20July%202024_0.pdf)

[08/California%20Aircraft%20and%20Airports%20Fact%20Sheet%20-%20July%202024\\_0.pdf](https://ww2.arb.ca.gov/sites/default/files/2024-08/California%20Aircraft%20and%20Airports%20Fact%20Sheet%20-%20July%202024_0.pdf)

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.<sup>42</sup> 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.

<sup>42</sup> <https://theicct.org/wp-content/uploads/2023/01/ca-aviation-decarbonization-jan23.pdf>

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 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. (15d1-219.30)

**Comment: 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 hotspots<sup>1</sup>. 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.

<sup>1</sup> “California’s Actions in Reducing Emissions from Airports and Aircraft”. CARB (2024).

[https://ww2.arb.ca.gov/sites/default/files/2024-](https://ww2.arb.ca.gov/sites/default/files/2024-08/California%20Aircraft%20and%20Airports%20Fact%20Sheet%20-%20July%202024_0.pdf)

[08/California%20Aircraft%20and%20Airports%20Fact%20Sheet%20-%20July%202024\\_0.pdf](https://ww2.arb.ca.gov/sites/default/files/2024-08/California%20Aircraft%20and%20Airports%20Fact%20Sheet%20-%20July%202024_0.pdf)

(15d1-221.2)

**Comment: 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. (15d1-222.7)

**Comment: Removal of jet fuel as a deficit generator is counterproductive and inequitable and lacks justification; CARB should restore jet fuel as a deficit generator.**

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.<sup>36</sup> CARB should restore jet fuel as a deficit generator in its final rule.

<sup>36</sup> 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 decarbonizing the aviation sector, and with EJAC's recommendation to further integrate opt-in sectors into the regulation.<sup>79,80</sup> 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."

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 2021<sup>37</sup> 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.<sup>38</sup>

<sup>37</sup> See 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](https://ww2.arb.ca.gov/sites/default/files/2021-12/LCFS%2012_7%20Workshop%20Presentation_notes.pdf).

<sup>38</sup> Governor Gavin Newsom, Letter to Liane Randolph (July 22, 2022), <https://www.gov.ca.gov/wpcontent/uploads/2022/07/07.22.2022-Governors-Letter-to-CARB.pdf?emrc=1054d6>.

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 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. (15d1-222.33)

**Comment:** Ultimately the biggest loss in this 15-day package is SAF production and the feedstocks needed to decarbonize the aviation sector. (15d1-228.17)

**Comment:** 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. (15d1-228.19)

**Comment:** 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. (15d1-235.3)

**Comment: 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”.<sup>4</sup> We believe that CARB can still enact meaningful measures in the present rulemaking to support SAF deployment in California.

<sup>4</sup> 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 gCO<sub>2</sub>e/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.

(15d1-235.9)

**Comment:** Removing fossil jet fuel from the program sends a bad message to polluting airlines, and the workers and communities they harm. (15d1-240.4)

**Comment: REMOVING FOSSIL JET FUEL FROM THE PROGRAM SENDS A BAD MESSAGE TO POLLUTING AIRLINES.**

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.<sup>70</sup> 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.

<sup>70</sup> 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).

(15d1-240.36)

**Comment:** 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.

- 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.** (15d1-244.3)

**Comment:** 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 CO<sub>2</sub> emissions in 2018.<sup>1</sup> 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.

<sup>1</sup> Brandon Graver et al., CO<sub>2</sub> 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.<sup>2</sup> However, progress is lacking. In 2023, United Airlines topped U.S. carriers with only 0.17% of its fuel from cleaner sources.<sup>3</sup> 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.

<sup>2</sup> International Air Transport Association, “Fly Net Zero” (webpage), available at: <https://www.iata.org/en/programs/sustainability/flynetzero>.

<sup>3</sup> 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>.

**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 implement these policies in 2025.

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.<sup>4</sup>

<sup>4</sup> 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>.

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. (15d1-246.1)

**Comment: 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
<b>TOTAL</b>	<b>\$4.19</b>	<b>\$4.62</b>	

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. (15d1-248.1)

**Comment:** 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 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.*** (15d1-248.2)

**Comment:** Reincorporate Fossil Jet Fuel as a Deficit Generator

We remain surprised by the decision to remove fossil jet fuel as a deficit generator from the previous 15-day package. The absence of deficits from fossil jet fuel will significantly reduce the financial pressure on the aviation industry to adopt SAF, a key element in the decarbonization of air travel.

The rationale provided in August 2024 contradicts the core philosophy of the LCFS: that pricing carbon emissions and reductions incentivizes the adoption of low-carbon alternatives. At the time, CARB provided commentary saying that the waiver from deficit production for fossil jet fuel was maintained because removing it “did not guarantee that airlines would procure and use alternative jet fuel”. That represents a misunderstanding of the power of the LCFS program, in which no specific fuel is ever mandated but instead California sends pricing signals to market actors to invest in and deploy low carbon fuels. If that sounds too theoretical, consider what we have regularly seen in the market: SAF projects have struggled to obtain financing because the airlines procuring the fuel are not willing to pay meaningfully more than the price of fossil jet fuel. By pricing the emissions from fossil jet fuel, the LCFS would create the economic imperative for airlines to account for the cost of carbon into the price they pay for low-CI alternatives, thereby enabling substantially more capital to fund the deployment of SAF production capacity.

Further, the inclusion of fossil jet fuel as a deficit generator would not preclude additional action - by CARB or by California's legislature - to mandate the adoption of sustainable aviation fuel. The decarbonization of air travel will require multiple policy drivers and these two are certainly not mutually exclusive but rather reinforcing.

Without fossil jet fuel as a deficit generator, California risks slowing progress in reducing emissions from one of the most challenging sectors to decarbonize. We urge CARB to

**reinstate fossil jet fuel as a deficit generator** to ensure the aviation industry contributes to California's broader climate goals. (15d2-166.5)

**Comment:** Remove the exemption for fossil jet fuel. (15d2-192.3)

**Comment:** 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. (15d2-244.14)

**Comment:** Remove the exemption for fossil jet fuel. (15d2-274.4)

**Comment:** We view the following as significant elements of the proposal that warrant closer scrutiny by the board:... Continued exemption of fossil-based aviation fuels. (15d2-275.3)

**Comment:** Finally, we want to support the directive from CARB Board members to staff at the September 12, 2024, joint hearing of the Board and Environmental Justice Advisory in seeking a regulatory pathway for alternative jet fuel in the LCFS regulation. We strongly support a policy that incentivizes the production and utilization of alternative jet fuel in California, and we believe the LCFS regulation enables both goals. We specifically support the directive from several CARB board members that the state must continue to work towards the development of this policy. We would hope that CARB staff can lay out a regulatory plan at the November 8, 2024 Board meeting for alternative jet fuel in response to the board members' guidance. (15d2-295.3)

### **Comment: Greater Support for Near-Term Aviation Solutions Particularly SAF**

SkyNRG sees sustainable aviation fuel as one of the few near-term, readily available solutions to addressing both carbon dioxide (CO<sub>2</sub>) and non-CO<sub>2</sub> emissions from aviation. For this reason, we remain disappointed by the 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,<sup>5</sup> 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.<sup>6</sup> The result: in 2023, 2 billion gallons of renewable diesel were registered by the program but only 23 million gallons of SAF.<sup>7</sup> It remains unclear what differences exist between aviation and on-road fuels that justify continuation of uneven supportive policies.

<sup>5</sup> 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.

<sup>6</sup> 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/>.

<sup>7</sup> CARB Data Dashboard available at <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>

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. (15d2-302.8)

**Comment: EXEMPTING AVIATION FUEL CREATES UNCERTAINTY IN OTHER FUELS**

While an exemption for all aviation fuels is included in the first 15-day language, there are real concerns about the unintended consequences to other fuels remaining under compliance. Sustainable Aviation Fuel (SAF) is one of the primary refining sources for renewable propane that complies with LCFS. Renewable propane creates fuel that is available for propane used in transportation, particularly in Southern California. By exempting aviation fuel and reducing available credits for SAF, there could be the unintended consequence of drastically reducing SAF production and thereby one of the most available sources of renewable propane – driving up costs for end-users. Likewise, it could drive production of these fuels further out of state and reduce the accessibility of SAF and renewable propane for the markets obligated to use them. (15d2-304.4)

**Comment:** Ensure that all major polluters are covered under the LCFS and restore intra-state fossil jet fuel as a deficit generator. Airport workers were assured in the rulemaking process that CARB would attempt to leverage the LCFS to tackle pollution from jet fuel. But by excluding fossil jet fuel from generating deficits, there is little incentive for airlines to invest in cleaner fuels, or support higher credit prices that accelerate zero-emissions investments in cargo handling or airport ground support equipment. CARB's backsliding on this key reform reduces the effectiveness of the LCFS and stalls progress on the challenge of reducing pollution from jet fuel, all while absolving the profitable airline industry—a transportation segment catering primarily to more affluent consumers—of paying its fair share. (BH-030.8)

**Comment:** While our policy was pulled out in the staff recommendations, we have worked with CARB staff over a few weeks to include in their resolutions today and commit to keep on going with this conversation to discuss again the next time the LCFS is open for -- up for change. Trump administration has no interest in environmental justice regulations. California needs to be bold and protect itself from the airlines. (BHT-56)

**Agency Response:** No changes were made to the Proposed Amendments in response to these comments, which supported the initially proposed amendments to partially remove the exemption of fossil jet fuel in the LCFS. In the First 15-day package of proposed changes to the amendments, staff proposed to remove "Fossil Jet Fuel" from the list of transportation fuels that the LCFS applies to. No changes were made in

response to the comments recommending that CARB return to the initial proposal to partially remove the exemption. The reasons for the restoration of the exemption are provided in the First 15-day changes Notice, and in the response to comments opposing the partial removal of the exemption in Response V-2 below.

Although not necessary to support the response to these comments above, staff provide additional information on developments in this policy area below: While staff is proposing to retain the current exemption on fossil jet fuel, 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. In CARB Resolution 24-14, the Board directed staff to consider, for upcoming and relevant items going to the board including the next LCFS rulemaking, potential regulatory approaches to support emission reductions associated with conventional jet fuel.

As noted in the First 15-day changes Notice, CARB released a fact sheet<sup>1</sup> in July 2024 on partnering with federal and local agencies to address harmful air pollution at airports. CARB, the Environmental Protection Agency (EPA), and South Coast Air Quality Management District (South Coast) announced their joint intent to act for further emissions reductions from a variety of sources primarily under federal control, including airports and aircrafts. In the 2022 State SIP Strategy, CARB committed to return to the Board in 2027 with an update on an evaluation of opportunities to reduce airport and aircraft emissions to the maximum extent practicable. CARB also announced its intent to explore developing a Zero Emission Airport Ground Operations Regulation to require zero-emissions taxiing, zero-emissions ground support equipment (GSE), and zero-emissions gate operations. CARB intends to host three technology forums for aviation on the following:

- How airport operations are managed, focusing on optimizing zero-emissions GSE, auxiliary unit operation, and airplane operations (e.g., taxiing);
- Operational practices and economics of aircraft routing within the State, country, and internationally; and
- Strategies for lowering NOx emissions from aircraft, including improved combustor design, selective catalytic reduction, water-in-fuel strategies, or other strategies.

Additionally, in October 2024, CARB and the nation's leading airlines announced a landmark partnership for a sustainable aviation future and to reduce emissions. CARB and Airlines for America (A4A), an industry trade organization representing nearly a dozen major airlines, committed to a goal of increasing the availability of cost-competitive and sustainable aviation fuel (SAF) for use within California to 200 million gallons by 2035, an amount that would meet about 40% of intrastate travel

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<sup>1</sup> California Air Resources Board. *California's Action in Reducing Emissions from Airports and Aircraft*. July 19, 2024. Available at: [https://ww2.arb.ca.gov/sites/default/files/2024-08/California%20Aircraft%20and%20Airports%20Fact%20Sheet%20-%20July%202024\\_0.pdf](https://ww2.arb.ca.gov/sites/default/files/2024-08/California%20Aircraft%20and%20Airports%20Fact%20Sheet%20-%20July%202024_0.pdf)



demand and represent more than a tenfold increase from current levels. The partnership accelerates solutions to California's climate and air quality goals by partnering with the aviation industry in emissions reduction efforts, and it supports a commitment by the major U.S. airlines to achieve net-zero carbon emissions by 2050, which will require completely transitioning from conventional petroleum-based jet fuel to sustainable alternatives, prioritizing waste-based feedstocks. The collaboration is an example of California's partnerships with industry to move toward a clean air future, and one that was made possible by the development of alternative fuels spurred by the LCFS that provide the industry lower-carbon, sustainable options. Key goals of the Sustainable Aviation Fuel Partnership include:

- CARB and A4A will work together with sustainable aviation fuel producers, aviation stakeholders, labor, and the federal government to ensure that at least 200 million gallons of cost-competitive options are available for use by airlines within California by 2035.
- To achieve these goals, CARB and A4A will work together to identify, evaluate, and prioritize new policies and actions, including incentives for investment and timely permitting to help accelerate the availability and use of sustainable aviation fuels for intrastate flights in California.
- The partnership will establish a Sustainable Aviation Fuel Working Group of government, labor, and industry stakeholders that will meet annually to report progress and address barriers to meeting those goals.
- CARB staff will create a public website that will display the latest information on the availability and use of conventional jet fuel and sustainable aviation fuel within California, as well as details on relevant state and federal incentives and policies.

In addition to bolstering climate action in California, this agreement supports and builds on the climate goals outlined in the federal government's Sustainable Aviation Fuel Grand Challenge, a national initiative to develop a comprehensive strategy for scaling up new technologies to produce sustainable aviation fuels on a commercial scale.<sup>2</sup>

Finally, at the Board Hearing held on November 8, 2024, to consider the amendments to the LCFS, in CARB Resolution 24-14, the Board directed the Executive Officer, along with the airlines represented by Airlines for America, to implement the Sustainable Aviation Fuel Partnership and associated goals and cooperation recognized in October 2024, including the goal to ensure at least 200 million gallons of cost-competitive and commercially viable sustainable aviation fuel is available for use by operators in California by 2035.<sup>3</sup>

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<sup>2</sup> California Air Resources Board and Airlines for America. *Sustainable Aviation Fuel Partnership*. October 30, 2024. Available at: [https://ww2.arb.ca.gov/sites/default/files/2024-10/Sustainable-Aviation-Fuel-Partnership-signed\\_0.pdf](https://ww2.arb.ca.gov/sites/default/files/2024-10/Sustainable-Aviation-Fuel-Partnership-signed_0.pdf)

<sup>3</sup> California Air Resources Board. *Public Hearing to Consider Proposed Low Carbon Fuel Standard Amendments*. Resolution 24-14. November 8, 2024. Available at: <https://ww2.arb.ca.gov/sites/default/files/barcu/board/res/2024/res24-14.pdf>

In response to the comment seeking clarity as to the stackability of CORSIA and LCFS credits, LCFS credit value can generally be stacked with other incentives, including CORSIA credits, to provide a stronger financial signal for investment in cleaner fuels.

In response to the comments related to crop-based biofuels in regard to feedstocks for SAF, please see Response BB-3. As mentioned, the Sustainable Aviation Fuel Partnership described above prioritizes waste-based feedstocks.

## **V-2 Multiple Comments: Oppose Inclusion of Fossil Jet Fuel in LCFS**

**Comment:** The Valley Industry & Commerce Association (VICA) asserts its opposition to the proposed elimination of the Low Carbon Fuel Standard (LCFS) exemption for intrastate fossil jet fuel. We firmly believe that the current proposal, if implemented, would fall short of achieving its intended goal to increase Sustainable Aviation Fuel (SAF) production and mitigating greenhouse gas emissions, while inevitably leading to significant economic burdens on the aviation industry, travelers, and consumers. (45d-017.1)

**Comment:** This proposed change is unlikely to result in increased SAF production, availability, or use in California, but would lead to higher jet fuel prices. 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. The CARB proposal would not meaningfully address this fundamental challenge and therefore unlikely to meaningfully increase SAF supply or use... The proposal seeks to regulate jet fuel and reduce emissions from aviation, both of which are pre-empted under federal law a fact that CARB recognized when it exempted jet fuel in 2018. Aviation has unique circumstances, that go beyond considerations of interstate commerce, for the safe operation and maintenance of aircraft that the federal government has recognized in the EPA's Clean Air Act and the jurisdiction of the FAA. These statutory authorities establish clean and broad federal authority for regulating jet fuel and aircraft emissions that pre-empts California from regulating jet fuel. (45d-033.1)

**Comment:** A recent National Academy of Sciences paper on life cycle assessments highlighted the critical importance of evaluating scale when assessing different transportation fuels.<sup>15</sup> The proposed amendments open the door for the inclusion of Sustainable Aviation Fuels (SAF) for flights within the state of California. The future of the SAF market is highly speculative. The World Resources Institute estimates that to meet the Energy Department's stated goal on SAF it would require an additional 114 million acres of corn, 20% more than current corn acreage.<sup>16</sup> This type of major expansion in corn production would have a profound effect on land use change. We urge CARB to consider the impact of the additional inclusion of SAFs within the LCFS credit system for California and land use emissions in other states and countries.

<sup>15</sup> <https://www.nationalacademies.org/our-work/current-methods-for-life-cycle-analyses-of-low-carbon-transportation-fuels-in-the-united-states>

<sup>16</sup> <https://www.wri.org/insights/us-sustainable-aviation-fuel-emissionsimpacts#:~:text=If%20the%20U.S.%20were%20to,United%20States%20for%20all%20purposes>

(45d-042.4)

**Comment:** The proposed deficits will add a new cost to air transportation within the State of California. However, the credits needed to satisfy this new obligation are far more likely to come from established fuels under the LCFS: ethanol, biodiesel, renewable diesel, RNG, and electric vehicles. While Alternative Jet Fuel...qualifies as an opt-in fuel under the LCFS, the proposed deficits do nothing to improve the economics of its use...The apparent logic is that adding deficits for intrastate jet will boost demand for AJF, but demand is not the problem. (45d-047.1)

**Comment:** The LCFS is already doing its part to encourage AJF adoption through the ability to opt in and generate credits. (45d-047.2)

**Comment:** The intent is to obligate only intrastate jet fuel but executing this will be extremely problematic. Designating refiners and importers as the first reporting entities will bring all fossil jet fuel produced in the state into the program, meaning that CARB will be regulating interstate and international commerce... The LCFS obligation must ultimately be transferred to the aircraft operators who are the only parties that could segregate and report the intrastate and exempt volumes. For multiple reasons, the segregation will be challenging to do accurately, with the likely outcome that some of the LCFS burden will be placed on jet fuel used for interstate and international flights. (45d-047.3)

**Comment:** It is likely that aircraft operators will have to create new accounting and reporting systems to accurately measure and record fuel consumption for any California intrastate leg of a flight...CARB must consider the added burden for small aircraft operators that fuel at fixed base operators. It would be impractical to expect individual aircraft owners to understand and comply with this obligation under the LCFS. (45d-047.4)

**Comment:** The minimal regulatory amendments made in this proposed rulemaking do not provide sufficient guidelines for compliance. (45d-047.5)

**Comment:** The proposed regulations require fuel importers and producers to determine (a) what is intrastate aviation and (b) how and where the purchasers (i.e. the airlines) consume jet fuel.

Fuel importers and producers cannot comply because in large part they aren't able to track where their jet fuel is consumed. Accordingly, fuel importers and producers cannot provide any information regarding what portion of their jet fuel is interstate vs. intrastate. Fuel importers and producers only know the amount of jet fuel delivered to storage facilities.

In our view, the language related to intrastate fossil jet fuel should be removed until these issues can be properly vetted. (45d-088.1)

**Comment:** We are concerned that the proposed regulations do not account for the significant infrastructure upgrades required for SAF and Jet A blending, particularly at general aviation airports. The logistics of transportation and storage for SAF, which differ from conventional jet fuel, pose additional challenges. Implementing this proposal could impose substantial operational burdens on county airports, potentially disrupting the progress toward our state's sustainable aviation future. (45d-179.1)

**Comment:** Moving forward with eliminating the fossil jet fuel exemption and implementation of a new obligation will likely result in litigation that will be lengthy, costly and do nothing to advance the mission of more SAF production and uplift...We urge CARB to reconsider and withdraw the proposal to remove the exemption for jet fuel for intrastate flights and instead preserve the existing opt-in approach for SAF and partner with the aviation sector and stakeholders across the emerging SAF ecosystem on new policies and approaches to rapidly increase the availability of SAF in California. We urge CARB to focus on the ultimate goal – how to get more SAF into planes in California by reducing barriers to production, availability and use. (45d-183.1)

**Comment:** WSPA strongly urges CARB to retain the exemption, or make aircraft operators (which include passenger airlines, aircraft cargo companies, and small aircraft owners) the First Fuel Reporting Entity...Without information on the intended use of the fuel at the time a transaction takes place, all fossil jet fuel may carry an obligation which may increase the price of jet fuels within the State. (45d-241.10)

**Comment:** CARB's proposal may therefore impermissibly burden interstate commerce in violation of the Dormant Commerce Clause doctrine. States cannot place burdens on interstate commerce that are "clearly excessive in relation to the putative local benefits." (45d-241.11)

**Comment:** CARB should remove fossil jet fuel. Otherwise, CARB should specify "intrastate" fossil jet fuel. CARB should specify "Fossil jet fuel produced or imported before 2028 or used for interstate or international flights in any year. (45d-241.49; 45d-241.55)

**Comment:** The added language should be revised to clearly state that the parameter should only include intrastate fossil jet fuel (45d-241.61)

**Comment:** SVLG is concerned that obligating jet fuel under an LCFS pathway at this time would present enormous and excessive cost implications for all airlines and airports that operate in-state, without effectively supporting production of the tools and fuels needed to reduce emissions. In turn, these cost impacts would be felt by all consumers and businesses that rely on airline services for travel and commerce. (45d-242.6)

**Comment:** The Authority respectfully asks CARB to reconsider the proposal to regulate jet fuel as an obligated fuel under the LCFS Program...This proposed change is unlikely to result in increased SAF production, availability, or use in the state, but would lead to higher jet fuel prices. (45d-247.1)

**Comment:** It bears emphasis that federal law preempts state agencies from regulating jet fuel to reduce emissions from aviation. (45d-247.2)

**Comment:** Regarding the addition of intrastate jet fuel as an obligated fuel, we echo previous concerns raised about the complexities and challenges associated with this proposal. The verification process for transactions involving this type of fuel would undoubtedly pose significant challenges, particularly given the intricate nature of traceability requirements. (45d-248.1)

**Comment:** As President of Castle & Cooke Aviation Services, Inc. headquartered at the Van Nuys Airport in Los Angeles, with 36 employees in Southern California, I am opposed to the

CARB proposal to eliminate the LCFS's current exemption of jet fuel due to the following concerns:

1. The new amendment would increase the current price of jet fuel, negatively impacting the aviation industry's economic impact.
2. Jet fuel was originally recognized by CARB as exempted. This change would increase company demerits if jet fuel were used, negatively impacting overall company goals.
3. SAF production does not match current fuel uptake rates, and this proposal would do nothing to increase SAF availability.
4. Reduction in aviation activity due to the above items could negatively impact my employment numbers reducing payroll and tax contribution to the state. (45d-260.1)

**Comment:** Jet fuel regulatory proposal

I do not agree with this change. If jet fuel is not being omitted then it will raise the prices and jet fuel is already a huge part of a budget for the airline industry thus this will raise ticket prices for customers and this will negatively impact sales. (45d-262.1)

**Comment:** I oppose the proposal to demerit jet fuel, as SAF production does not currently meet uptake and an increase in jet fuel prices will negatively impact industry, not to mention your entire state in general. Instead, I support policies that will increase the production and supply of SAF and policies that will support CARB to identify alternatives to this proposal through continued industry cooperation and communication. (45d-283.1)

**Comment:** Specifically, we ask that CARB cap carbon intensity ratings for new Sustainable Aviation Fuel (SAF) production facilities;...

CARB should consider opening a 10-year window during which time SAF refinery projects would be allowed to keep, for a period of 20 years, the CI determination made by CARB using the GREET methodology at the time of the project's Final Investment Decision (FID). To ensure the baseline CI determined at FID is continuously met, producers should agree to re-testing on a regular bi-annual cadence. By better aligning CI incentives with asset lifespans, CARB would provide the predictability necessary for securing the large-scale financing needed to jump-start this important new industry. (45d-293.1)

**Comment:** Specifically, we ask that CARB... provide equal access expansion of book and claim accounting to SAF...

We commend CARB's current policy supporting book and claim accounting for low-CI electricity and RNG inputs for low-CI hydrogen production, as well as their initiative to expand access through power purchase agreements (PPAs). Nevertheless, we advocate for equal access expansion to Sustainable Aviation Fuel (SAF). Both low-CI hydrogen and SAF play pivotal roles in displacing hard-to-electrify sectors like aviation, as outlined in the 2022 CARB Scoping Plan. However, existing LCFS rules tend to disadvantage SAF in comparison to hydrogen due to limited access to emissions reductions from process energy, such as low-CI electricity and RNG. This incongruity undermines state objectives for SAF uptake and aviation

decarbonization, necessitating CARB's intervention to ensure equitable treatment between these future fuels. (45d-293.2)

**Comment:** Specifically, we ask that CARB... leverage LCFS provisions to realize additional SAF air quality benefits beyond GhG emissions...

Furthermore, we underscore the critical importance of encouraging the long-term adoption of SAF by leveraging LCFS provisions to realize additional air quality and climate benefits. Notably, while light and medium/heavy-duty transportation are expected to electrify within decades, aviation's transition to decarbonization will be more prolonged, with SAF anticipated as the primary lever. CARB must recognize and account for the substantial positive externalities associated with SAF substitution for fossil jet fuel and devise mechanisms within the LCFS to drive SAF adoption. Additionally, considerations such as the air quality benefits of SAF, particularly in reducing fine particulate matter, must be addressed. Equally significant are the environmental justice concerns raised by communities living near airports, urging CARB's support for SAF as a means to mitigate the disproportionate health impacts of fossil jet fuel combustion. It is only through actual SAF adoption that these air quality benefits might be realized. Given these multifaceted benefits unique to SAF, we urge CARB to prioritize its utilization and explore innovative measures, such as credit multipliers or CO<sub>2</sub> equivalent metrics, to appropriately incentivize its adoption and address its distinctive contributions to climate mitigation.

... Instead, the Bay Area Council suggests CARB consider alternative incentive structures that can help close the price gap between SAF and Conventional Jet-A, alongside SAF-specific economic development programs and investments via GoBiz as previously encouraged by SB1383 and the SAF Coalition. (45d-293.3)

**Comment:** Specifically, we ask that... CARB reconsider its proposal to regulate fossil jet fuel for intrastate flights.

...

In addition, The Bay Area Council also expresses serious concern with a new proposal by the California Air Resources Board (CARB) to regulate "fossil jet fuel used for intrastate flights" as an obligated fuel under the LCFS Program. We do not believe this proposed change would result in increased SAF production, availability, or use in California, but it would lead to higher jet fuel prices. The primary barrier 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. The CARB proposal would not address this fundamental challenge or otherwise meaningfully increase SAF supply or use. ...

Additionally, the intra-state flight proposal seeks to regulate jet fuel and reduce emissions from aviation, both of which are pre-empted under federal law - a fact that CARB recognized when it exempted jet fuel in 2018. Aviation has unique demands for reliability and consistency with approved fuel specifications for the safe operation and maintenance of aircraft. Accordingly, while the EPA is the primary federal regulator for on-highway, non-road, and marine fuels, under 42 U.S.C. § 7545, the FAA has the authority to establish standards for composition and chemical or physical properties of jet fuel or to eliminate aircraft emissions (49 U.S.C. § 44714). The FAA retains federal jurisdiction over such fuels even if used for intrastate flights.

These statutory authorities establish clear and broad federal authority for regulating jet fuel and aircraft engine emissions that pre-empts California from regulating fossil jet fuel under the LCFS program. We ask that CARB reconsider this aspect of the proposed regulation and maintain the exemption for jet fuel from regulation under the LCFS program. (45d-293.4)

**Comment:** With this context, we express our serious concern with the proposal by CARB to regulate jet fuel used for flights within California as an obligated fuel under the LCFS Program. This proposal to obligate jet fuel would be unlikely to result in increased SAF production, availability, or use in California, but would lead to higher jet fuel prices and slow down rather than accelerate efforts to increase SAF production and use in California. 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. In addition, the long permitting processes for constructing SAF production facilities is a major impediment to growing overall production capacity in California, a necessary step to achieve California's goals.

...

1. The proposal to remove the exemption for conventional jet fuel is unlikely to lead to increased SAF production, availability, or use

The proposal to remove the exemption for conventional jet fuel for flights within California is unlikely to result in increased SAF production, availability, or use in California, but is likely lead to higher jet fuel prices. Given the higher cost of SAF compared to other regulated fuels, such as renewable diesel, producers and importers are most likely to buy credits generated from other fuels, rather than produce SAF to address the deficits generated by conventional fuels used on flights within California. Fuel producers will continue to prioritize renewable diesel production instead of SAF. As a result, the removal of the exemption for conventional jet fuel is unlikely to materially change the SAF production relative to the status quo. In fact, the deficits created by intrastate jet fuel likely will be retired primarily by renewable diesel and other road transport related credits. Obligating jet fuel will lead to the increased price of jet fuel, diverting resources that might have gone for SAF purchase and use towards renewable diesel production instead.

The relationship between deficit generation and credit generation is unchanged by the CARB proposal. Under the structure of the LCFS program, deficits are created for fuel producers from specific conventional fuels delivered into California as identified and defined by the program. These deficits form a common pool that can be retired with credits from any type of eligible fuel. But there is no requirement for a relationship between the type of fuel that created the deficit and the type of credit that retires that deficit. To illustrate this situation, one must only look at which fuels generate deficits in the current program, and which alternative fuels receive the credit benefits. In the current program, CARBOB (gasoline) generates 85% of the deficits, but gasoline alternatives (i.e. ethanol and EV related credits) receive only 40% of the credits. Diesel, on the other hand, generates only 14% of the deficits, but receives 44% of the credits.

Share of LCFS Program deficits and credits by fuel type for 2022 calendar year<sup>5</sup>

	CARBOB (Gasoline)	Diesel	Jet
Share of Total Deficits by Source	85%	14%	0%
Share of Credits by Fuel Alternative	40% (24% Electric, 16% ethanol)	44% (36% Renewable Diesel, 8% Biodiesel)	<1% (Alternative Jet Fuel)

<sup>5</sup> A4A analysis of LCFS Program Quarterly Data Spreadsheet, available at [https://ww2.arb.ca.gov/sites/default/files/2023-10/quarterlysummary\\_Q22023.xlsx](https://ww2.arb.ca.gov/sites/default/files/2023-10/quarterlysummary_Q22023.xlsx)

Very few (<1%) AJF credits are generated because of the relatively higher cost of AJF compared to renewable diesel, not because of the absence of conventional jet fuel deficits. The relative cost of the fuels that can generate credits will be unchanged by the CARB proposal and therefore the relative supply and demand for renewable diesel and AJF credits is also unlikely to change. The LCFS proposal is likely to undermine the critical need to rapidly scale up production and use of SAF in order to meet ambitious government and aviation sector climate goals, including California's own ambitions for aviation within the state.

Also, regarding implementation, the proposal identifies producers as the First Fuel Reporting Entity for jet fuel but does not provide any information for how Reporting Entities would determine the volume of jet fuel used for flights within California. Data on jet fuel usage for flights within California is not currently collected or readily available and reporting entities would not be able to accurately measure and report on jet fuel used for intrastate flights across all types of operators – commercial, business, and general aviation. CARB's proposal is therefore completely unworkable and cannot be complied with in its current form. (45d-299.1)

**Comment:** The CARB proposal would not address these fundamental challenges or otherwise meaningfully increase SAF supply or use. And because the proposal will not meaningfully increase SAF supply, the local air quality benefits attributed to increased SAF use as a result of eliminating the intrastate jet fuel exemption are overstated.

...

The air quality benefits attributed to the intrastate jet fuel obligation are inaccurate and overstated.

A4A and its members concur with CARB's assessment that SAF has the potential to provide local air quality (LAQ) benefits (compared to conventional jet fuel) near airports. Significant academic and industry research has been conducted, including full scale static engine tests and flight tests have demonstrated lower Sulphur Oxides (SOx) and Particulate Matter (PM) emissions from SAF compared to conventional fossil jet fuel. However, we disagree with CARB's analysis and presentation of future LAQ levels that implies reductions in jet fuel related LAQ emissions resulting from the proposed intrastate jet fuel obligation. In addition, we recommend CARB review its model for jet fuel LAQ emissions as it does not appear to reflect



the current scientific consensus. This analysis is so fundamental to CARB's proposal that it deserves an accurate and more robust study of the available facts.

As described in earlier sections of this document, the proposal to remove the jet fuel exemption is unlikely to stimulate additional SAF production, with producers most likely using credits generated by other fuels to satisfy the jet fuel obligation. Further, whatever increases in SAF production occur over the forecast time period will be the result of all economic levers: federal incentives<sup>6</sup>, LCFS incentives, LCFS deficit generation, and operator contributions. Attributing all SAF increase to only LCFS deficit generation is a misattribution of benefit of the proposed obligation. Therefore, claims of PM and NOx reduction from SAF use as a result of the intrastate jet fuel proposal are greatly overstated. LAQ emissions reduction will only occur when and where SAF is actually used in significant quantities.

<sup>6</sup> See ISOR p. 55, IRA tax credits are included in baseline scenario

In addition, we note that CARB's analysis of the benefits of LAQ emissions resulting from the use of SAF is based on a single series of tests conducted by NASA in 2009 and reported on in 2011<sup>7</sup>. CARB's interpretation of the results from this test identified that "Alternative jet fuel emits 87.4% the NOx and 55% the PM2.5 that fossil jet fuel emits." Additional research has been conducted since 2009 and the scientific consensus differs significantly from what CARB has modeled. The Airport Cooperative Research Program analyzed the body of research available in 2018 and concluded that SAF minimally reduces or has no effect on NOx. The body of research and summary analysis does verify that potential reductions in SOx and PM emissions are significant, similar to CARB's assumptions, and generally proportional to the SAF blend percentage as combusted in the engine.<sup>8</sup> We recommend CARB review its Methodology for Estimating Changes in Criteria Pollutant Emissions from Use of Alternative Jet Fuel for AJF emissions and update to current scientific consensus.

<sup>7</sup> See ISOR Appendix C-1, Sec VI, p. B-6

<sup>8</sup> See <https://nap.nationalacademies.org/download/25095>

[https://onlinepubs.trb.org/onlinepubs/acrp/acrp\\_wod\\_41Factsheet.pdf](https://onlinepubs.trb.org/onlinepubs/acrp/acrp_wod_41Factsheet.pdf)

(45d-299.2)

**Comment:** In addition to not being an effective policy tool to increase SAF production, the CARB proposal to regulate jet fuel is pre-empted by federal law, a fact that CARB recognized when it exempted jet fuel from the LCFS in 2018.<sup>4</sup> It is critically important that uniform federal rules apply to aviation and aviation fuels, under the Supremacy Clause of the U.S. Constitution. The CARB proposal seeks to regulate jet fuel and reduce emissions from aviation through such regulation, both of which are pre-empted under federal law, as described in further detail below. In light of the clear and broad federal authority for regulating jet fuel and aircraft engine emissions, California is pre-empted from regulating jet fuel under the LCFS.

<sup>4</sup> CARB stated that "[s]ubjecting aircraft fuels to annual carbon intensity standards would raise federal preemption issues" available at

[https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/lcfs18/isor.pdf?\\_ga=2.259407882.1202437490.1641231788-253234234.1573227006](https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/lcfs18/isor.pdf?_ga=2.259407882.1202437490.1641231788-253234234.1573227006)

...

The proposal to remove the exemption for jet fuel used on flights within California is pre-empted by Federal Law.

### CARB's Previous Recognition of Federal Preemption

Conventional Jet Fuel (CJF), which is defined in section 95481(a)(33) of the LCFS regulation, is currently exempt from the LCFS Program through section 95482(c)(2). When CARB proposed and then finalized this exemption as part of the 2018 LCFS rulemaking, CARB stated, correctly, that “[s]ubjecting aircraft fuels to annual carbon intensity standards would raise federal preemption issues.”<sup>9</sup> CARB then pointed out that it “has the authority to amend the LCFS regulations to create incentives to promote the use of low carbon fuels in aircraft by allowing credit for such fuels. Importantly, by promoting the voluntary production and use of alternative jet fuel, CARB would not be regulating aircraft fuels, but rather would simply be creating opportunities for airlines to better support California’s GHG objectives.”<sup>10</sup> A4A fully supported CARB’s continuation of the non-deficit generating status of CJF (which was originally set forth in section 95480.1(d)(1) of the LCFS regulation before being moved to section 95482(d)(4)) and its inclusion of AJF as a credit-generating fuel under the LCFS Program on a voluntary, opt-in basis.<sup>11</sup>

<sup>9</sup> See Staff Report on Public Hearing on Proposed Amendments to LCFS, CARB at III-30 (Mar. 6, 2018) [https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/lcfs18/isor.pdf?\\_ga=2.259407882.1202437490.1641231788-253234234.1573227006](https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/lcfs18/isor.pdf?_ga=2.259407882.1202437490.1641231788-253234234.1573227006) at III-30.

<sup>10</sup> *Id.*

<sup>11</sup> We incorporate by reference the comments we filed during the 2018 LCFS rulemaking, “Comments on the 2018 Amendments to the Low Carbon Fuel Standard” (April 23, 2018), and “Airlines for America’s Comments on Proposed Modifications to the Proposed Revisions to the Low Carbon Fuel Standard (LCFS) Regulation” (July 5, 2018).

The exemption in section 95482(c)(2) is expansive and encompasses all CJF, whether used in intrastate flights or any other flights taking off from California airports. Nothing has changed since the 2018 LCFS rulemaking, meaning California, like every other state in the country, continues to be federally preempted from regulating jet fuel irrespective of a flight’s destination. Put another way, CARB remains subject to federal law that clearly preempts any authority other than the Federal Aviation Administration (FAA) from regulating aviation fuel, and CARB is compelled to maintain the scope of 95482(c)(2) to include CJF used for intrastate flights.

### Preemption Under the Clean Air Act and the Federal Aviation Act

Federal law has for many decades made clear that the FAA has exclusive jurisdiction over jet fuel and that states are expressly preempted from adopting and enforcing fuel standards for aircraft:

The Administrator of the [FAA] shall prescribe-

(1) standards for the composition or chemical or physical properties of an aircraft fuel or fuel additive to control or eliminate aircraft emissions the Administrator of the Environmental Protection Agency decides under section 231 of the Clean Air Act (42 U.S.C. 7571) endanger the public health or welfare; and

(2) regulations providing for carrying out and enforcing those standards.<sup>12</sup>

<sup>12</sup> See 49 U.S.C. § 44714 (“Aviation fuel standards”).

Congress added this provision to the Federal Aviation Act of 1958 in conjunction with its adoption of Sections 231-234 of the Clean Air Amendments of 1970. Taken together, those complementary legislative enactments manifested an express Congressional intent that federal regulation alone was govern the regulation of aircraft emissions.<sup>13</sup>

<sup>13</sup> See Conf. Rep. No. 1783, 91st Cong. 2nd Session (1970) (“The states were preempted from adopting or enforcing any emissions control standard with respect to aircraft or aircraft engines to which federal standards would apply”).

That express intent with respect to the aircraft fuel and emissions must be read in the broader context of federal preemption of the field of aircraft regulation that has been legislated by Congress and embraced by the courts. As the Supreme Court has held, it is well-settled that the Federal Aviation Act of 1958 creates a “uniform and exclusive system of federal regulation” of aircraft that preempts state and local regulation.<sup>14</sup> This recognizes the critical importance of ensuring aircraft operations are not subject to a patchwork of state and local laws. It also recognizes the critical importance that maintaining the integrity of aviation fuel has to maintaining the safety of aircraft operations. Quite simply, Congress recognized the need to ensure the FAA had sole and exclusive authority to regulate aviation fuels.

<sup>14</sup> See *Burbank v. Lockheed Air Terminal, Inc.*, 411 U.S. 624, 639 (1973); see also *American Airlines v. of Transp.*, 202 F.3d 788, 801 (5th Cir. 2000) (aviation regulation is an area where “[f]ederal control is intensive and exclusive”) (quoting *Northwest Airlines, Inc. v. Minnesota*, 322 U.S. 292, 303 (1944)).

As a corollary of the federal government’s express and exclusive authority with respect to the regulation of aviation fuel, Section 233 of the Clean Air Act explicitly preempts states and their political subdivisions from “adopt[ing] or attempt[ing] to enforce any standard respecting emissions from any aircraft or engine thereof unless such standard is identical to a standard” established under section 231,<sup>15</sup> which requires that the FAA be consulted on any aircraft engine emission standards proposed by the U.S. Environmental Protection Agency (EPA).<sup>16</sup>

<sup>15</sup> See 42 U.S.C. § 7573; 40 C.F.R. § 87.3(d).

<sup>16</sup> 40 C.F.R. § 87.3(a) (EPA emission standards “apply to engines on all aircraft that are required to be certificated by FAA”). Aircraft and engine certification is the exclusive domain of the FAA. Thus, any state regulation that interferes with EPA’s emissions standards for aircraft engines also interferes with FAA’s authority.

EPA, for its part, has openly acknowledged that FAA has exclusive authority over aviation fuel. In a 2012 response to a rulemaking petition requesting that EPA address the lead content of fuel used in piston-engine general aviation aircraft, EPA explained as follows:

EPA has no direct authority on setting . . . aviation fuel specifications by regulation. Rather, FAA has authority to prescribe standards for the composition or chemical or physical properties of aircraft fuels to control or eliminate aircraft emissions. 49 U.S.C. § 44714. However, under current practice, these specifications are not set directly by government regulation. Rather, FAA indirectly regulates aircraft fuel by specifying that fuel meeting specifications identified by the aircraft engine manufacturer as part [of] the engine type certificate . . . must be used by the operator as a condition of operating the aircraft under its type certificate. Thus, while EPA has an interest in environmentally compatible fuels, our direct role here is limited to setting an engine emission standard under [Clean Air

Act] section 231 that can be met, within appropriate leadtime, with the development and application of requisite technology, giving appropriate consideration to the cost of compliance and to safety and noise factors.<sup>17</sup>

17 See EPA, *Memorandum in Response to Petition Regarding Lead Emissions from General Aviation Aircraft Piston-Engines*, at 16 (July 18, 2012) (footnote omitted) (emphasis added), available at <https://www.epa.gov/sites/default/files/2016-09/documents/ltr-response-av-ld-petition.pdf>; see also 75 Fed. Reg. 22440, 22441 (Apr. 28, 2010) (“Under the [Clean Air Act], if, in the Administrator’s judgment, lead emissions from the use of leaded avgas cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare, then EPA would be required under our statutory authority to prescribe standards to control the emissions of lead from piston-engine aircraft. In promulgating such standards, the EPA would be required to consult with the [FAA], and could not change standards if doing so would significantly increase noise and adversely affect safety. FAA would then be required, after consultation with EPA, to prescribe regulations to [e]nsure compliance with any standards to control the emissions of lead from piston-engine aircraft. **Under 49 U.S.C. 44714, FAA would also be required to prescribe standards for the composition or chemical or physical properties of piston-engine fuel or fuel additives to control or eliminate aircraft lead emissions.**”) (emphasis added); *id.* At 22445-46 (“**fuels used exclusively in aircraft engines are to be regulated by the FAA**”) (emphasis added); National Academies of Sciences, Engineering, and Medicine, *State and Federal Regulations That May Affect Initiatives to Reduce Airports’ GHG Emissions*, at 15 (2012) (footnote omitted) (“EPA’s authority to establish [aircraft emission standards] under the [Clean Air Act] does not extend to the regulation of jet fuel. Rather, FAA has exclusive authority to prescribe ‘standards for the composition or chemical or physical properties of an aircraft fuel or fuel additive to control or eliminate aircraft emissions’ for pollutants EPA has found endanger the public health and welfare”), available at [https://www.nap.edu/cart/download.cgi?record\\_id=22671](https://www.nap.edu/cart/download.cgi?record_id=22671).

In accordance with the legislative directives of CAA Section 231 (requiring the EPA Administrator to issue regulations for aircraft engine emissions) and Section 232(a) (granting the Secretary of Transportation authority to enforce standards issued under Section 7571) both EPA and FAA have issued regulations exercising their exclusive authorities in this space.<sup>18</sup> There is no language in those regulations suggesting an exemption that would allow California or any other state to regulate fuel content, nor has any court decision recognized the same.

<sup>18</sup> See notes 14 and 15, *supra*. FAA has issued regulations under 49 U.S.C. § 44714, set forth at 14 CFR Part 34.

For aviation fuel, 14 CFR § 34.3 sets forth the uniform “General Requirements” for that fuel. As explained above, that regulation contemplates FAA setting standards in consultation with EPA as the federal agency with expertise in this area. States, however, are not involved, reflecting the legislative intent for uniform federal regulation. Further, the LCFS is not identical to any fuel standard that has been adopted by EPA and FAA under the auspices of Sections 231 and 233 of the CAA and the Federal Aviation Act. Extending its reach to aviation fuel is therefore not excused from preemption.

### The Federal Aviation Act Preempts State Regulation of Aircraft Operations

Extending the reach of the LCFS to jet fuel would impose a regulatory mandate of aircraft operations. California is both expressly precluded from regulating aircraft fuels, and the Federal Aviation Act more broadly preempts the field of aviation regulation so as to preclude applying the LCFS to aircraft operations. See *City of Burbank*, 411 U.S. at 634 (explaining that the *pervasive* nature of federal regulation evidences Congress' preemptive intent). Congress recognized that the airline industry is a uniquely complex, interconnected system in which even the slightest disruption can have ripple effects that disrupt the functioning of the National Airspace System and interstate commerce.

Indeed, with respect to operational mandates there is no "minor" encroachment in the aviation industry—any state interference with airlines' operations has the potential to cause chaos at a national or international level. *Northwest Airlines v. State of Minnesota*, 322 U.S. 292, 303 (1944) ("Planes do not wander about in the sky like vagrant clouds. They move only by federal permission, subject to federal inspection, in the hands of federally certified personnel and under an intricate system of federal commands. The moment a ship taxis onto a runway it is caught up in an elaborate and detailed system of controls. It takes off only by instruction from the control tower, it travels on prescribed beams, it may be diverted from its intended landing, and it obeys signals and orders. Its privileges, rights, and protection, so far as transit is concerned, it owes to the Federal Government alone and not to any state government").

This concern prompted Congress to vest FAA with sole, exclusive authority to regulate airline operations. As the court explained in *Arapahoe County Public Airport Authority v. Federal Aviation Administration*, 242 F.3d 1213, 1221 (10th Cir. 2001), it is "difficult to visualize a more comprehensive scheme of combined regulation, subsidization, and operational participation than that which Congress has provided in the field of aviation") (citations omitted). ("Congress' clear intent to occupy the field with respect to the airline industry "tilts the balance toward the application of supremacy principles to protect against state courts trumping the federal interests and concerns") *Id.*; see also *English v. General Electric Co.*, 496 U.S. 72, 79 (1990) ("in the absence of explicit statutory language, state law is pre-empted where it regulates conduct in a field that Congress intended the Federal Government to occupy exclusively").

#### Extending the LCFS to Aviation Fuels Would be Preempted by the Airline Deregulation Act

California's proposal would interfere with airlines' prices, routes, and services, and is therefore preempted under the Airline Deregulation Act (ADA). Under the ADA, states are expressly forbidden from interfering with airlines' prices, routes, and services. The ADA provides that "[a] State, political subdivision of a State, or political authority of at least 2 States may not enact or enforce a law, regulation, or other provision having the force and effect of law related to a price, route, or service of an air carrier." 49 U.S.C. § 41713(b).

This is an expansive prohibition and federal courts have consistently struck down laws that even minimally encroach on the aviation industry. *Rowe v. New Hampshire Motor Transport Association*, 552 U.S. 364 (2008). Congress' goal in passing the ADA was to avoid inefficient regulation of the airline industry and to allow market demands to drive airlines' competitive decisions. *Federal Express Corp. v. California Public Utilities Commission*, 936 F.2d 1075, 1075, 1079 (9th Cir. 1991) (explaining that Congress preempted state regulation of the airline industry to create a "sound regulatory environment" and to "facilitate adaptation of the air transportation system to the present and future needs of the domestic and foreign commerce

of the United States). By including these specific statutory preemption provisions, Congress sought to ensure the ADA purposes and avoid the effect of a balkanized system of local laws and a patchwork of regulatory regimes at odds with a national objective of deregulating air commerce. *Ventress v. Japan Airlines*, 747 F.3d 716 (9th Cir. 2014).

California's proposed LCFS expansion would cause disruptions that would impermissibly interfere with airlines' operations, including but not limited to:

- Forcing airlines to alter their methods of tracking fuel supply sources and uses.
- Forcing airlines to potentially alter the amount of fuel carried by planes involved in intrastate trips.
- Forcing airlines to restructure their supply chain based on California's regulatory CI metric, rather than based on the demands of the marketplace.

All of these effects will have impacts on airlines' prices, routes, and services. They are all far more disruptive to airlines' methods of service than other state regulations that have been struck down, such as the signature requirement for packages at issue in *Rowe*. 552 U.S. 364. They will also affect airlines' prices because disruptions to the supply chain and the larger market will raise costs for airlines, and those costs will inevitably be passed on to consumers.<sup>19</sup>

<sup>19</sup> While the ADA does not prevent a state that owns or operates an airport from carrying out its proprietary powers and rights (49 U.S.C. § 41713(b)(3)), the regulation of jet fuel does not fall within said powers, and 49 U.S.C. § 44714 recognizes no exception to its express preemptive language. *see also Arapahoe County*, 242 F.3d at 1221-22 (explaining the interactions of FAA's preemptive authority and the "proprietary powers" exception).

Any argument that the economic impact from the rule will be felt by fuel producers, not airlines themselves, is also misplaced. Higher costs for fuel producers will be passed on to the airlines and it is beyond dispute that higher costs translate into higher prices. "It is freshman-year economics that higher prices mean lower demand, and that consumers are sensitive to the full price that they must pay, not just the portion of the price that will stay in the seller's coffers." *Sanchez*, 590 F.3d 1027 at 1030 (citing *Buck v. Am. Airlines, Inc.*, 476 F.3d 29, 36 (1st Cir. 2007)).

### CARB's Program in its Current Form Would Violate the Commerce Clause

CARB's Program also is not in conformity with the Dormant Commerce Clause. Courts have refused to enforce state regulations with the type of burdens that are proposed here on instrumentalities of interstate transportation—trucks, trains, and the like. *See, e.g., Bibb v. Navajo Freight Lines, Inc.*, 359 U. S. 520, 523–530 (1959) (concerning a state law specifying certain mud flaps for trucks and trailers); *Southern Pacific Co. v. Arizona ex rel. Sullivan*, 325 U.S. 761, 763–782 (1945) (addressing a state law regarding the length of trains).<sup>20</sup>

<sup>20</sup> *See generally National Pork Producers Council et al. v. Ross*, 598 U.S. 356, 373 (May 11, 2023); *see also id.* at 389 n.4 (dormant Commerce Clause protects the instrumentalities of transportation from state regulation).

These cases support a prohibition on state regulations that impose improper or discriminatory extraterritorial burden, and apply a balancing of legitimate interests which has not been undertaken here. At a minimum, these cases condemning state laws that "although neutral on their face . . . were enacted at the instance of, and primarily benefit," in-state interests. *Raymond Motor Transp., Inc. v. Rice*, 434 U. S. 429, 447 (1978). These concerns predominate

where preemption also applies state regulation of the entire field of aviation operations and fuels, and where a lack of national uniformity would impede the flow of interstate goods. (45d-299.3)

**Comment:** We urge CARB to reconsider and withdraw the proposal to remove the exemption for jet fuel for intrastate flights and instead preserve the existing opt-in approach for SAF and partner with the aviation sector and stakeholders across the emerging SAF ecosystem on new policies and approaches to address the underlying challenges which could rapidly increase the availability and use of SAF in California. We encourage further dialog on this point to find a mutually acceptable path forward. (45d-299.4)

**Comment:** Concerns about SAF producer's ability to source low-carbon intensity electricity and hydrogen produced from low-carbon intensity electricity through indirect accounting

Under the existing LCFS Regulation, indirect accounting (aka book-and-claim accounting) is authorized for low-CI electricity supplied as a transportation fuel or to produce hydrogen through electrolysis if that hydrogen is used either as a transportation fuel or in the production of another transportation fuel (e.g., SAF). Through these provisions, SAF production facilities are explicitly authorized to source low-CI electricity from the grid to produce hydrogen that is used in the production of transportation fuels. Under the existing LCFS provisions, low-CI electricity can be sourced flexibly through the use of Renewable Energy Certificates (RECs) or via a qualifying Green Tariff program.

The proposed LCFS program revisions would dramatically narrow the power-sourcing landscape for SAF producers and limit the use of "Indirect Accounting" for "low-CI Electricity" to produce "Hydrogen as a transportation fuel." The proposed amendments would revoke the current authorization to source low-CI electricity for electrolysis through the REC mechanism when used for SAF production.

CARB's proposal will particularly and 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 attract PtL SAF, and CARB's proposal will encourage PtL SAF producers that utilize indirect accounting for the sourcing of low-CI electricity in their production to sell their fuels into those jurisdictions. 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.

We recommend CARB preserve its existing policy allowing use of indirect accounting mechanisms for low-CI electricity that is used for hydrogen production in the production of a transportation fuel. We also recommend that CARB expand the use of its existing indirect accounting mechanisms to extend the use of book-and-claim RECs to facilities sourcing power to produce SAF, PtL and other alternative fuels. (45d-299.6)

**Comment:** World Energy sees alignment between the staff proposal to include intrastate jet fuel under the provisions of the LCFS and the goals of the program, which are to abate climate impacts from the state's transportation sector. As AJF continues to develop and grow in the state, including incentives within the LCFS will only serve as encouragement for increasing

production of AJF. World Energy is hopeful that it will foster additional growth in the use of AJF as a low-CI alternative for aviation in California. (45d-300.4)

**Comment:** As members of the aviation industry, we are writing to share our serious concern and opposition to the recent California Air Resources Board (CARB) proposal to regulate jet fuel under its Low Carb Fuel Standard (LCFS) Program. We believe the CARB proposal will raise the cost of jet fuel without inducing additional Sustainable Aviation Fuels (SAF) production or use in California, an objective the aviation industry shares with CARB.

...

With this context, we express our serious concern with the proposal by CARB to regulate jet fuel used for flights within California as an obligated fuel under the LCFS Program. This proposed change would be unlikely to result in increased SAF production, availability, or use in California, but would lead to higher jet fuel prices and slow down, rather than accelerate, efforts to increase the state's SAF production and use. 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. The CARB proposal would not address this fundamental challenge or otherwise meaningfully increase SAF supply or use. (45d-309.1)

**Comment:** And further, the proposal to regulate jet fuel is pre-empted by federal authority.

...

In addition to not being an effective policy tool to increase SAF production, the proposal seeks to regulate jet fuel and reduce emissions from aviation, both of which are preempted under federal law, a fact that CARB recognized when it exempted jet fuel from the LCFS in 2018.<sup>2</sup> Aviation, unlike many other industries, is uniquely situated in that other factors such as the safe operation and maintenance of aircraft are of great importance, which the federal government has recognized in the jurisdiction of the FAA and the EPA's Clean Air Act.

<sup>2</sup> CARB stated that "[s]ubjecting aircraft fuels to annual carbon intensity standards would raise federal preemption issues" *available at*

[https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/lcfs18/isor.pdf?\\_ga=2.259407882.1202437490.1641231788-253234234.1573227006](https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/lcfs18/isor.pdf?_ga=2.259407882.1202437490.1641231788-253234234.1573227006)

(45d-309.2)

**Comment:** We encourage CARB to withdraw the proposal to regulate jet fuel and instead establish a joint CARB-industry working group to explore alternative solutions to increase SAF production and use.

...

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 urge CARB to reconsider and withdraw the proposal to remove the exemption for jet fuel for intrastate flights, preserve the existing opt-in approach for SAF, and 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. (45d-309.3)

**Comment:** Strengthening the annual carbon intensity benchmarks in the aviation sector as proposed may not be as effective as maintaining the current higher carbon intensity standard. (45d-386.1)

**Comment:** Although we recognize how these proposed regulations support the State's broader goals for sustainability and environmental protection, the proposal to regulate jet fuel usage presents several challenges that could disproportionately affect county airports. Many county airports are not equipped with the infrastructure necessary for Sustainable Aviation Fuel (SAF) and Jet A blending, nor do they have the financial resources to undertake such significant upgrades. Implementing these upgrades will negatively impact their operations and services, exposing them to be in violation of federally mandated grant assurances and Federal Aviation Administration (FAA) policy.

We recognize and appreciate California's leadership in adopting SAF. However, we are concerned that the proposed regulations do not account for the significant infrastructure upgrades required for SAF and Jet A blending, particularly at general aviation airports. The logistics of transportation and storage for SAF, which differ from conventional jet fuel, pose additional challenges. Implementing this proposal could impose substantial operational burdens on county airports, potentially disrupting the progress toward our state's sustainable aviation future.

County airports play a vital role in the state transportation system and support numerous ancillary industries, it is imperative to consider the operational implications of this regulation carefully, not to mention the risk of losing federal entitlement monies by being in violation of federal grant assurance policies. We must avoid creating an aviation environment within our State where regulatory compliance costs undermine the viability of county airports. County airports are a vital part of the transportation system and delivery of emergency fire services in communities across California.

We urge CARB to reconsider this proposal, given the unique circumstances of county general aviation airports. Instead of a one-size-fits-all approach, we advocate for a strategy that includes grants for infrastructure upgrades and a phased implementation plan that allows county airports to transition to SAF usage without compromising their federal obligations and operational or financial stability.

In conclusion, we respectfully request that CARB preserve the existing opt-in approach for SAF, collaborate with county airports to address the complexities of SAF integration and focus on realistic policies that facilitate a smooth transition to a greener aviation future in California. (45d-396.1)

**Comment:** 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. 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. The CARB proposal would not meaningfully address this fundamental challenge and therefore unlikely to meaningfully increase SAF supply or use. (45d-397.1)

**Comment:** The proposal seeks to regulate jet fuel and reduce emissions from aviation, both of which are pre-empted under federal law a fact that CARB recognized when it exempted jet fuel in 2018.<sup>2</sup> Aviation has unique circumstances, that go beyond considerations of interstate commerce, for the sale operation and maintenance of aircraft that the federal government has recognized in the EPA's Clean Air Act and the jurisdiction of the FAA. These statutory authorities establish clear and broad federal authority for regulating jet fuel and aircraft engine emissions that pre-empts California from regulating jet fuel under the LCFS program.

<sup>2</sup> CARB stated that "[s]ubjecting aircraft fuels to annual carbon intensity standards would raise federal preemption issues" *available at*

[https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/lcfs18/isor.pdf?\\_ga=2.259407882.1202437490.1641231788-253234234.1573227006](https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/lcfs18/isor.pdf?_ga=2.259407882.1202437490.1641231788-253234234.1573227006)

Moving forward with eliminating the fossil jet fuel exemption and implementation of a new obligation will likely result in litigation that will be lengthy, costly and do nothing to advance the mission of more SAF production and uplift. Engaging in litigation will divert resources from the state and aviation industry that would be better spent enabling greater SAF production. 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.

Based on these considerations, we urge CARB to reconsider and withdraw the proposal to remove the exemption for jet fuel for intrastate flights and instead preserve the existing opt-in approach for SAF and partner with the aviation sector and stakeholders across the emerging SAF ecosystem on new policies and approaches to rapidly increase the availability of SAF in California. We urge CARB to focus on the ultimate goal – how to get more SAF into planes in California by reducing barriers to production, availability and use. (45d-397.2)

**Comment:** Guardrails for crop-based biofuels are threatened by Sustainable Aviation Fuels

A recent National Academy of Sciences paper on life cycle assessments highlighted the critical importance of evaluating scale when assessing different transportation fuels.<sup>15</sup> The proposed amendments open the door for the inclusion of Sustainable Aviation Fuels (SAF) for flights within the state of California. The future of the SAF market is highly speculative. The World Resources Institute estimates that to meet the Energy Department's stated goal on SAF it would require an additional 114 million acres of corn, 20% more than current corn acreage.<sup>16</sup> This type of major expansion in corn production would have a profound effect on land use change. We urge CARB to consider the impact of the additional inclusion of SAFs within the LCFS credit system for California and land use emissions in other states and countries.

<sup>15</sup> <https://www.nationalacademies.org/our-work/current-methods-for-life-cycle-analyses-of-low-carbon-transportation-fuels-in-the-united-states>

<sup>16</sup> <https://www.wri.org/insights/us-sustainable-aviation-fuel-emissions-impacts#:~:text=If%20the%20U.S.%20were%20to,United%20States%20for%20all%20purposes>

(Apr-010.9)

**Comment:** Chevron opposes the proposal to assign deficits to fossil jet fuel used for intrastate flights in California. Because these new deficits can be met with credits from any lower-CI fuel, we do not believe this proposal will achieve the intended goal of increasing the use of alternative jet fuel (AJF). It will instead create a complex and impractical compliance framework that will increase the cost of air travel and affect interstate and international flights as well. We recommend that CARB remove this proposal from the rulemaking and consider other ways to incentivize AJF production and consumption. (Apr-34.5)

**Comment:** If CARB intends to retain this proposal, it is critical that a technical workshop be held to address the issues with the proposed regulatory amendments. As written, there is no realistic path to compliance. (Apr-34.6)

**Comment Summary:** In response to the workshop held April 10th, 2024, the airlines are writing to share and restate their serious concern and opposition to the recent California Air Resources Board (CARB) proposal to regulate conventional jet fuel under its Low Carb Fuel Standard (LCFS) Program. They believe the CARB proposal will raise the cost of conventional jet fuel without inducing additional Sustainable Aviation Fuels (SAF) production or use in California, an objective the aviation industry shares with CARB. And further, the proposal to regulate jet fuel is pre-empted by federal law. They encourage CARB to withdraw the proposal to regulate conventional jet fuel and instead establish a joint CARB-industry working group to explore alternative solutions to increase SAF production and use.

The airline industry is committed to reducing its environmental impact and achieving net zero greenhouse gas (GHG) emissions by 2050 without relying on the use of voluntary carbon offsets. Transitioning to SAF is core to this commitment. They have long recognized that scaling up the supply of SAF and achieving net zero GHG 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 outsized economic impact relative to its share of emissions. The United States civil aviation firms employ more than 380,000 California-based employees, with an overall economic impact of \$194 billion.<sup>1</sup> 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.

<sup>1</sup> The Economic Impact of Civil Aviation on the U.S. Economy, State Supplement, US Department of Transportation, November 2020

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. This has enabled United Airlines to purchase SAF in California since 2016. 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 re-stated that a principle objective of its regulatory proposal is to “Increase the use of alternative jet fuel in the State”. They share that objective as reflected in their company commitment to net zero GHG emissions by 2050 and their US airline industry support for the US government’s SAF Grand Challenge. The airline industry has 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.

With this context, they express our serious concern with the proposal by CARB to regulate jet fuel used for flights within California as an obligated fuel under the LCFS Program. The proposal to eliminate the exemption for jet fuel used on intrastate flights would not result in significantly increased SAF production, availability, or use in California, but would lead to higher jet fuel prices and slow down, rather than accelerate, efforts to increase the state’s SAF production and use. 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. As the proposal does not provide a mechanism to reduce the economic disadvantage of alternative jet fuel, it will have no material impact on the availability or use of alternative jet fuel in California.

In addition to not being an effective policy tool to increase SAF production, the proposal seeks to regulate jet fuel and reduce emissions from aviation, both of which are preempted under federal law, a fact that CARB recognized when it exempted jet fuel from the LCFS in 2018.<sup>2</sup> Aviation, unlike many other industries, is uniquely situated in that other factors such as the safe operation and maintenance of aircraft are of great importance, which the federal government has recognized in the jurisdiction of the FAA and the EPA under the Clean Air Act.

<sup>2</sup> CARB stated that “[s]ubjecting aircraft fuels to annual carbon intensity standards would raise federal preemption issues” *available at*

[https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/lcfs18/isor.pdf?\\_ga=2.259407882.1202437490.1641231788-253234234.1573227006](https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/lcfs18/isor.pdf?_ga=2.259407882.1202437490.1641231788-253234234.1573227006)

Their 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. Only actual SAF use – not merely the creation of jet fuel deficits – will provide the benefits of SAF desired by CARB, airport communities, SAF producers, and airlines. They urge CARB to reconsider and withdraw the proposal to remove the exemption for jet fuel for intrastate flights, preserve the existing opt-in approach for SAF, and 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. They look forward to working with CARB on such measures to accelerate SAF deployment. (Apr-037.1, Apr-050.1, Apr-062.1, Apr-075.3, Apr-194.1)

**Comment:** WSPA reiterates here that obligating intrastate jet fuel as a deficit-generator will not bring additional “Sustainable Aviation Fuel” into California because it can otherwise be met with credits from any lower-CI fuel source.<sup>14</sup>

<sup>14</sup> WSPA, “WSPA Comments on Proposed Low Carbon Fuels Standard Amendments,” February 20, 2024.

(Apr-094.5)

**Comment:** WSPA remains extremely concerned that the proposed LCFS Amendments would eliminate the existing exemption for intrastate fossil jet fuel and make fuel importers and producers the First Fuel Reporting Entity beginning in 2028. Given the evolving nature of this proposal, the ongoing requests by some stakeholders regarding applicability to *interstate* jet fuel, and the complexity of inserting such a significant new obligation into the Regulation, WSPA urges CARB to host a dedicated workshop to discuss any implementation challenges stakeholders have raised. If not, WSPA strongly urges CARB to retain the exemption, or make aircraft operators (which include passenger airlines, aircraft cargo companies, and small aircraft owners) the First Fuel Reporting Entity as originally proposed.

Fuel importers and producers lack sufficient information to meet these new reporting requirements. They have no ability to differentiate between intrastate, interstate, and international fuel usage<sup>19</sup> and CARB has not proposed a definition for intrastate jet fuel consumption. As written, CARB's proposal will sweep in a broad range of fueling operations outside *intrastate* jet fuel consumption and impose significant new reporting burdens on entities that have minimal connections to California. We continue to be concerned that CARB's proposal may impermissibly burden *interstate* commerce in violation of the Dormant Commerce Clause doctrine.<sup>20</sup> By regulating aviation fuels, CARB's proposal impacts the instrumentalities of interstate transportation and impedes the flow of interstate commerce. Aircraft operators are far better positioned to report on their fuel usage and can better ensure that the reported information is accurate. As a result, aircraft operators possess relevant information to support reporting, including:

<sup>19</sup> Interestingly, there is no consideration that some fossil jet fuel imported or produced in California may also be used in military applications. There is no evaluation of whether this is a legally permissible scope for LCFS or whether fuel producers and importers could reasonably expect to be provided with information about the end use of such fuel, given the classified nature of such information.

<sup>20</sup> *Pike v. Bruce Church, Inc.*, 397 U.S. 137, 142 (1970).

- How each individual operator(s) use the fuel supplied to the airport storage facility;
- Which plane the fuel is uploaded into; and
- The flight path of each plane (including those scheduled to take off and land within the State of California).

Some of this information may be considered confidential business information, which WSPA believes should not be shared with fuel producers and importers. The ripple effect of adding the intrastate jet fuel obligation may include aircraft operators re-optimizing flights to flight paths to include additional fueling outside of California, reducing intrastate jet fuel consumption; this would contribute to emissions leakage. Under Assembly Bill (AB) 32 (2006), CARB has an obligation to minimize leakage resulting from its regulatory activities.<sup>21</sup>

<sup>21</sup> HSC § 38562(b)(8).

(Apr-094.12)

**Comment:** In summary, CARB is federally pre-empted from regulating jet fuel under the LCFS program, but even if implemented the proposal to eliminate the exemption for jet fuel used on intrastate flights would not achieve CARB's stated objective to increase the production, availability, and use of Sustainable Aviation Fuel (SAF), also referred to as Alternative Jet Fuel

(AJF) by CARB, in California. A different approach is necessary for CARB and the aviation industry to achieve our mutual objectives for SAF use in California.

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. Through this and individual airline targets and goals a clear market signal for affordable SAF has been established. 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 helps reduce the price difference 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 billion<sup>3</sup>. 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.

<sup>3</sup> The Economic Impact of Civil Aviation on the U.S. Economy, State Supplement, US Department of Transportation, November 2020

## II. Discussion

With this context, we reiterate our serious concern with the proposal by CARB to regulate jet fuel used for flights within California as an obligated fuel under the LCFS Program. This proposal to obligate jet fuel would be unlikely to result in increased SAF production, availability, or use in California, but would lead to higher jet fuel prices and slow down rather than accelerate efforts to increase SAF production and use in California. 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.

The relationship between deficit generation and credit generation is unchanged by the CARB proposal. Under the structure of the LCFS program, deficits are created for fuel producers from specific conventional fuels delivered into California as identified and defined by the program. These deficits form a common pool that can be retired with credits from any type of eligible fuel. But there is no requirement for a relationship between the type of fuel that created the deficit and the type of credit that retires that deficit. Because of the relative economic advantages of renewable diesel compared to SAF, fuel producers will continue to prioritize

renewable diesel production instead of SAF. As a result, the removal of the exemption for conventional jet fuel is unlikely to materially change the SAF production relative to the status quo. In fact, the deficits created by intrastate jet fuel likely would be retired primarily by renewable diesel and other road transport related credits. Obligating jet fuel will lead to the increased price of jet fuel, diverting resources that might have gone for SAF purchase and use towards renewable diesel production instead, without creating additional SAF production. And because the proposal will not meaningfully increase SAF supply and use, the local air quality benefits attributed to increased SAF use as a result of eliminating the intrastate jet fuel exemption are overstated.

In addition to not being an effective policy tool to increase SAF production, the CARB proposal to regulate jet fuel is pre-empted by federal law, a fact that CARB recognized when it exempted jet fuel from the LCFS in 2018.<sup>4</sup> It is critically important that uniform federal rules apply to aviation and aviation fuels, under the Supremacy Clause of the U.S. Constitution. The CARB proposal seeks to regulate jet fuel and reduce emissions from aviation through such regulation, both of which are pre-empted under federal law, as described in further detail below. In light of the clear and broad federal authority for regulating jet fuel and aircraft engine emissions, California is pre-empted from regulating jet fuel under the LCFS. This is explained in detail in our comments submitted on February 20, 2024.

<sup>4</sup> CARB stated that “[s]ubjecting aircraft fuels to annual carbon intensity standards would raise federal preemption issues” available at [https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/lcfs18/isor.pdf?\\_ga=2.259407882.1202437490.1641231788-253234234.1573227006](https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/lcfs18/isor.pdf?_ga=2.259407882.1202437490.1641231788-253234234.1573227006)

III. Comments on Public Workshop and Supplemental Information

CARB Staff hosted a public workshop on April 10, 2024, and posted supplemental information on CARB Staff analysis on the proposed amendments. With regard to jet fuel, CARB Staff restated the objective to “Increase the use of alternative jet fuel in the State”. The supplemental information posted by CARB provides new data on CARB estimates and expectations for how much SAF would be used in California under the proposed regulations. While there is insufficient information provided to deduce the assumptions in how the projected volumes were achieved, the analysis overstates the projected increase in SAF volumes caused by removing the exemption for jet fuel used on intrastate flights.

Table 1. CARB Analysis of projected AJF volumes under BAU and Proposed Amendments Scenarios, in millions of gallons per year<sup>5</sup>

	2022	2023	2024	2025	2026	2027	2028	2029	2030
BAU Scenario	11.6	5.8	5.8	5.3	5.2	3.9	3.2	3.3	3.3
Proposed Amendments Scenario	11.6	5.8	6.1	111.5	144.8	178.1	211.4	244.7	278.0

<sup>5</sup> Supplemental 2023 LCFS ISOR Documentation | California Air Resources Board, posted April 10, 2024

The CARB analysis projects that in 2025 SAF use in California will grow from approximately 6.1 million gallons in 2024 to 111.5 million gallons in 2025, three years before the jet fuel

obligation is proposed to take effect. First, it is highly unlikely that SAF availability and use could increase this dramatically in a single calendar year. And second, this analysis does not support the effectiveness of the proposal to eliminate the exemption for intrastate jet fuel. If anything, the CARB analysis indicates that eliminating the exemption for jet fuel (i.e. creating deficits from jet fuel) used on intrastate flights is not a significant contributor to increasing SAF use in California. To significantly increase SAF production, availability, and use of SAF in California, and to obtain the benefits of increased SAF use spoken of by many stakeholders at the workshop, one must address the economic disadvantages of SAF production relative to Renewable Diesel. The regulatory proposal does not materially change the relative value of RD and SAF to producers and therefore estimated increases in SAF production, availability and use as a result of the proposal to eliminate the intrastate jet fuel exemption are unlikely to occur. Increasing SAF availability and use as envisioned by the CARB analysis requires a different policy intervention.

...

Lastly, we also note in the supplemental information provided by CARB for the workshop that only waste oil and virgin oil feedstocks and pathways are included in CARB's analysis for AJF. Our expectation is that a variety of feedstocks and pathways, including ethanol to jet, cellulosic biomass from wastes and residues, and power-to-liquid pathways will reach commercial maturity during the lifetime of the LCFS program. A4A member airlines are making investments and offtake agreements with future SAF producers of these next generation production pathways to help accelerate their availability.

## CONCLUSION

A4A supports the existing opt-in crediting model under the LCFS, combined with U.S. federal incentives, as 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 availability of SAF to achieve CARB's objectives of a sustainable and workable reduction of carbon emissions in the transportation sector. The proposal to remove the exemption for jet fuel used on flights within California, however, will not be an effective tool for stimulating SAF production and use, and instead would divert resources and attention away from SAF objectives shared by California and the aviation industry. In addition, CARB is federally pre-empted from removing the exemption for jet fuel and obligating conventional jet fuel as a deficit-generating fuel. We urge CARB to reconsider and withdraw the proposal to eliminate the exemption for jet fuel used on flights within California and instead preserve the existing opt-in approach for SAF and partner with the aviation sector and stakeholders across the emerging SAF ecosystem on new policies and approaches to address the underlying challenges which could rapidly increase the availability and use of SAF in California. We encourage further dialog on this point to find a mutually acceptable path forward. (Apr-138.1)

**Comment:** Delta has significant concerns about CARB's proposal to regulate jet fuel under the LCFS Program. We believe the CARB proposal will raise the cost of jet fuel without increasing



Sustainable Aviation Fuel (SAF) production or use in California. Furthermore, the proposal to regulate jet fuel is pre-empted by federal authority. Along with our trade association Airlines for America (A4A), we encourage CARB to withdraw the proposal to regulate jet fuel and instead establish a joint CARB-industry working group to explore alternative solutions to increase SAF production and use.

Delta Air Lines 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.

Delta's Global Sustainability and Fuel teams have been working over the past several years to catalyze investment and stimulate SAF production by signing what's known as offtake agreements with various SAF producers. In these agreements, Delta commits to purchasing SAF from the producer when they have it, subject to certain conditions. To date, Delta has signed long-term offtake agreements for more than 200 million gallons of SAF to help us reach our goal of 10% SAF usage by the end of 2030. We are also entering into short-term offtake agreements to use the SAF that is available today. However, we know we cannot do this alone, and we are actively building coalitions across the SAF value chain to demonstrate the capacity for building and scaling SAF. We need government policies that build on those efforts, and not hinder the development.

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 workshop, CARB re-stated its objective to "increase the use of alternative jet fuel in the State." We share that objective as reflected in our company commitments and our US airline industry support for the US government SAF Grand Challenge. 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.

With this context, we express our serious concern with the proposal by CARB to regulate jet fuel used for flights within California as an obligated fuel under the LCFS Program. The proposal to eliminate the exemption for jet fuel used on intrastate flights would not result in significantly increased SAF production, availability, or use in California, but would lead to higher jet fuel prices and slow down, rather than accelerate, efforts to increase the state's SAF production and use. 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. Because the proposal does not provide a

mechanism to reduce the economic disadvantage of alternative jet fuel, it will have no material impact on the availability or use of alternative jet fuel in California.

In addition to not being an effective policy tool to increase SAF production, the proposal seeks to regulate jet fuel and reduce emissions from aviation, both of which are preempted under federal law, a fact that CARB recognized when it exempted jet fuel from the LCFS in 2018.<sup>1</sup> Aviation, unlike many other industries, is uniquely situated in that other factors such as the safe operation and maintenance of aircraft are of great importance, which the federal government has recognized in the jurisdiction of the FAA and the EPA's Clean Air Act.

<sup>1</sup> CARB stated that "[s]ubjecting aircraft fuels to annual carbon intensity standards would raise federal preemption issues" *available at*

[https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/lcfs18/isor.pdf?\\_ga=2.259407882.1202437490.1641231788-253234234.1573227006](https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/lcfs18/isor.pdf?_ga=2.259407882.1202437490.1641231788-253234234.1573227006)

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. Only actual SAF use – not merely the creation of jet fuel deficits – will provide the benefits of SAF desired by CARB, airport communities, SAF producers, and airlines. We urge CARB to reconsider and withdraw the proposal to remove the exemption for jet fuel for intrastate flights, preserve the existing opt-in approach for SAF, and 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. (Apr-171.1)

**Comment Summary:** In response to the revised Proposed Low Carbon Fuel Standard Amendments posted August 12th, 2024, the airlines are writing to share their support for the recent California Air Resources Board (CARB) proposal to retain the jet fuel exemption under its Low Carb Fuel Standard (LCFS) Program. The airlines support 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 airlines are committed to reducing its climate impact and achieving net zero carbon emissions by 2050, and transitioning to SAF is core to this commitment. They 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.<sup>1</sup> 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.

<sup>1</sup> The Economic Impact of Civil Aviation on the U.S. Economy, State Supplement, US Department of Transportation, November 2020

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 re-stated that a principal objective of its regulatory proposal is to "Increase the use of alternative jet fuel in the State". They 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 they also support the US government's SAF Grand Challenge. Since 2019, they have executed numerous SAF offtake agreements, both short- and long-term, to help them achieve these goals. The 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. They 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.

Their 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. They 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. They 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. They 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. (15d1-016.1, 15d1-093.1, 15d1-170.1, 15d1-232.1)

**Comment:** Raizen 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. Raizen'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. (15d1-019.4)

**Comment: 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.<sup>8</sup> 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. (15d1-042.13)

**Comment: 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. (15d1-079.8)

**Comment: 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'.<sup>2</sup> We note that this approach has been implemented in the British Columbia Low Carbon Fuel Standard as of January 2024.<sup>3</sup>

<sup>2</sup> As stated in the *Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information*.

<sup>3</sup> British Columbia LCFS: [https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/282\\_2023](https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/282_2023)

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 gC02e/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); 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. (15d1-113.8)

**Comment:** A4A supports CARB's withdrawal of the proposal to eliminate the jet fuel exemption and it's 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.

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 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 billion<sup>3</sup>. 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.

<sup>3</sup> The Economic Impact of Civil Aviation on the U.S. Economy, State Supplement, US Department of Transportation, November 2020

...

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.

...

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.

...

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. (15d1-189.1)

**Comment:** 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.

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.<sup>1</sup> 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.

<sup>1</sup> The Economic Impact of Civil Aviation on the U.S. Economy, State Supplement, US Department of Transportation, November 2020

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.

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. (15d1-191.1)

**Comment:** Support for Maintaining Fossil Jet Fuel Exemption; (15d1-214.3)

...

### **Support for Maintaining Fossil Jet Fuel Exemption**

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. (15d1-214.13)

**Comment:** 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. (15d1-236.1)

**Comment:** 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. (15d1-236.2)

**Comment:** 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. CARB subsequently issued a 15-Day Changes to Proposed Regulation Order which withdrew the proposal to eliminate the jet fuel exemption and retain the existing opt-in approach for SAF under the CARB LCFS Program. A4A supported 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 as proposed in this new "15-Day" proposal.

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 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 billion<sup>3</sup>. 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.



<sup>3</sup> The Economic Impact of Civil Aviation on the U.S. Economy, State Supplement, US Department of Transportation, November 2020

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, and that that conclusion has been retained in the subject revised 15-day proposal.

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.

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. 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. (15d2-277.1)

***Comment: Updates to LCFS have nationwide implications for sustainable aviation fuel***

The US Inflation Reduction Act (IRA) section 40B Sustainable Aviation Fuel (SAF) tax credit applies safe harbor to any candidate fuel demonstrating compliance with CARB LCFS verification. Each time the LCFS changes, so too does the floor for 40B stringency. In the event that the forthcoming 45Z credit guidance also relies on LCFS verification procedures, any weakening of LCFS stringency will open the door to large-scale unsustainable practices nationwide as well. (15d2-289.9)

**Comment:** I represent United Airlines and just want to thank the CARB Chair, members, and staff for the work that you've been doing over the past really almost decade on sustainable aviation fuel, first as an opt-in into the LCFS, and most recently with the announcement last week of the SAF Partnership. (BHT-257)

**Agency Response:** Changes were made in response to these comments. In the first 15-day changes package, staff proposed to remove "Fossil Jet Fuel" from the list of transportation fuels that the LCFS applies to. These comments accurately identified that the initial 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 instead choose to acquire credits on the LCFS credit market generated by other fuels to meet that compliance obligation. For more detail on CARB's continuing 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, please see Response V-1 above.

### V-3 Potential Impact of Jet Fuel Prices on Aviation Demand

**Comment:** In our analysis, we measured the potential impact of jet fuel prices on aviation demand if the LCFS mandates intrastate conventional jet fuel.

Aviation demand ( $D$ ) can be modeled as a function of the state's gross domestic product (GDP) and either jet fuel prices ( $P$ ) or airfare (Airfare):

$$\ln D = \beta_0 + \beta_1 \cdot \ln GDP + \beta_2 \cdot \ln P + \varepsilon$$

$$\ln D = \theta_0 + \theta_1 \cdot \ln GDP + \theta_2 \cdot \ln Airfare + \varepsilon$$

Where, airfare can be expressed by a function of jet fuel prices ( $P$ ):

$$\ln Airfare = \alpha_0 + \alpha_1 \cdot \ln P + \varepsilon$$

Therefore, the elasticity of air transport demand with respect to jet fuel prices ( $\beta_2$ ) is equal to the elasticity of air transport demand with respect to airfare ( $\theta_2$ ), multiplied by the elasticity of airfare with respect to jet fuel prices ( $\alpha_1$ ):

$$\frac{\partial \ln D}{\partial \ln P} = \frac{\partial \ln D}{\partial \ln Airfare} \cdot \frac{\partial \ln Airfare}{\partial \ln P}$$

$$(\beta_2 = \theta_2 \cdot \alpha_1)$$

Thus, by measuring the elasticity of aviation demand with respect to airfare and the elasticity of airfare with respect to jet fuel prices, we can measure the impact of jet fuel prices on aviation demand.

Our analysis used total passengers as the metric for aviation demand and the passenger-weighted average airfare as the metric for airfare. To model California's aviation demand for both intrastate and domestic flights, we gathered quarterly data on demand and airfare from the Bureau of Transportation Statistics, as well as GDP data from the US Bureau of Economic Analysis from 2000 to 2019. Additionally, we collected jet fuel price data from the Energy Information Agency (EIA) to establish the relationship between airfare and jet fuel prices. By leveraging these datasets, we were able to measure the elasticity of aviation demand with respect to airfare and the elasticity of airfare with respect to jet fuel prices.

The jet fuel price forecast is \$16.44 per million Btu (\$723.5/Ton) for 2030 and \$17.77 per million Btu (\$779/Ton) for 2035, based on EIA forecasts. Credit price is based on

Appendix C-1: Standardized Regulatory Impact Assessment in the proposed LCFS Standard Amendments where the credit price is \$76/MT credits in 2030 while \$138/MT credits in 2035. Based on the adjusted carbon intensity in Appendix C, the jet fuel adjusted CI is 89.43 g CO<sub>2</sub>e/MJ. Thus, the deficits for intrastate jet fuel used is \$0.15/gallon (\$48/Ton) in 2030, and \$0.68/gallon (\$222.5/Ton) in 2035.

Three scenarios were evaluated: the baseline scenario, consistent with the existing design of the LCFS without eliminating the jet fuel exemption from fossil jet fuels; the proposed scenario, based on proposed amendments to the LCFS with the elimination of the jet fuel exemption from intrastate fossil jet fuels; and the enhanced scenario, considering the elimination of the jet fuel exemption from domestic fossil jet fuels (both intrastate and interstate).

Under these scenarios, two assumptions for price impacts on flight types were considered: assuming the price impact will affect domestic flights, not just intrastate flights, with an elasticity of air transport demand with respect to jet fuel prices ( $\beta_2$ ) of -0.0625; assuming the price impact specifically targets intrastate flights, with an elasticity of air transport demand with respect to jet fuel prices ( $\beta_2$ ) of -0.1154.

The following tables show the changes in the jet fuel price, the percentage change in jet fuel price, and the corresponding impact on intrastate demand (or domestic demand).

Table 1. Jet Fuel Price Impacts on Domestic Aviation Demand Change

Scenario		Jet Fuel Price (\$/Ton)	Jet Fuel Price Change (%)	Domestic Aviation Demand Change (%)
2030	Baseline	723.5	-	-
	Proposed	727.8	+0.6%	-0.04%
	Enhanced	771.5	+6.6%	-0.4%
2035	Baseline	779	-	-
	Proposed	799	+2.6%	-0.2%
	Enhanced	1001.5	+29%	-1.8%

Table 2. Jet Fuel Price Impacts on Intrastate Aviation Demand Change

Scenario		Jet Fuel Price (\$/Ton)	Jet Fuel Price Change (%)	Intrastate Aviation Demand Change (%)
2030	Baseline	723.5	-	-
	Proposed	771.5	+6.6%	-0.8%
2035	Baseline	779	-	-
	Proposed	1001.5	+29%	-3.3%

\* where under enhanced scenario, the jet fuel price impact on domestic aviation demand is the same as shown in Table 1.

Based on the tables above, our main observations are as follows: When considering the impact on domestic flights, the proposed scenario leads to minor changes, with reductions of -0.04% in 2030 and -0.2% in 2035. However, if price impact specifically targets intrastate

flights, the impact becomes more significant. Under the proposed scenario, reductions will be -0.8% in 2030 and -3.3% in 2035. (Apr-184.1)

**Agency Response:** No changes were made in response to this comment, which does not include an objection or recommendation on the Proposed Amendments. Staff does appreciate the commenter's analysis on potential impact of jet fuel prices on aviation demand flowing from hypothetical LCFS deficit generation for intrastate conventional jet fuel. In the first 15-day proposal, staff proposed to remove "Fossil Jet Fuel" from the list of transportation fuels that the LCFS applies to. For more details, please see Responses V-1 and V-2.

#### **V-4 Multiple Comments: Jet Fuel CI Benchmarks**

**Comment:** Purpose of Carbon Intensity Benchmark for Fossil Jet Fuel (Table 3) Unclear: 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? (15d1-228.43)

**Comment:** 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. (15d1-235.11)

**Comment: CARB Should be Sending Stronger Signals in Support of SAF:** We are disappointed that the Second 15-Day Changes do not include any revisions or changes intended to encourage Sustainable Aviation Fuel ("SAF") sales in California. We believe that concrete, well-defined measures are needed to incentivize SAF and level the playing field with other renewable fuels. We intend to continue to engage with CARB to emphasize the critical need to support this emerging fuel sector; however, there is still time for CARB to implement at least a modest change that would send an important investment signal. CARB should remove the applicability of the Auto Acceleration Mechanism (AAM) to the table of annual jet fuel CI benchmarks. This would help ensure that LCFS credit generation opportunities for SAF will proceed predictably, without being subject to the dynamics of an LCFS credit bank that is well beyond the ability of the nascent SAF market to influence. (15d2-219.5)

**Agency Response:** No changes were made in response to these comments. Staff acknowledges that maintaining the jet fuel CI targets at a 20% reduction in 2030 that would stay constant at that level after 2030 would provide more credits for reported alternative jet fuel than the same reported volumes would receive under the proposed declining benchmarks. Staff aligned the declining average CI benchmark trajectories across all three fuel pools (diesel, gasoline, and jet fuel) for consistency and to send a clear signal to transition to the lowest carbon intensity fuels throughout California's fuel pool, including in the jet fuel sector, in alignment with the State's decarbonization targets. The jet fuel benchmark curve matches the diesel benchmark curve from 2023 through 2030 both before and after these amendments because jet fuel and diesel are created through similar processes, as are their most common replacements, hydroprocessed esters and fatty acids sustainable aviation fuel (HEFA-SAF) and renewable diesel (RD). As heavy-duty vehicles increasingly use electricity and hydrogen as fuels, it is anticipated that RD feedstocks will be used to produce HEFA-SAF instead.

Table 3 is used to in the calculation of credits for alternative jet fuel, as suggested by the commenter.

## **V-5 Multiple Comments: Support Emissions Reductions at Airports**

**Comment:** Zero-emission standards for airport ground support equipment (GSE) – given the need to protect the health of airport personnel, CARB should establish a date for completion of zero-emission ground support equipment for airport operations.

- *CARB staff will complete a zero-emission ground support equipment regulation as noted in the 2022 State Implementation and Draft 2025 Mobile Source Strategy as a near-term measure to be completed by 2029 to meet clean air and climate standards, and Executive Order N-79-20, which calls for off-road equipment to be zero-emission by 2035. (15d2-275.7)*

**Comment:** 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 CO<sub>2</sub> and non-CO<sub>2</sub> emissions from aviation and there is a growing body of data that SAF offers this in both cases.<sup>8</sup>

<sup>8</sup> <https://www.dlr.de/en/vt/research-transfer/faq/faq-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](https://www.who.int/health-topics/cardiovascular-diseases#tab=tab_1)

(15d2-302.10)

**Comment:** We also appreciate that there is a mention of possibly developing a zero-emission airport ground operations regulation. We would suggest that be made more explicit and to state that you will, in fact, move forward with such a regulation, so that we can clean up that part of the aviation sector that is clearly within the State's jurisdiction. (BHT-129)

**Agency Response:** No changes were made in response to these comments, which make recommendations to support emissions reductions at airports that go beyond the scope of this regulatory proposal.

Staff appreciates the commenters' support for future CARB work in this area. See Response V-1 for additional information on CARB's efforts to reduce aviation emissions. With the approval of Resolution 24-14 at the Board Hearing, held on November 8, 2024, to consider the amendments to the LCFS, the Board directed staff to explore developing a zero-emission- airport ground operations regulation and consider, for upcoming and relevant items going to the Board, including the next LCFS rulemaking, potential regulatory approaches to support emission reductions associated with conventional jet fuel. In considering these actions, staff shall engage with labor, airport workers, airlines, airport operators, airport-adjacent communities, relevant federal, state, and local agencies, and interested members of the public.<sup>4</sup>

## **V-6 Low-Carbon Feedstock Research for Jet Fuel**

**Comment:** 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 airlift 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. (45d-367.4)

**Agency Response:** In response to the comment related to conducting a life cycle analysis to determine the extent to which supplies of sustainable biofuels produced from

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<sup>4</sup> California Air Resources Board. *Public Hearing to Consider Proposed Low Carbon Fuel Standard Amendments*. Resolution 21-14. November 8, 2024. Available at: <https://ww2.arb.ca.gov/sites/default/files/barcu/board/res/2024/res24-14.pdf>

various feedstocks can be expanded while not converting additional land to agricultural uses, please see Response JJ-1.

## **W. Marine**

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### **W-1 Multiple Comments: *Allow Credit Generation for Marine Sector***

**Comment:** Consider the inclusion of intrastate jet fuel and marine fuels as a deficit generator and provide analysis of this option as part of the LCFS. (45d-001.8)

**Comment: Allow crediting in the marine sector.**

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. (45d-101.7, Apr-039.7, 15d1-177.4)

**Comment:** Allow credits for zero-emission transportation fuels used for ocean-going vessels, and simplifying the process for credits for shore power installations serving electrified harbor crafts and for dispensing green hydrogen. (45d-163.7, 45d-337.6, 45d-372.9)

**Comment:** California as World-Leading on Climate ctions

Umwelt Energy currently have projects in different stages of development in the US, with several projects specifically located in California. However, regulatory hurdles, including limitations within the LCFS, hinder our ability to contribute fully to the state's ambitious climate goals.

A critical shortcoming is the current exemption for ocean-going vessels from the LCFS. This exclusion undermines California's potential for comprehensive GHG reduction, considering the global shipping industry's 2-3% share of global emissions<sup>2</sup>. As California ascends to become the world's fourth-largest economy while simultaneously claiming the "most ambitious set of climate goals of any jurisdiction in the world"<sup>3</sup> this inconsistency becomes particularly glaring.

<sup>2</sup> <https://www.globalmaritimeforum.org/getting-to-zero-coalition>

<sup>3</sup> <https://ww2.arb.ca.gov/news/california-releases-final-2022-climate-scopingplan-proposal>

Thousands of ships traverse the world's oceans, transporting goods to and from California, virtually all reliant on fossil fuels that generate significant GHG emissions. Overlooking these emissions, with their undeniable Californian footprint, is counterproductive. While the latest LCFS amendment addresses important areas, it fails to consider this major contributor to the state's climate challenge.

Therefore, we urge CARB to include ocean-going vessels within the LCFS scope. This crucial step would not only align with the state's climate goals but also incentivize the adoption of clean e-fuels in the maritime sector, ultimately contributing to a cleaner future for California and beyond. (45d-185.1)

**Comment:** Low Carbon Fuels for the Maritime Sector

Ocean-going vessels are undeniable contributors to climate change and local air quality concerns, not just through their 2-3% share of global GHG emissions, but also by spewing significant air pollutants. While geographically, much of this occurs outside California's immediate jurisdiction, the impacts of climate change and degraded air quality transcend borders, significantly affecting the state.

Including ocean-going vessels within the LCFS presents a unique opportunity to leverage California's leadership role in environmental progress. Such a bold move would not only address a significant source of emissions directly linked to California's economy and environment, but also set a powerful precedent for stricter regulations on a global scale. This precedent could pave the way for the wider adoption of cleaner technologies and practices, driving meaningful change in a problem with undeniable global implications.

Furthermore, incorporating ocean-going vessels into the LCFS aligns with the rising tides of stricter regulations being implemented by both the European Union (EU) and the International Maritime Organization (IMO). By taking this step, California would not only be leading by example but also aligning itself with the progressive efforts of these influential bodies, potentially accelerating the pace of positive change in the maritime sector.

As an example, bio-methanol and e-methanol hold significant potential as future shipping fuels. They have emerged as a major pathway for achieving maritime decarbonization goals and offer one of the most promising solutions for reducing emissions in the marine industry.

Methanol is an organic chemical used in various products and as a fuel. When burned, it produces lower amounts of CO<sub>2</sub>, particulate matter, and sulfur emissions compared to heavy fuel oil (“**HFO**”) or marine gas oil (“**MGO**”). Naturally, CO<sub>2</sub> is emitted as well in the process (1.4 kilograms per kilogram of methanol versus 3.1 kilograms per kilogram of fuel oil<sup>4</sup>). However, as the bio-methanol and e-methanol is produced from captured biogenic or unavoidable CO<sub>2</sub>, and for e-methanol, combined with green hydrogen generated from renewable electricity sources, these fuels ultimately represent carbon-neutral fuels.

<sup>4</sup> <https://www.man-es.com/discover/methanol-fueled-ships>

Leading shipping companies, including A.P. Møller-Maersk, CMA CGM, COSCO, Methanex Waterfront Shipping, and Stena, have already chosen marine methanol as the near-term low carbon future fuel<sup>5</sup>. Therefore, California also needs to support the immediate development of a greener future for the maritime sector by making these low-carbon intensity fuels available at a competitive price. This can be achieved by including ocean-going vessels in the LCFS program.

<sup>5</sup>

[https://www.methanol.org/wpcontent/uploads/2023/05/Marine\\_Methanol\\_Report\\_Methanol\\_Institute\\_May\\_2023.pdf](https://www.methanol.org/wpcontent/uploads/2023/05/Marine_Methanol_Report_Methanol_Institute_May_2023.pdf)

Additionally, deploying bio-methanol and e-methanol as a marine fuel dramatically lowers emissions of sulfur oxides, nitrogen oxides, and particulate matter compared to HFO or MGO. (45d-185.2)

**Comment:** Leveraging the Amendment to the Intrastate Aviation Fuel Precedent

The proposed amendment to include intrastate sustainable aviation fuel (“**SAF**”) in the LCFS sets a crucial precedent for holding all transportation sectors accountable for emissions



reduction. Exempting ocean-going vessels creates an inconsistency that undermines California's leadership in environmental action and sends a message of unequal treatment of GHG emitters.

Expanding the LCFS to encompass – as a bare minimum - intrastate marine fuels for ocean-going vessels demonstrates policy coherence and continuity. It builds upon the established framework for regulating intrastate fuel sources and sends a clear message of comprehensive decarbonization efforts across all transportation modes.

In addition, the 2028 start date for SAF LCFS regulation reflects anticipation of technological advancements and infrastructure development for cleaner fuels. Similarly, including ocean-going vessels in the LCFS incentivizes investments in low-carbon intensity fuel production and infrastructure, is aligned with expected advancements in the timeframe of technological advancements for low-carbon marine fuels. (45d-185.3)

**Comment:** Benefit of including ocean-going vessels to section 95482(d)(2)

Incentives created by including ocean-going vessels to the LCFS could spur the development and adoption of clean technologies like bio-methanol and e-methanol, generating economic opportunities across the state of California. This shift away from fossil fuels wouldn't just benefit the environment, but also enhance the competitiveness of Californian fuel infrastructure, ports and shipping companies through their leadership in sustainability.

In addition, including ocean-going vessels in the LCFS creates a fair environment for players who invest in green technologies. Companies choosing cleaner fuels would gain a competitive edge in the global market, accelerating the transition towards a sustainable maritime industry, which ultimately reduce the climate impact on California. (45d-185.4)

**Comment:** We must also address, that communities living near Californian ports and heavy industries suffer disproportionately from air pollution. By including ocean-going vessels in the LCFS, California can demonstrate its commitment to environmental justice, ensuring all communities benefit from cleaner air and a healthier environment.

As the world's fourth-largest economy with ambitious climate goals, California has a unique responsibility to address its maritime emissions. A phased approach starting with vessels operating within Californian waters can lay the groundwork for broader inclusion. (45d-185.5)

**Comment:** EVCA and CalETC support expanding LCFS to new sectors. We support expanding LCFS to include new types of transportation (e.g., sea and air transport). Including new types of transportation will further necessitate increasing the stringency of LCFS. The Low Carbon Fuel Standard is a successful tool for decarbonizing transportation and should be expanded to other types of transportation given the climate crisis. (45d-188.10)

**Comment:** We also encourage the board to further expand credit eligibility to aviation and shipping sector projects utilizing zero-emission technologies. (45d-277.5)

**Comment:** Given the addition of intrastate fossil jet as a deficit generator in the LCFS proposed amendments, World Energy requests CARB to consider adding ocean-going and marine vessels to the program. Like aviation, ocean-going and marine vessels are hard-to-decarbonize and represent more than 150% of the GHG emissions from aviation.

Similar to the other success stories of the LCFS, including ocean-going and marine vessels can signal for long-term investment in finding low-CI solutions. While this may not be an issue that staff can incorporate in this rulemaking period, we encourage staff to begin the learning process now for a future program update. One early example is biodiesel testing (B100) on Canada Steamship Lines in their Great Lakes / St Lawrence Seaway fleet.<sup>1</sup>

<sup>1</sup>

<https://static1.squarespace.com/static/5b57ab49f407b4a7ffa44ffa/t/65cd3c74d1a72f445cdc7a7e/1707949173143/ICFReport2024.pdf>

On January 1, 2024, the EU added maritime fuels into their ETS carbon trading system<sup>1</sup> and the International Maritime Organization (IMO) is following the lead of the International Civil Aviation Organization in their commitment to reduce GHG emissions similar to the commercial aviation industry.<sup>1</sup> Similar to California's lower carbon aviation fuel goals, California can encourage lower carbon maritime fuels through the LCFS program. (45d-300.8)

**Comment:** California continues to experience some of the worst air quality in the nation with the South Coast Air Basin and San Joaquin Valley being in extreme nonattainment with the Federal Clean Air Act. Diesel exhausts from ships carrying goods at ports are known to cause severe illnesses from aggravated asthma, lung cancer, heart disease and neurological disorders, and premature death.

While CA's At Berth Regulation will deliver important health and environmental benefits from OGVs at berth, the bulk of air and climate emissions comes from the transiting, maneuvering, and anchoring of these vessels. These emissions remain a threat to public health and the environment, therefore CARB must explore all opportunities to achieve additional emission reductions from OGVs, including through the LCFS program. (45d-377.2)

**Comment: Strike Ocean-going vessels from exemption under § 95482 (d) to allow for credits for zero-emission transportation fuels used for OGV ships**

The revision of the LCFS program presents an important opportunity to support marine vessels as the transition to zero-emission fuels begins against the backdrop of the IMO's adoption of an updated GHG strategy last July 2023 and other regional initiatives in the EU to regulate international shipping's OGV emissions. Allowing credit generation and creating a new revenue stream for the maritime industry lowers key financial barriers commonly cited as the largest concern for industry stakeholders when making vessel and fuel orders.

According to 95482(d), the LCFS does not apply to transportation fuel used Ocean-going vessels, as defined in CCR, title 17, section 93118.5(d). CARB does have the authority to regulate and incentivize fuels: in 2007 CARB passed the world's first sulfur emissions cap on maritime fuels. This regulation successfully reduced sulfur emissions from ships in California by over 90%. The United Nations eventually adopted a global version of this regulation in 2020. We urge CARB to update the LCFS to allow for credits for zero emission transportation fuels used for ships such as liquid fuels derived from green hydrogen. Financial incentives are now needed to accelerate the zero-emission market, transition to land-side fueling, and help save lives, our ocean, and our climate.

Adopting a ruling allowing for credit generation for OGVs within California's regulated waters would incentivize installation and bunkering of zero emission fuels such as green hydrogen

and fuels derived from green hydrogen and create an important market signal and incentive for maritime industry decarbonization. Crediting opt-in entities without obligation could avoid legal challenges to regulation of international maritime activities while signaling the importance of OGV emissions close to California's shores and communities. We urge CARB to expand the opt-in ability to include OGVs leaving or entering California waters.

In addition, credits for zero- and near-zero emission marine fuels such as hydrogen-derived, green methanol and ammonia would help stimulate the growth and uptake of next-generation marine fuels and provide an important revenue source to offset the green fuel price differential in early adoption years.

Recent trends show that an increasing share of new vessel orders are built with dual fuel capabilities allowing for flexibility at ports and across a greater patchwork of fuel and sustainability regulations when it comes to marine fuel choices. But these dual-fuel capable vessels are under no obligation or incentive to utilize zero-emission fuels despite their capability. Industry leaders have highlighted the need for fuel transition support as a key step for industry decarbonization. CARB can create incentives through the use of LCFS credit generation to encourage zero-emission fuel uptake and usage at California ports and near overburdened portside communities. The momentum to transition to sustainable marine fuels is there and the LCFS revision could bring it to California shores and communities. (45d-377.3)

**Comment:** Harbor craft vessels such as tugboats and ferries are a major driver of air pollution at seaports, and in Los Angeles, Long Beach, and Oakland, these vessels are **one of the top three drivers of cancer risk to frontline communities** due to their diesel PM emissions. While CARB's Commercial Harbor Craft rule mandate zero-emission ferries, the rule require the cleanest certified engine (Tier 3 or 4) with a diesel particulate filter for all other regulated vessels. In these categories, there are opportunities to send a strong signal to move towards zero-emissions beyond the cleaner but still diesel engine standards in the rule.

We encourage CARB to update language and LCFS materials available to more explicitly show commercial harbor craft (CHC) is eligible under the electric and hydrogen offroad transportation category. As CHC regulations come into effect, LCFS credit generation can play an important role in transitioning fleets and new vessels onto new fueling pathways and infrastructure. Currently the exception to the exception language does not make it clear CHC infrastructure qualifies for credits. (45d-377.4)

#### **Comment: LCFS Incentives for Low CI Methanol**

HIF USA provided testimony to the Board during the September 28, 2023 hearing on the LCFS program amendments, emphasizing one specific way that CARB could incentivize the proliferation of innovative carbon-neutral fuels in California: by amending the LCFS regulations (specifically Section 95482) to ensure that low-carbon intensity (CI) methanol (also referred to as "green methanol") is made eligible for LCFS crediting as an opt-in fuel, when sold for use in marine and other specialty transportation applications such as direct methanol fuel cells. HIF USA writes to reiterate this request as CARB considers how to craft a final rule that will create optimal incentives for a variety of low-carbon transportation fuels in California.

HIF USA's process involves using low-CI electricity to power a process known as electrolysis. This process produces "green hydrogen" by breaking water molecules into hydrogen and

oxygen. The hydrogen is then combined with CO<sub>2</sub> captured from biogenic or industrial sources to produce green methanol in a reactor through a process called synthesis. Further processing will produce other carbon-neutral eFuels that could be used for different purposes, such as eGasoline for road transport, Sustainable Aviation Fuel for air transport, and liquefied petroleum gas (LPG). HIF USA is currently in the front-end engineering and design phase for an eFuels facility in Texas that will produce carbon-neutral drop-in fuels, such as green methanol, for sale in the California transportation fuels market. As noted above, HIF USA has submitted to CARB a request for LCFS pathway approval so that its process may generate credits under the program.

Amending the LCFS regulations to identify green methanol as an opt-in fuel would create an important incentive for low-CI fuels in hard-to-decarbonize sectors such as marine transportation. Currently the LCFS regulations do not identify green methanol as an opt-in fuel, and they provide that transportation fuel used in most ocean-going vessels is exempt from regulation, meaning that there is no opportunity for low-CI methanol created via HIF USA's process to generate LCFS credits. CARB could amend the LCFS regulations to incentivize the production and sale of this fuel in California by specifying (1) that opt-in entities can obtain LCFS credits for low-CI methanol volumes sold for use in marine applications, and/or (2) that the aforementioned LCFS exemption does not apply to methanol provided as a transportation fuel for ocean-going vessels.

In a presentation during an LCFS workshop held in July 2022, 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. Yet, the proposed regulations issued in these proceedings do not include this proposed change. We encourage CARB to pick this up again and specify in the forthcoming proposed rule that opt-in entities can obtain credits for low-CI methanol provided as a transportation fuel in marine and other specialty applications. To create as comprehensive an incentive possible for green methanol, we request that CARB allow any such fuel used in ocean-going vessels in California to qualify as an LCFS opt-in fuel.

According to the Methanol Institute, as compared to conventional fuels, green methanol cuts carbon dioxide emissions by up to 95%, reduces nitrogen oxide emissions by up to 80%, and completely eliminates sulfur oxide and particulate matter emissions.<sup>1</sup> Further, as explained by the Methanol Institute, the large-scale integration of low-carbon and net carbon neutral fuels, such as green methanol, at an accelerated rate in marine applications will be fundamental to achieving international targets for GHG reductions in the marine sector.<sup>2</sup>

<sup>1</sup> See Methanol Institute, "Renewable Methanol," <https://www.methanol.org/renewable/>.

<sup>2</sup> See Methanol Institute, "Components in Measuring GHG Intensity of Marine Fuels," <https://www.methanol.org/marine/>.

Demand for methanol as a marine transportation fuel has grown steadily in recent years, as major shipping companies have built out their ship fleets capable of running on methanol. Allowing low-CI methanol to generate LCFS credits will further stimulate demand by making this fuel more readily available and cost-effective, ultimately incentivizing shipping companies to grow their ship fleets able to use green methanol and reducing emissions from the marine transportation sector.<sup>3</sup>

<sup>3</sup> Incentivizing the use of green methanol in California's marine transportation sector is also consistent with emission reduction initiatives of several of the major California ports. For instance, the Ports of Los Angeles and Long Beach announced efforts to establish a trans-Pacific green shipping corridor between California and Asia to accelerate emissions reductions on one of the world's busiest container shipping routes. See Port of Los Angeles, "Ports of Los Angeles, Long Beach, and Shanghai Unveil Implementation Plan Outline for first Trans-Pacific Green Shipping Corridor," [https://www.portoflosangeles.org/references/2023-news-releases/news\\_092223\\_green\\_shipping\\_corridor](https://www.portoflosangeles.org/references/2023-news-releases/news_092223_green_shipping_corridor). Providing LCFS incentives for green methanol used in ocean-going vessels will significantly support this effort.

(45d-380.1)

**Comment:** The Methanol Institute believes the large-scale integration of low-carbon and net carbon-neutral fuels, such as renewable methanol, at an accelerated rate in marine applications, will be fundamental to achieving international targets for GHG reductions in the marine sector.<sup>1</sup> Under the current LCFS regulations, renewable methanol is ineligible for credit generation because it is not identified as an opt-in fuel. Therefore, the Methanol Institute supports amending Section 95482 of the LCFS regulations to ensure that low-carbon intensity methanol is made eligible for LCFS crediting as an opt-in fuel when sold for use in marine vessels. Specific proposed regulatory text is attached in Appendix A below.

<sup>1</sup> See Methanol Institute, "Components in Measuring GHG Intensity of Marine Fuels," available at <https://www.methanol.org/marine/>.

CARB has determined that marine transportation is a hard-to-decarbonize sector<sup>2</sup> that severely impacts local air quality in California's port-adjacent communities.<sup>3</sup> Expanding the use of renewable methanol presents an opportunity to both reduce carbon emissions and improve local air quality for traditional pollutants. Compared to conventional fuels such as diesel, renewable methanol cuts carbon dioxide emissions by up to 95%, reduces nitrogen oxide emissions by up to 80%, and completely eliminates sulfur oxide and particulate matter emissions.<sup>4</sup> Amending the LCFS regulations to allow low-carbon and net carbon-neutral methanol to generate credits when used in marine vessels will incentivize the use of renewable methanol over traditional marine fuels, leading to an overall reduction in emissions in the marine transportation sector in alignment with CARB's goals to improve local air quality and address global climate change.

<sup>2</sup> See California Air Resources Board, "2022 Scoping Plan," 190, available at <https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents>.

<sup>3</sup> See California Air Resources Board, "Interim Evaluation Report – Control Measure For Ocean-Going Vessels At Berth," available at <https://ww2.arb.ca.gov/news/carb-passes-amendments-commercial-harbor-craft-regulation>.

<sup>4</sup> See Methanol Institute, "Renewable Methanol," available at <https://www.methanol.org/renewable/>.

In recent years, demand for methanol as a marine transportation fuel has steadily grown as major shipping companies are building out ship fleets capable of running on methanol. Maersk has now launched their third container ship operating on low-carbon and net carbon-neutral methanol. According to Clarksons (<https://www.clarksons.com/>), there are now more than 250 newbuild methanol vessels on order and set to enter service over the next four years. There have also been more than 100 orders for the retrofit of existing vessels to operate on methanol fuels. Lloyd's Register has estimated that the fleet of methanol-fueled vessels could exceed 1,200 ships by 2030<sup>5</sup>.

<sup>5</sup> See: <https://www.lr.org/en/knowledge/press-room/press-listing/press-release/renewable-production-needed-to-make-methanol-a-viable-fuel-for-the-maritime-energy-transition/>

Since each of the larger 16,000-24,000 TEU containerships will consume as much as 40,000 metric tons of methanol per year the demand for low carbon intensity methanol will reach tens of millions of tons in the coming years. Since many of these vessels will call on ports in California, it will be critically important for the State to foster the production and bunkering of renewable methanol.

The Methanol Institute strongly urges CARB to include in the final LCFS amendments the ability to generate credits from the use of low-CI methanol as an opt-in fuel for marine vessels under Section 95482. The Methanol Institute thanks CARB for its time and dedication to the LCFS amendment process and looks forward to continued engagement with CARB staff throughout this process. As noted above, we would be happy to help you address data needs around the use of methanol as a marine fuel. (Apr-003.1)

**Comment:** There was significant interest expressed during the workshop around encouraging growth in renewables use in the marine sector, in addition to the aviation sector. To promote this growth, we suggest that CARB allow exempt applications in 95482 to voluntarily opt in to the program as is done under Oregon and Washington's programs.

We suggest the following update to 95482(d):

Exemption for Specific Applications. The LCFS regulation does not apply to any **deficit-generating** transportation fuel used in the following applications: (Apr-34.8)

**Comment:** HIF USA's representative, Shannon Broome, explained at the September 2023 Board hearing and April 2024 workshop that an important way for CARB to incentivize the proliferation of carbon-neutral transportation fuels in California is to amend the LCFS regulations (specifically Section 95482) to ensure that low-carbon intensity (CI) methanol (also referred to as "green methanol") is eligible for LCFS crediting as an opt-in fuel when sold for use in marine and other specialty transportation applications such as direct methanol fuel cells. HIF USA writes to reiterate this request as CARB considers how to craft a final rule that will create optimal incentives for a variety of low-carbon transportation fuels in California.

As explained in Ms. Broome's testimony at the September 2023 Board hearing and April 2024 workshop, as well as in the written submittal to this docket by Greg Dolan of the Methanol Institute, amending the LCFS regulations to identify green methanol as an opt-in fuel would create an important incentive for low-CI fuels in hard-to-decarbonize sectors such as marine transportation. Currently the LCFS regulations do not identify green methanol as an opt-in fuel, meaning that there is no opportunity for low-CI methanol created via HIF USA's process to generate LCFS credits. CARB could amend the LCFS regulations to incentivize the production and sale of this fuel in California by specifying that opt-in entities can obtain LCFS credits for low-CI methanol volumes sold for use in marine applications.

In a presentation during an LCFS workshop held in July 2022, 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. Yet, its proposed regulatory amendments released in December 2023 did not include this proposed change, nor did CARB staff address the possibility of including this change in its presentation during the April 2024 workshop.

Ms. Broome asked staff during the April 2024 workshop about why CARB did not move forward with proposing to include green methanol as an opt-in fuel as was under consideration at the July 2022 workshop, and the response was that CARB did not feel that it had enough data on this fuel to support a proposal. CARB also raised the concern that, because methanol was not included as an opt-in fuel in the proposed rule package put out for a 45-day comment period in December 2023, it could not be included in the final amendments. HIF USA addresses these two issues as follows:

1. HIF USA is more than happy to support CARB in obtaining whatever data it may feel is necessary, either as part of this rulemaking proceeding or in the context of its currently-pending LCFS pathway application. In its April 11, 2024 submittal to this docket, the Methanol Institute also indicated its willingness to engage with CARB staff to facilitate access to all necessary data on green methanol. Indeed, as we have previously commented, we would very much welcome the opportunity to engage with staff on this issue. (Apr-051.1)

**Comment:** CARB could accomplish the requested change without initiating a new 45-day comment period. Members of the public were put on notice that CARB was considering including methanol as an opt-in fuel for certain applications back in July 2022 when CARB staff originally presented the concept during its “Public Workshop to Discuss Potential Changes to the Low Carbon Fuel Standard.”<sup>1</sup> HIF USA has commented multiple times in public forums on this change and has noted the benefits of such a change in its written submittals to CARB’s public comment dockets, including in testimony at the September 28, 2023 Board hearing on the LCFS amendments—which occurred well before the proposed rule package was released for 45-day comment.<sup>2</sup> Thus, the change would be sufficiently related to the regulatory language included in the 45-day package (within the meaning of Cal. Gov. Code § 11346.8(c)) such that CARB would only be required to issue 15-day notice of the change.<sup>3</sup> Given the multiple times that the potential change was raised in these proceedings, a reasonable member of the directly affected public has certainly been on notice that such a change was possible.<sup>4</sup>

<sup>1</sup> See CARB, “Public Workshop to Discuss Potential Changes to the Low Carbon Fuel Standard,” “CARB Presentation” at Slide 31 (July 7, 2022), available here.

<sup>2</sup> See, e.g., 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).

<sup>3</sup> Cal. Gov. Code § 11346.8(c).

<sup>4</sup> See 1 CCR § 42 (defining “sufficiently related” changes). See also *Western Oil & Gas Ass’n v. Air Resources Bd.* (1984) 37 Cal. 3d 502, 526 (“[T]he regulation adopted need not be the same as that proposed as long as it deals with the same subject or issue dealt with by the notice.”).

(Apr-051.2)

**Comment:** Similarly, crediting zero-emission shipping fuels and simplifying crediting for shore power installations for electric harbor crafts are both necessary actions to reduce port emissions. This action would be on par with commitments from major cargo owners and shipping to transition to zero-carbon shipping fuels by 2040<sup>1</sup>.

<sup>1</sup> “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](https://www.cozev.org/img/FINAL-coZEV-2040-Ambition-Statement_2021-10-18-144834_uorz.pdf)

(Apr-055.2)

**Comment:** 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. Updating crediting for these would provide the financial incentives to usher in this transition in a timely manner, in addition to reducing the emissions burden faced by port communities. (Apr-055.3)

**Comment:** Understanding that there is not enough time to deploy immediately, reducing marine fuel emissions also needs to be a high priority. The U.S. and Canada have already started taking steps toward decarbonizing this sector. We look forward to the opportunity to work together with CARB staff to help make this a reality. (Apr-079.20)

**Comment: 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 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.<sup>2</sup> 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.<sup>3</sup>

<sup>2</sup> See CARB, “Public Workshop to Discuss Potential Changes to the Low Carbon Fuel Standard,” “CARB Presentation” at Slide 31 (July 7, 2022), available [here](#).

<sup>3</sup> See, e.g., Comments of the Methanol Institute on Low Carbon Fuel Standard Public Workshop - April 10, 2024 (April 11, 2024), available [here](#).

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. (15d1-046.1)

**Comment:** 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. (15d1-118.9)

**Comment:** 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. (15d1-134.1)

**Comment: 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.

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 CO<sub>2</sub>E 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. (15d1-184.6)

**Comment:** 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. (15d1-202.5)

**Comment: 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 be on par with commitments from major cargo owners and shipping to transition to zero-carbon shipping fuels by 2040. 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.

<sup>2</sup> 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](https://www.cozev.org/img/FINAL-coZEV-2040-Ambition-Statement_2021-10-18-144834_uorz.pdf)

(15d1-221.3)

**Comment:** This comment letter focuses on the role that methanol can play in immediately reducing emissions from vessels given the significant interest from carriers partnering on these two GSCs, the relative ease of methanol handling, and the already significant investment in vessels that can utilize this fuel. Methanol is compatible with modified 2- and 4-stroke marine engines and is already being used by over 20 large ocean-going vessels, highlighting its

viability in the maritime sector. From a cost perspective, green methanol production is significantly higher than Marine Gas Oil, primarily due to its lower energy density (requiring larger fuel tanks) and production costs. The cost ranges from \$700-\$800/mt for bio-methanol to \$1100-\$1400/mt for electrolysis-based methanol, making it 3 to 4 times more expensive than current fossil fuel alternatives. Price parity with fossil fuels is uncertain without significant incentives and further regulation. Notably, MPA, a critical partner on our Singapore GSC, is developing a Technical Reference for methanol bunkering that can be leveraged by the two Ports to support bunkering in California.

The carbon intensity of methanol varies widely based on the production source. Methanol from coal has the highest carbon intensity, while e-methanol produced with hydrogen recycling exhibits the lowest carbon intensity. E-methanol is produced through electrolysis by splitting water to create hydrogen, which is then reacted with carbon dioxide (methanation) to produce methanol.

HIF Global and the industry partners referenced at the beginning of this letter have been advocating for regulatory language that would allow e-methanol to generate LCFS credits when used in marine operations in the most recent rulemaking for amendments to the LCFS program. We support their advocacy and their letter submitted to the regulatory docket. The Ports understand that CARB is about to complete the currently pending rulemaking amendments. Given the significantly greater cost of e-methanol and other alternative fuels compared to conventional maritime fuels, and the urgent need for emission reductions from vessels, we strongly encourage CARB staff to request approval to proceed with a new regulatory amendment to the LCFS program under Section 95482 at the November 8, 2024 Board hearing. The amendment should at a minimum seek to incorporate e-methanol into the LCFS program. This recommendation aligns with the comment letter submitted by HIF Global and our other industry partners as part of the open LCFS regulatory amendment process. (15d2-191.1)

**Comment:** 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 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 (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. (15d1-247.1)

**Comment: CARB Should Propose Narrow Amendments to the LCFS to Include Low-CI Methanol as an Opt-In Fuel.**

We acknowledge that CARB has not proposed in the current LCFS amendment process to include low carbon intensity (CI) methanol (also referred to as “green methanol”) as an opt-in fuel, as we and other stakeholders have previously suggested.

Specifically, we urge CARB staff to propose targeted changes to 17 C.C.R. § 95482 to make low-CI methanol 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 explained 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. Low-CI methanol has significant potential as a drop-in fuel to alleviate emission impacts on port-adjacent communities in the near term and requires limited regulatory incentives to accelerated adoption.

CARB indicated its willingness to make this change at the beginning of its process to update the LCFS. 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.<sup>2</sup> Yet, its proposed regulatory amendments released in December 2023 did not include this proposed change, nor did CARB include this change in the First or Second 15-Day Notices, despite recommendations from multiple entities that it do so.<sup>3</sup>

<sup>2</sup> See CARB, “Public Workshop to Discuss Potential Changes to the Low Carbon Fuel Standard,” “CARB Presentation” at Slide 31 (July 7, 2022), available [here](#).

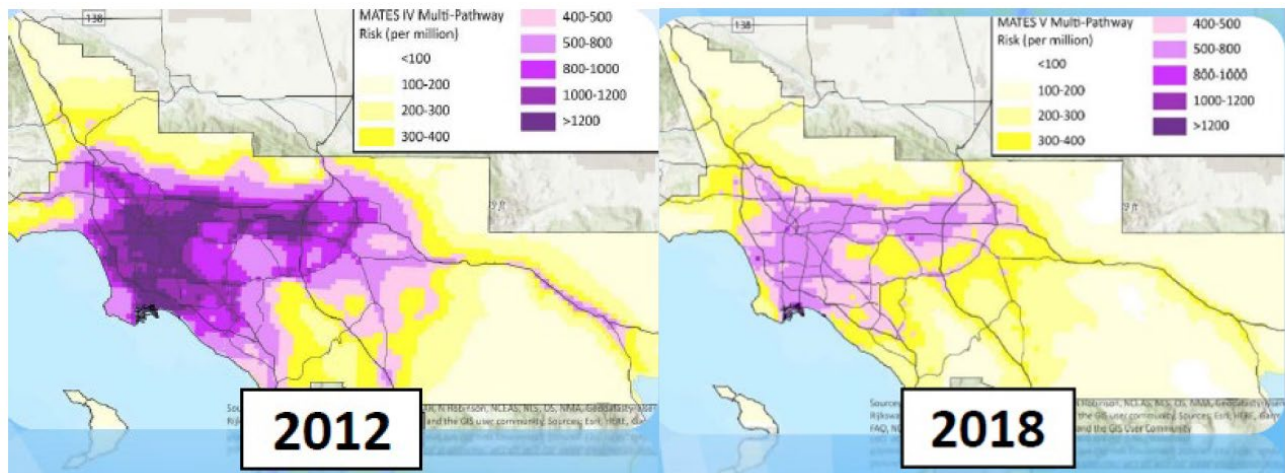
<sup>3</sup> See, e.g., Comments of the Methanol Institute on Low Carbon Fuel Standard Public Workshop - April 10, 2024 (April 11, 2024), available here.

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. The benefits of low-CI methanol in marine applications more than justifies a regulatory amendment to make this change, and we stand ready to support CARB staff in developing a proposal to make it a reality. (15d2-282.1)

**Comment:** On behalf of the undersigned representatives of the methanol-as-marine-fuel supply chain, we thank you for convening a meeting with key stakeholders on September 26, 2024, to explore the opportunity methanol presents as a marine fuel in the near term to reduce greenhouse gas emissions and to reduce air toxics and criteria pollutant emissions at California ports and in the areas surrounding the ports. Thanks to you and the other CARB staff present for your thoughtful engagement and questions.

As you know, several parties have been advocating in the most recent rulemaking for the Board to make minor amendments to the LCFS regulatory language that would allow low-carbon intensity ("low-CI") methanol to generate LCFS credits when used in marine operations. There is interest in this opportunity to decarbonize and reduce emissions in underserved areas because the necessary infrastructure exists currently. In other words, a transition to low-CI marine methanol could be a near-term "plug and play" option that is not available with other potential fuels. And of course, with hundreds of millions of gallons of diesel fuel being used in marine operations in California now, it is important to have as many options available to come online as quickly as possible. While many fuels will have a role in decarbonizing the ports, the need for liquid fuels will continue to exist, and with current air quality challenges, obtaining reductions quickly will benefit the communities that currently live nearby the operations of what is agreed to be a hard-to-decarbonize sector.

During our September 26 meeting, you heard from the full range of the supply chain stakeholders that would be needed to make marine methanol fuel a reality at the Ports of Los Angeles and Long Beach. Specifically, we highlighted that in 2018 over 57,000 barrels per day of marine fuel was sold in these two ports, approximately 80% of which was residual bunker fuel (approximately 46,000 barrels per day). In addition to the heavy air toxics and criteria pollutant loading, this equates to 11.7 million tonnes of greenhouse gases annually. From an air toxics perspective, we shared a recent presentation from the South Coast Air Quality Management District (SCAQMD), which shows dramatic improvements in health risk in the South Coast region from 2012 to 2018, but, while improved, due to diesel emissions, the ports remain challenged.



We understand that the Board is about to complete the currently pending LCFS rulemaking amendments. While CARB staff suggested during the early stages of the current rulemaking that marine methanol was being considered for inclusion as an LCFS opt-in fuel, this change is not included in the proposal under consideration for adoption later this year. As we explained, while it is a proven technology and could essentially operate as a drop in fuel to replace diesel, some investment is required to bring marine methanol and its many benefits to California ports. The economics require incentives from responsible regulatory bodies like CARB. The ability to generate LCFS credits as an opt-in fuel would serve as an important incentive.

The Ports of Los Angeles and Long Beach support this amendment. We urge the staff and the Board to make this a reality. With proper regulatory signals, the ports and the people who live near them could experience health and welfare benefits in the near term and of course, there would be significant emissions reductions from a climate change perspective as well.

In sum, adding regulatory language to the LCFS that allows credit generation for low-CI marine methanol would be consistent with California's first-mover history in policies to accelerate decarbonization, fully align with the Board's environmental justice initiatives to improve air quality right away in and near the ports, support California's efforts and requirements to achieve increasingly stringent national ambient air quality standards for particulate matter and sulfur dioxide, support achieving the Scoping Plan's 85% 2045 greenhouse gas reduction target, and dramatically reduce diesel use in the ports.

We hope that the Board's resolution adopting the currently proposed LCFS amendments will include direction to staff to pursue in short-order methanol as an approved opt-in fuel for the LCFS program under Section 95482. We believe this could be a first step toward broader inclusion of e-fuels, including low-CI methanol. For now, the benefits of low-CI methanol in marine applications, on their own, more than justify a regulatory amendment. Direction from the Board would be helpful in ensuring that staff can devote resources to pursuing this type of amendment and would signal the Board's support for low-CI methanol as a commercially viable alternative to diesel fuel. For example, the Board could include the following type of finding:

“Communities living near ports in California bear a disproportionate impact of emissions from port activities, which include not only on-highway equipment but also ocean going and other port vessels, which have historically been hard to decarbonize due to their operations.

“Low-Carbon Intensity (CI) Methanol has significant potential as a drop-in fuel to alleviate impacts on communities in the near term.

“Low-CI Methanol could largely function as a drop-in fuel at ports.

“Low-CI Methanol requires limited regulatory incentives to accelerate adoption.

“Regulatory amendments providing the ability to generate credits for use of methanol as an opt-in fuel in marine application under the LCFS would promote Low-CI Methanol for the marine vessel sources.

“CARB staff are directed to evaluate and bring to the Board for consideration regulatory amendments that would promote the use of Low-CI Methanol in marine applications.”

We hope the above is helpful to you as you consider the best next steps for reducing emissions at California’s ports and working to decarbonize marine sector transportation. We understand that the Ports of Los Angeles and Long Beach are writing separately on this issue, so that they may speak both to the use of low-CI methanol as a drop-in fuel and their efforts related to the Green Shipping Corridor that they discussed in the meeting. We also understand that Centerline Logistics is preparing a separate letter to address specifics related to the items discussed during the meeting. (15d2-283.1)

**Comment:** Furthermore, **it is deeply unsatisfactory that these amendments do not act on jet fuel or marine fuel**, both of which would have strengthened the program’s ability to thoroughly decarbonize the transportation sector. The LCFS is not a fledgling program, and where possible, we must fold additional sectors into the rule. This is a missed opportunity to broaden our transportation emissions strategy, especially regarding marine fuel. The momentum for zero-emission transition is clearly reflected by industry and market activity. We also can’t afford to pass up on an additional opportunity to ease the air quality burden facing port communities. (15d2-292.2)

**Comment:** While you heard from the full range of the supply chain stakeholders that would be needed to make marine methanol fuel a reality at the Ports of Los Angeles and Long Beach, Centerline Logistics is prepared to play its role in advancing this effort. Centerline is actively preparing our barges to be capable of providing methanol as a marine fuel.

We understand that the timeline of the current rulemaking may preclude including this option now, but we hope that CARB will take immediate steps to advance such a rulemaking. Such action will provide needed incentives for the investment needed to bring methanol in as a drop-in fuel. The ability to generate LCFS credits as an opt-in fuel would serve as the necessary incentives.

In sum, adding regulatory language to the LCFS that allows credit generation for low-carbon Methanol in marine transport would be consistent with California’s first-mover history in policies

to accelerate decarbonization, fully align with the Board's environmental justice initiatives to improve air quality right away in and near the ports, support California's efforts and requirements to achieve increasingly stringent national ambient air quality standards for particulate matter and sulfur dioxide, support achieving the Scoping Plan's 85% 2045 greenhouse gas reduction target, and dramatically reduce diesel use in the ports.

We hope that the Board can include in the November 8, 2024, adopting resolution language direction to staff to pursue in short-order methanol as an approved opt-in fuel for the LCFS program under Section 95482. We believe this could be a first step toward broader inclusion of e-fuels, including low-carbon methanol. For now, the benefits of low-carbon methanol in marine applications, on their own, more than justify a regulatory amendment. Direction from the Board would be helpful in ensuring that staff can devote resources to pursuing this type of amendment and would signal the Board's support for low-carbon methanol as a commercially viable renewable fuel. (15d2-299.1)

**Comment:** We support the LCFS program and appreciate the inclusion of an evaluation for incorporating ocean-going fuels into future rulemaking within Resolution 24-14: Public Hearing to Consider Proposed Amendments to the LCFS.

...

The Pasha Group supports the LCFS program and CARB's efforts to reduce the carbon intensity of transportation fuels – and appreciates the inclusion of an evaluation to include ocean-going fuels in the next LCFS rulemaking. Establishing an LCFS pathway for maritime Bio-LNG presents a significant opportunity for both the marine sector and the state to achieve its environmental objectives. Bio-LNG has established pathways for heavy-duty road transportation and could be applied to help decarbonization of the marine industry.

Additionally, the maritime industry shares several important similarities with the aviation sector, making it a valuable reference point for Bio-LNG applications in maritime use, similar to the existing pathway for Sustainable Aviation Fuel (SAF). Both industries encounter challenges related to long-lived assets, energy density requirements, and international operations. In both aviation and maritime, assets have operational lifespans that span decades, complicating rapid fleet turnover. Additionally, both sectors require high energy-density fuels for efficient long-distance travel, which limits the immediate feasibility of certain zero-emission technologies. Furthermore, their global operations demand internationally compatible fuel solutions and regulatory frameworks.

Incorporating maritime fuels into the LCFS program would create a vital incentive to overcome barriers and transition legacy fleets to lower carbon technologies. Most of the ships today run on traditional marine diesel; however, a significant percentage of newbuild orders are incorporating LNG capability and recent trends show that LNG is quickly becoming the alternative fuel of choice for newbuilds. The timing is ripe to incentivize more ships to be LNG-capable and encourage the use of Bio-LNG to significantly decrease greenhouse gas emissions in the marine sector. We strongly encourage CARB to evaluate marine fuels in the next LCFS rulemaking.



We look forward to continuing to work with CARB and other stakeholders to support the inclusion of ocean-going fuels in the next LCFS rulemaking – and urge approval of the current proposed amendments. (BH-003.1)

**Comment:** Additionally, credits for use of fuels for renewable diesel should not be granted for overseas sources unless the communities impacted by the marine transportation at Ports are not already overburdened with pollutants. (BH-049.2)

**Comment:** Vopak operates at several ports in California, and we urge the Board to adopt a resolution that would involve amending the LCFS regulations to allow for credit generation of methanol as a marine fuel. There are significant opportunities to generate low-carbon methanol and we believe that our existing infrastructure could quickly support methanol as a marine fuel. Providing LCFS credits would at least speed implementation of this opportunity to reduce greenhouse gas emissions as well as emissions of traditional pollutants. We hope the Board will take this important step today and that any amendments can be adopted in a timely manner. (BH-063.1)

**Comment:** We believe methanol can serve as an effective marine fuel. In fact, we recently introduced an innovative solution called Clean Harbor Alternative Mobile Power (CHAMP). This platform will use methanol-fueled generators to supply clean power and thereby reduce emissions from vessels such as containerships, cruise ships and tankers by up to 93% while they are idling at port. Offering LCFS credits for initiatives like CHAMP would significantly accelerate the adoption of methanol in the marine industry. Additionally, we believe our existing bunkering operations, which involve delivering marine fuels to other vessels, can support methanol with minimal infrastructure adjustments compared to other alternatives.

We urge the Board to act swiftly to enable opt-in credits for alternative fuels like methanol within the marine sector. We support a resolution that initiates and expedites these necessary amendments. (BH-070.1)

**Comment:** Please... include methanol as an opt-in fuel. (BH-078.2)

**Comment:** MI supports a proposed resolution to amend the LCFS regulations to allow for low-carbon fuels in marine applications to generate LCFS credits.

Methanol is a potential “drop-in” fuel in marine applications that would both reduce carbon emissions and improve air quality near ports. While the technologies are commercially available, it is important for California to signal that credits can be generated for methanol as a marine fuel under the LCFS to ensure that it can be commercially viable.

The Methanol Institute prepared a report last year that explained how methanol can help the shipping industry navigate the transition towards low carbon and net carbon neutral shipping.

Additionally, MI has partnered with Finland’s GENA Solutions on the development of a robust database of the biomethanol and e-methanol projects pipeline. As of September 2024, the database tracks over 180 renewable methanol projects globally.

Methanol is available at over 120 ports worldwide and shipped globally.

Deploying methanol as a marine fuel dramatically lowers emissions of sulfur oxides, nitrogen oxides, and particulate matter compared to Heavy Fuel Oil or Marine Gas Oil.

We urge the Board to approve the resolution that would allow for methanol to generate LCFS credits as an opt-in fuel in marine applications. (BH-083.1)

**Comment:** We are requesting today that CARB take an important step to encourage a diverse low CI marine transportation fuel mix. And specifically, we would like for low CI methanol used in marine and specialty transportation applications to be able to opt in and generate LCFS credits. These are hard to decarbonize sectors and they present a real opportunity to get immediate carbon reductions and also air toxics and criteria pollutant reductions from the marine sector. And we've all seen the maps of the ports with the hotspots there. And so it's a real opportunity. (BHT-67)

**Comment:** First, we're highly appreciative that the Board has signaled interest in alternative fuels for ocean-going vessels and to assess how LCFS can support this endeavor for future rulemaking. LCFS is an opportunity to spur investment and production in green maritime fuels and to partner with us, partner with industry, as we seek to decarbonize shipping. (BHT-131)

**Comment:** We support the LCFS Program. Within CARB's resolution that was released earlier this week, we appreciate the inclusion of an evaluation for incorporating ocean-going vessels into the future LCFS rulemaking. Incorporating maritime fuels into the LCF Program would create a vital incentive to overcome barriers and transition legacy fleets to lower carbon technologies. (BHT-195)

**Comment:** We believe methanol can serve as an effective marine fuel. In fact, we recently introduced an innovative solution called Clean Harbor Alternative Mobile Power, or CHAMP. This platform will use methanol-fueled generators to supply clean power and thereby reduce emissions from vessels such as container ships, cruise ships, and tankers by up to 93 percent while they are idling at port.

Offering LCFS credits or initiatives like the CHAMP would significantly accelerate the adoption of methanol in the marine industry. Additionally, we believe our existing bunkering operations, which involves delivering marine fuels to other vessels, can support methanol with minimal infrastructure adjustments compared to the other options being contemplated. We urge the Board to act swiftly to enable opt-in credits for alternative fuels like methanol within the marine sector. (BHT-196)

**Comment:** We operate at several ports in California and we respectfully urge the Board to adopt a resolution that would involve amending the LCFS regulations to allow for credit generation of methanol as a marine fuel.

There are significant opportunities to generate low-carbon methanol and we believe that existing infrastructure, such as ours, could quickly support methanol as a marine fuel. Providing LCFs credits would at least be implementation of this opportunity to reduce greenhouse gas emissions as well as emissions Of traditional pollutants. (BHT-210)

**Comment:** As CARB worked on the in-transit rule to tackle emissions from the shipping sector, the LCFS is a critical tool and we are pleased to see and support the inclusion of

marine fuels in the -- in the Board resolution language. It is imperative that we use non-combustion solutions wherever possible, such as fuel cell, as well as prioritizing the least carbon-intensive fuels, such as truly green hydrogen made from renewable energy and not false solution such as liquified natural gas. (BHT-225)

**Comment:** I'd like to express the Port's strong support for the staff proposal to open a future rulemaking to include ocean-going vessel fuels as eligible opt-in fuels under the LCFS Program.

...

However, if we were going to hit our goals around decarbonization, we need to lower the cost of and expand availability of cleaner alternative fuels. (BHT-235)

**Comment:** We also support the directive to evaluate adding marine fuels to the LCFS, which could be another large market for drop-in crop oil fuels. (BHT-240)

**Comment:** Therefore, I urge the Board to provide opportunities to include methanol as an opt-in fuel for marine applications and other sectors where this zero particulate fuel can help reduce both criteria pollutants and provide an opportunity for low-carbon options, such as eFuels, and renewable, and waste-based methanol. (BHT-245)

**Agency Response:** Staff appreciates the commenters' recommendations but declined to incorporate the recommendations to remove or modify the current general LCFS exemption for fuel used in ocean-going vessels, as defined in CCR, title 17, section 93118.5(d), as commenters' recommendations are beyond the scope of this rulemaking.

But Resolution 24-14, approved by CARB at the Board Hearing held on November 8, 2024, directed staff to consider – for a future rulemaking – including ocean-going vessel fuels as LCFS-regulated fuels. That direction specified that consideration will include both combustion and non-combustion fuels, with prioritization of non-combustion and least carbon fuels, and any other relevant policies to decarbonize the sector. The direction also specified that “any potential change in approach to ocean-going vessel fuels under a future LCFS rulemaking must not impede progress to decarbonize on-road sources, which are the leading source of air pollution and greenhouse gases in the State.”<sup>5</sup>

In response to the comment related to jet fuel, please see Responses V-1 and V-2.

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<sup>5</sup> California Air Resources Board. *Public Hearing to Consider Proposed Low Carbon Fuel Standard Amendments*. Resolution 24-14. November 8, 2024. Available at: <https://ww2.arb.ca.gov/sites/default/files/barcu/board/res/2024/res24-14.pdf>

## **X. Forklifts**

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### **X-1 Multiple Comments: *Request for Delay in Forklift Amendments Implementation***

**Comment:** More time needed for implementation: The time needed to evaluate appropriate solutions relative to specific fleets (e.g. charger frequencies) and operating conditions (i.e. cold storage) and cost-effectiveness relative to estimated revenue. (45d-004.2)

**Comment:** Recommend extending estimation method for several quarters to give industry opportunity to adapt. (45d-004.3)

**Comment:** If one or both of these proposed changes must be implemented, please allow us a minimum of 2 years before adoption. (45d-16.02)

**Comment:** PineSpire understands CARB's goal to move forklifts towards increased accuracy and into alignment with other EVs by requiring metering of the energy usage. However, we urge CARB to be aware of the significant time and resources required to make this shift, and to provide adequate lead time for the transition. An abrupt transition would likely disenfranchise the vast majority of forklift owners from the opportunity to participate for several quarters; PineSpire recommends CARB to continue to allow participation of e-forklifts through the estimation method during a reasonable transition timeline. To support this request, we have summarized some of the forklift-specific limitations on data collection that set this vehicle class apart from other types of equipment in the LCFS program:

Current limitations: □ Nascent technologies: The data collection industry for forklifts is in its early stages, unlike the more established on-road EV charger technology. Current telematics solutions remain under development to be able to reliably deliver the level of data and detail that would be required for LCFS reporting. Additional time is needed to deploy and scale financially viable solutions across the California forklift fleet. □ Unique Aspects of Forklift Metering: Typical metering solutions seen in other vehicle classes are unlikely to apply to most forklift operations for several reasons. o Unlike other vehicle classes, the cost of implementing energy measurement must show a reasonable return on investment solely from LCFS credits, as there are no fees for charging in this vehicle class. o Existing telematics solutions are prohibitively expensive, with upfront costs in the many hundreds of dollars per unit and ongoing monthly subscription fees. Additionally, some require costly technician site visits for manual data downloads. High upfront costs, ongoing fees, and limited functionality currently make the financial justification for adopting the telematics technology challenging. o Installing metering on the AC side is prohibitively expensive as it requires electricians, downtime to operations, and more costly hardware. As mentioned, forklift chargers are frequently distributed throughout facilities, not on a single AC circuit. And the AC circuits have the potential to serve other non-charging usage, thus requiring submetering.

Implementation challenges: These implementation challenges are based on our experience deploying meters across forklift chargers at a range of facilities in Oregon. □ Hardware: Current monitoring options may require essential hardware modifications to accommodate the diverse range of forklift chargers, unlike the more standardized EV charger hardware. For example, there is a wide range of voltage and frequencies at which forklift chargers operate, both of which have the potential to 'fry' electric components of meters. Ensuring safety and

functionality of new hardware, as proven in a range of test environments, is key before requiring widespread deployment. □ Connectivity: Reliable data connectivity requires site-specific troubleshooting and ongoing refinement. Additionally, successful implementation requires working with individual facilities to ensure all use of connectivity technology is secure. The one-off nature of this issue requires more time to implement than a universally designed charging network. □ Software complexity: Frequent software updates are needed to comply with varying state reporting and registration requirements, while maintaining historical data accuracy. This translates to significant lead times and resource allocation for the engineering and manufacturing updates of measurement devices. □ Evaluation burden: Developing hardware quotes, connectivity plans, and completing ROI analyses require time and resources for each individual site and its equipment team. This would be further complicated by the changes the proposed Amendments may have on LCFS values and the associated financial analysis. Allowing entities time to put together this information, after other proposed amendments have been addressed and their market impact demonstrated, is appropriate.

Additional Considerations: □ Consistency with other CARB regulations: Fleet owners and operators are simultaneously responsible for complying with other CARB regulations, such as the proposed Zero Emission Forklift rule. CARB's zero-emission rules typically rely on a phased-in approach for adoption and implementation, as an acknowledgment of the cost and resources required for compliance. This phase-in approach also ensures a smoother transition for all parties by providing a more gradual 'ramp up' of metering. Using a phased-in approach with metering in the LCFS would be consistent and appropriate. □ Agriculture and Processing Industry Issues: Agricultural, food processing, wine, and beverage industries have several operational constraints relevant to developing hardware, connectivity solutions, and deploying meters. For example, many post-harvest and food processing facilities operate equipment within environments with a high level of dust that may require specific hardware enclosure designs. Similarly, cold storage facilities may challenge typical hardware specifications and require time to adapt specifications. Additionally, during harvest/post-harvest seasons (which can last one to two quarters), many facilities operate around the clock and do not have staff resources nor fleet down-time that would be required to deploy meters. Many of these facilities are large and forklift charging equipment is dispersed at many locations; it is common for facilities not to have reliable Wi-Fi reach throughout these dispersed locations, meaning that additional time and cost is required to deploy routers solely for use by energy measurement devices. PineSpire represents dozens of agricultural and food processing businesses across California, responsible for thousands of acres of farmland, and millions to billions of dollars of food production. If CARB has specific questions for these types of facilities, we are happy to put you in touch with facility managers to discuss further. (45d-150.6)

**Comment:** Phase-in the implementation of forklift metering requirements to give fleet operators time to install metering solutions. (45d-189.3)

**Comment:** A metering requirement for forklift credit generation calculations should be phased-in so that industry has time to adjust their equipment and processes. (45d-195.3)

**Comment:** Metering requirements for forklifts need to be phased in. As "smarter technologies are made more available by OEM's to give energy consumption insight to fleet operators, we

believe a phase-in schedule similar to the ZE Forklift Rule is appropriate to accommodate for naturally-occurring turnover to new systems. (45d-218.4)

**Comment:** Phase In of e-Forklift Metering Requirements We support the move to metering of forklifts; however, we urge CARB to consider the many complications of developing and deploying devices that can accomplish this and to allow a gradual timeline to transition from estimation method to metering, as Washington and Oregon have done. (Apr-47.3)

**Comment:** Metering requirements for forklifts need to be phased in. There is widespread agreement that metering for forklifts is a preferred method of reporting for credit generation, as it more closely aligns with other reporting categories, is more accurate, and would eliminate an administrative burden related to registering and tracking equipment locations. However, as is also widely agreed, the electric forklift technology evolution status is still very rudimentary, with almost all deployed charging systems not having any integrated metering. To date, telematic deployments are still largely cost-prohibitive on a per-unit/battery level to be installed just for purposes of LCFS participation, have difficulty with data access and transfer within confined warehouse operations, and may not be appropriate across mixed OEMfleets. As “smarter” technologies are made more available by OEM's to give energy consumption insight to fleet operators, we believe a phase-in schedule similar to the ZE Forklift Rule is appropriate to accommodate for naturally-occurring turnover to new systems. (Apr-54.4)

**Comment:** 1. A more gradual approach is warranted to avoid negative reactions. According to CARB's rational document, “This proposed amendment (EER 50% drop) is necessary to ensure that forklift crediting more accurately reflect the fuels displaced by electricity and hydrogen forklift fueling.” (Apr-195.1b)

**Comment:** 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. (15d1-086.3)

**Agency Response:** Changes were made in response to these comments. Before 2026, the quantity of electricity may be estimated using a CARB-approved methodology. This will provide sufficient time for fleets to become familiar with metering procedures and install the necessary equipment.

## **X-2 Multiple Comments: *Opposition to Changing Default Credit Generating Entity from Forklift Owner to Operator***

**Comment:** e-Forklift Credit Generation issues The proposal to shift credit generation from forklift owner to operator would not resolve the issues that currently create complex registrations but could have the opposite effect of increasing confusion and re-registrations. Further work is needed to find a solution that supports accuracy as well as aligning the incentives with the entity making the investment in the hardware. (Apr-47.4)

**Comment:** Anew disagrees with the shift of default credit generator away from the forklift owner. (15d2-212.15)

**Comment:** **Suggest phase in of changes to credit generator.** The proposed updates to Section 95483(c)(4)(A) will result in changes to registrations and cause disturbance to the forklift market at the same time the industry is managing changes associated with the Zero Emission Forklift Rule. We suggest phasing in the proposed change to making the owner of the FSE the credit generator at the same time meter requirements are implemented so that re-registrations and changes to reporting can be handled at one time. This will also enable fleet owners and operators to address program changes and registration requirements at one time, rather than multiple changes and re-registrations to address the change in credit generator and change in metering registration separately. (15d2-288.3)

**Agency Response:** No changes were made in response to these comments. Staff aligned the default credit generator for electric forklifts with other off-road battery-electric crediting categories, including electric transport refrigeration units, cargo handling equipment, and ocean-going vessels at berth.

### **X-3 Multiple Comments: *Support for Metering of Forklifts***

**Comment:** Phase In of e-Forklift Metering Requirements We support the move to metering of forklifts; however, we urge CARB to consider the many complications of developing and deploying devices that can accomplish this and to allow a gradual timeline to transition from estimation method to metering, as Washington and Oregon have done. (Apr-47.3)

**Comment:** ➤ The above goal can be easily attained by the metering requirement as shown from the numbers in Oregon (90% drop in eFL credits 4Q22 to 4Q23).

➤ Re-asses the above CARB rational after studying the effect of implementing metering on the number of credits. 2. Class III Forklifts According to CARB's rational document, class III represents ~20% of the forklifts and not really contributing to the fossil fuel displacement. (Apr-195.1c)

**Comment:** 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. (15d1-086.3)

**Agency Response:** Changes were made in response to these comments. The metering requirement will not take effect under the Proposed Amendments until 2026. Staff appreciates the support for these amendments.

### **X-4 Multiple Comments: *Support for Existing Forklift Credit Generation Methodology***

**Comment:** 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: 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. (15d1-061.2)

**Comment:** FuSE supports the continued use of the Calculated Methodology used for forklift energy consumption, though technical revisions could be considered to ensure data accuracy and integrity. (Apr-54.5)

**Agency Response:** No changes were made in response to these comments. The requirement for metering will improve data accuracy and enable transactions verification while also aligning forklift reporting with all other reported electricity crediting.

#### **X-5    *Support for Revision of Forklift Credit Generation Methodology***

**Comment:** EVCA and CalETC support the proposal for all sizes of electric forklifts to remain in LCFS. We argued that many fuels and end-uses of low-carbon fuel technologies are regulated and/or already exist in the market (not just electric forklifts), and that any criteria for removal of a fuel or technology from LCFS eligibility should be fuel and technology neutral, transparent, support the state's requirements and goals to decarbonize transportation fuel and the transportation sector, complementary to existing regulations, and approved by the CARB Board. We also support the proposed LCFS provisions to remove estimation of kWh for electric forklifts and require metering and third-party verifiers. (45d-188.9)

**Agency Response:** No changes were made in response to this comment. Staff appreciates the support for these amendments.

#### **X-6    *Multiple Comments: Opposition to Revision of Forklift Credit Generation Methodology***

**Comment:** I am opposed to reduction in number of credits generated by e-forklifts for the reasons below: -Unlike other EVs, most forklifts do not have energy measurement devices, making this an additional expense in hardware as well as resources to implement. – The reduction of credit generation will make it difficult to finance implementation the required metering. -I recommend leaving the current credit generation or evaluating ways to temper the reduction. (45d-004.1)

**Comment:** We would like to submit our strongest opposition to the reduction of EER Ratio for Forklift Trucks with <12,000lbs Lift Capacity by 50%, down to 1.9 from the current value of 3.8. (45d-010.1)

**Comment:** We oppose the proposed reduction in credits generated by e-forklifts. Unlike other EV's, our forklifts do not have energy measurement devices. We would be faced with the additional expense of purchase and installation of such devices. (45d-16.01)

**Comment:** Class V Lift Truck Replacement: Class V lift truck replacement is still relatively low because electric lift truck options that can effectively replace Class V trucks are a relatively recent technological advancement. The Class V truck is critical to several industries, particularly agriculture and food processing (as mentioned above). The proposed amendments focus on lift truck capacity as a metric for prevalence of internal combustion lift trucks, which overlooks the wide-spread use of internal combustion Class V trucks that typically have a



capacity of 5,000lbs-6,000lbs. The current methodology and data provided do not account for the importance of conversion in this sector. (45d-150.5)

**Comment:** By ending the estimation methodology reporting technique, CARB improves the accuracy of credit generation, but creates an additional cost burden to install “direct metering” equipment at existing participants facilities. The cost of this additional metering equipment may decrease participation in the program and eliminate a revenue source that was part of the fleet’s procurement plan. It is understood that better quantification methods are necessary for forklifts, and we propose an intermediary step be taken to allow for a transition period of three (3) years to phase out the use of the estimation methodology for already registered FSE, rather than requiring an immediate transition. Such an intermediary measure would allow for continued recognition of emissions reductions from EV forklifts that were procured and registered under the current program requirements. (45d-153.4)

**Comment:** 3Degrees urges ARB to not phase out technology (e.g., zero-emission (ZE) forklifts) or fuel types from the program via energy economic ratio (EER) adjustments. Staff’s proposal to adjust the EER for forklifts with lift capacities less than 12,000 kg (§95486.1(a) - Table 5) to decrease credit generation opportunities for this technology introduces unnecessary regulatory risk to the LCFS program. In the Initial Statement of Reasons (ISOR), Staff explains that this adjustment is based on a re-evaluation of the forklift baseline; because ZE forklifts have replaced many combustion-fuel forklifts in the State, Staff is assuming that approximately 50% of new ZE forklifts purchased will be replacing older ZE forklifts, effectively neutralizing overall ZE forklift adoption rates. However, not only is this crediting limitation ill founded, it sets a precedent for the reduction of other credit generation opportunities that could threaten the ability to meet program targets, especially in the long-term. In conjunction with the LCFS, other California policies aimed at decarbonizing vehicle types and fuels, such as the Advanced Clean Cars II Regulation, Advanced Clean Trucks Regulation, and Advanced Clean Fleets Regulation, will inevitably lead to similar situations in which some portion of ZEV purchases for those equipment types will be made to replace existing ZEVs.

However, depending on the vehicle type, this does not necessarily mean that older ZEVs will be retired. For example, used light-duty ZEVs with a lower price point may replace fossil fuel vehicles that would not otherwise have been retired. The need for ARB to account for this kind of market dynamic while balancing decarbonization goals against program operability underscores the importance of establishing clear criteria for equipment phase outs.

Arbitrarily halving the EER, defined in the regulation as “the dimensionless value that represents the efficiency of a fuel as used in a powertrain as compared to a reference fuel used in the same powertrain,” should not be used as the method to discount forklift credit generation, or that of other technologies or fuels. If ARB must phase out any credit generation opportunity, this should only occur via a well-defined, data-driven methodology that accurately accounts for market saturation and other relevant factors. As noted in our comments during the workshop phase of this rulemaking, the LCFS should provide an off-ramp or other provision geared at a smooth and predictable transition out of the program. A lack of clarity on how other equipment types will be treated under the LCFS as they gain traction may result in reduced investment in these technologies, making it more difficult for the Program to achieve its long-term goals. (45d-195.2)

**Comment:** Air Products supports phasing down electric forklift crediting based on existing fleets that effectively transitioned to electrification where credits under the LCFS are understood to have little to no impact on the rate or magnitude of the transition (i.e., electrification is the baseline for new purchases/replacements and no longer should be considered an opt-in source eligible to generate LCFS credits). This is a durable principle that can be applied to other sectors when the transition is sustainable. However, we do not believe that adjusting the Energy Economy Ratio (EER) is a valid way to do this and are concerned about the precedent this will set for other vehicle classes. The CI targets in the LCFS regulation are anchored in the CI of the base fuels – gasoline and diesel. The EERs that are used in the credit generation calculation should likewise always be calculated relative to the conventional fuel vehicles that are being replaced. This helps ensure proper crediting for the vehicle turnover that is needed to comply with various ZEV regulations and mandates. (45d-214.38)

**Comment:** e-Mission Control strongly opposes the EER reduction for forklifts under 12,000lb lift capacity, for three important reasons: This will heavily undermine the success of the Zero-Emission Forklift Rule, which uses the LCFS program funds, as currently calculated, to show a beneficial ROI. The EER is not the place to account for market penetration effects of the LCFS program. There already exists high market penetration of renewable diesel, electrified eOGVs/shore-power for container operations, and several other LCFS-qualified equipment segments. Cavalier EER adjustments set a bad precedent for future rulemaking, both in and outside of California. Any tactic taken to reduce credit generation should only come from adjusting the compliance curve. The LCFS program should holistically support fleets of all types, mixes, and sizes, and, as there is no prohibition on spending funds generated from one technology (i.e. forklifts) on another (i.e. converting TRU's to hybrid eTRU's), CARB should continue incentivizing zero-emission technologies until entire fleets, not specific technologies, are entirely zero-emission. Additionally, considering specific technologies for a reduced EER value simply based on the commercialization readiness or market penetration becomes an extremely slippery slope. In addition to forklifts, total cost of ownership analysis for light-duty vehicles<sup>2</sup>, shore power<sup>3</sup>, hybrid eTRUs<sup>4</sup>, natural gas Class 8 trucks, and soon, heavy-duty vehicles<sup>5</sup>, all regularly show a net benefit, even without incentive from the LCFS, and many will reach a significant market penetration well within the time bounds of the LCFS. (45d-218.3)

**Comment:** Creating a Phase-Out process in the Rule rather than adjusting Energy Economy ratio CARB's proposal to modify the EER of forklifts is not consistent with the definition and purpose of an EER. While the SRIA points to some review of the original analysis, the discussion and methodology in the EER adjustment are not based on the technical parameters of the EER study (see previous comments from PineSpire including on the shortcomings of the explanation provided in the SRIA). It is recommended that rather than adjusting the Energy Economy Ratio, CARB take this opportunity to create a process in the Rule for determining when market saturation of a technology or fuel source has reached a point where it no longer qualifies for full participation in the LCFS program. Applying the reduction to reduce the EER for forklifts, but not to throttle participation by Renewable Diesel, for example, creates a confusing precedent and contributes to market uncertainty as well as undermining the State's push for vehicle electrification. (Apr-47.2)

**Comment:** e-Mission Control strongly opposes the EER reduction for forklifts under 12,000lb lift capacity, for three important reasons: cont. 1) This will heavily undermine the success of the Zero-Emission Forklift Rule, which uses the LCFS program funds, as currently calculated, to show a beneficial ROI. Reducing the EER by half increases the ROI by 50% or more, directly impacting small and medium-sized businesses that will be required to purchase new lifts and equipment to comply. 2) The EER is not the place to account for market penetration effects of the LCFS program. There already exists high market penetration of renewable diesel, electrified eOGVs/shore-power for container operations, and several other LCFS-qualified equipment segments. Cavalier EER adjustments set a bad precedent for future rulemaking, both in and outside of California. If market penetration is a concern of LCFS staff, then a credit calculation variable should be introduced. Please be aware that implementation of metering in the eMHE category will already reduce eMHE credit generation by 90%+ (most fleets will not see an ROI on sub-metering and Book-and-Claim ROI is not likely in the near term, meaning the reduced EER is impactful in the credit calculation equation twice). 3) Any tactic taken to reduce credit generation should only come from adjusting the compliance curve. The LCFS program should holistically support fleets of all types, mixes, and sizes, and, as there is no prohibition on spending funds generated from one technology (i.e. forklifts) on another (i.e. converting TRU's to hybrid's), CARB should continue incentivizing zero-emission technologies until entire fleets, not specific technologies, are entirely zero-emission. Additionally, considering specific technologies for a reduced EER value simply based on the commercialization readiness or market penetration becomes an extremely slippery slope. We believe that the argument for reduced credit generation potential, if based on the concept of additionality (whereby a key decision maker would have made the decision to electrify a certain piece of equipment anyway, even without the LCFS), should be fleet-focused, and not equipment-focused. As mentioned above, being equipment-focused is a short-sighted perspective considering the volume and mix of equipment at any one company, and is entirely juxtaposed with the intention of the LCFS. Excluding technologies now will set a bad precedent, intentional or otherwise, for states that need to lean on the CARB LCFS regulatory language for success, and worse, heavily influence greenhouse gas emission reduction in areas that do not have wide adoption of electrified vehicles and equipment. (Apr-54.3)

**Comment:** We would like to reiterate our previous comments that Staff's proposal to adjust the EER for zero-emission (ZE) forklifts with lift capacities less than 12,000 kg to decrease credit generation opportunities for this technology introduces unnecessary regulatory risk to the LCFS program.

This crediting limitation is founded on incorrect assumptions about ZE forklift adoption rates and turnover, and it sets a dangerous precedent for the reduction of other credit generation opportunities that could threaten the ability to meet program targets as the ambition of CI reduction rates increases. (Apr-128.5)

**Comment:** Smart Charging Technologies submits this letter to express our concern and offer solutions to the proposed amendment dropping eForklift EER from 3.8 to 1.9. First, the concerns:

1. Recent implementation of eForklifts metering requirements in Oregon resulted in over 90% drop in credits 4Q22 to 4Q23. Looking at the DEQ 4Q23 Credits report we notice:

- The 1st impact of metering started showing on 1Q23 when DEQ allowed only 30% Depth of Discharge. This resulted in a drop of 78% between 4Q22 and 1Q23.

- The 2nd impact of metering, a drop of 75%, showed on 4Q23 when using credit estimation was discontinued.

- Thus, the total impact of metering is a drop of over 90% between 4Q22 and 4Q23

2. Using the LCFS Credit/Deficit formula shows that reducing the eForklift EER by 50% reduces credits by 66%.

3. Combining the impact of Metering and EER drop causes severe eForklift Feasibility Impact.

- Reducing the eForklift EER by 50% reduces credits by (66%)

- New Metering requirements reduce credits by (90%)

- 3rd-Party Verification(Electricity) increases costs by \$5k - \$10k.

- The above proposed requirements lead to a very narrow margin, if not negative. This is a major disincentive to customers to go with eForklift.

The above impacts are illustrated in the following waterfall chart for a company having 2000 credits, sold at a \$100 each, almost double the current market price, resulting in \$1,800 net income.

4. Such impact leads to:

- Enrolled fleet operators opting out.

- Missing an opportunity to reduce CI from fossil forklift continued presence (40% of the market).

5. EER represents a scientific tool to compare the fuel efficiency of eForklift vs. fossil fuel forklift. Not a tool to arbitrary reflect policies or commercial reality. “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 used in the same powertrain. EERs are often a comparison of miles per gasoline gallon equivalent (mpge) between two fuels.” (Apr-195.1a)

**Comment:** 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: 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. (15d1-061.3)

**Agency Response:** Changes were made in response to these comments. Staff modified the Proposed Amendments to increase the EER of battery-electric forklifts with lift capacity less than 12,000 lbs from 1.9 to 2.4, and the EER of hydrogen fuel cell-electric forklifts with lift capacity less than 12,000 lbs from 1.1 to 1.6. This change reflected an average of an EER of 1 (to account for 50% of the baseline being zero

emission) and the existing EER (to account for 50% of the baseline fleet being internal combustion engine equipment). Battery-electric forklifts have been eligible for LCFS credit generation since the 2015 LCFS rulemaking. Much of the forklift inventory in the State has successfully transitioned to non-combustion technology, in line with State goals. This success story provided an opportunity for the LCFS program to re-evaluate the level of crediting appropriate for battery-electric forklifts. Accordingly, staff revised the baseline for battery-electric forklifts by incorporating the 2010 status of forklift electrification into the baseline, and proposed 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 2010 baseline, forklifts with lift capacities greater than 12,000 lbs. were left unchanged and remain at the established forklift EER.

#### **X-7 Multiple Comments: *Set Phase-Out Dates for Forklifts***

**Comment:** We further propose that any changes to forklift reporting criteria be aligned with CARB's proposed Zero-Emission Forklift Regulation, allowing companies to onboard new ZEVs and infrastructure that could also meet the goals of the LCFS quantification on the same timeline. The proposed Zero-Emission Forklift Regulation has scheduled phaseouts of MY 2025 forklifts beginning in 2028, aligning with the suggested transition period of three (3) years. This would allow fleets the ability to support LCFS goals while strategically preparing for the Zero-Emission Forklift Regulation in a way that causes minimal disruption to operations and maximizes adoption and emissions reductions. (45d-153.5)

**Comment:** 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 to be zero-emission by 2040. (45d-154.15)

**Comment:** It's a good idea to discontinue the credits for forklifts and move those funds to something else that needs electrification. (45d-297.7)

**Comment:** Higher limitations and phaseout measures for forklift crediting. (45d-376.4)

**Comment:** Creating a Phase-Out process in the Rule rather than adjusting Energy Economy ratio CARB's proposal to modify the EER of forklifts is not consistent with the definition and purpose of an EER. While the SRIA points to some review of the original analysis, the discussion and methodology in the EER adjustment are not based on the technical parameters of the EER study (see previous comments from PineSpire including on the shortcomings of the explanation provided in the SRIA). It is recommended that rather than adjusting the Energy Economy Ratio, CARB take this opportunity to create a process in the Rule for determining when market saturation of a technology or fuel source has reached a point where it no longer qualifies for full participation in the LCFS program. Applying the reduction to reduce the EER for forklifts, but not to throttle participation by Renewable Diesel, for example, creates a confusing precedent and contributes to market uncertainty as well as undermining the State's push for vehicle electrification. (Apr-47.2)

**Comment:** '➤ Removing Class III forklifts from the baseline may contribute to solve the baseline problem. ➤ Trying to delineate energy consumption amongst above and below 12,000lb lift capacities will be difficult for most fleets.

➤ The cost of metering implementation was not feasible for Class III fleet operators in Oregon, hence they opted out. (Apr-195.1d)

**Comment:** 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. (15d1-086.2)

**Comment:** Support the phase-in the implementation of forklift metering requirements. SRECTrade supports the phased in approach to forklift metering as an appropriate reflection of the complexities for forklift owners to implement the updates. We appreciate CARB's consideration of the business impacts and allowing for more time to meet these requirements. (15d2-288.2)

**Agency Response:** No changes were made in response to these comments. The phase-out of forklifts under the Zero-Emission Forklift Regulation continues until 2038; at this time, LCFS crediting continues to provide an important incentive to encourage the replacement of fossil fuel use by forklifts.

#### **X-8 *Allow Costs for LCFS Program Operation to be Excluded from Proceeds Required to Promote Electric Vehicle Use***

**Comment:** 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: Not allowing any LCFS credit proceeds to offset the cost of verification and meter installation. We therefore suggest the following: • 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. (15d1-061.5)

**Agency Response:** No changes were made in response to these comments. The estimated value of forklift LCFS credit generation should remain large enough to encourage opting-in while also covering registration and reporting costs.

#### **X-9 Multiple Comments: *Use Fractional Displacement Instead of Revising EER***

**Comment:** If an inaccurate baseline continues to be a problem, then a more scientific approach, e.g. Fractional Displacement<sup>1</sup>, may be considered for future rulemaking. In the paper, Dr. Murphy makes the following recommendation regarding e-forklifts: “Based on the assumption of a 40% incumbent fraction, immediate application of FD crediting would result in a precipitous drop in LCFS credit generation from this category, compared to the current method. While this would more accurately reflect anticipated emissions benefits, it could have a disruptive effect on the progress of this sector toward carbon neutrality. To mitigate this, a gradual catch-up approach that limited the maximum rate of change for the FD term to no more than 10% per year was adopted. This guaranteed a phase-down period for credits from fuel displacement of no less than 10 years (Figure 4).” (Apr-195.1e)

**Comment: Clarity on implementing EER updates.** SRECTrade requests that CARB clarify when the changes to the forklift EER will go into effect as well as the associated changes to application type reporting based on forklift capacity rather than model year. This clarification will give all parties time to update their reporting systems and support a smooth transition. (15d2-288.4)

**Agency Response:** Changes were made in response to this comment. The Proposed Amendments as modified now use a weighted-average adjusted EER for forklifts (see response to comment X-6), which has a similar effect as the fractional displacement approach and can also be easily applied to multi-fuel situations. See also the response to comment 45d-391.41 (Response C-11) with regard to fractional displacement. The change in EERs would be effective immediately upon the effective date of the regulation.

#### **X-10 Remove Class III Lift Truck Eligibility from LCFS Instead of Revising EER**

**Comment:** The proposed reduction in EER, paired with metering requirements, will make it untenable for nearly all forklifts to participate. Unlike other EV chargers that have built in ‘smart’ capabilities and other financial incentives (i.e. fees for charging) to measure energy usage, the incremental cost to install metering devices, connect to the cloud, and extract energy usage data from forklift chargers, would very likely exceed the value of the credits if the EER is reduced as proposed.

PineSpire recommends CARB remove Class III lift truck eligibility to address the issues in the analysis instead of cutting the EER for all lift trucks. This would be a more accurate and precise adjustment than the proposed 50% reduction, which is unclear how it was calculated. Furthermore, it would be more aligned with the previous analysis and methodology used to develop the forklift EER. (45d-150.3)

**Agency Response:** Changes were made in response to this comment. Staff revised the calculation of the EERs for forklifts with lift capacities less than 12,000 lbs (please see Response X-6 above).

### **X-11 Use California Forklift Data Instead of Nationwide Data**

**Comment:** California Specific Industries: The ITA data is a nationwide value that does not reflect the unique and very significant agriculture industry in California, which traditionally relies on propane due to varied indoor-outdoor working environments and seasonal demands for non-stop operations. It is not clear that this dataset is reflective of the sales and industries in California. (45d-150.4)

**Agency Response:** No changes were made in response to this comment. CARB determined that the national dataset was adequately representative for this purpose.

### **X-12 Multiple Comments: Recommend Universal Standard for Methodology Revisions**

**Comment:** One of the justifications that CARB has given in the statement of reasons is that many of the forklifts have successfully transitioned to zero-emission technology, which is widely available. Yet, CARB doesn't seem to have a standard to apply across the board when a certain pathway or technology has successfully transitioned to low/zero-emission or becomes widely available. (45d-010.2)

**Comment:** Additional Considerations: □ Consistency with other CARB regulations: Fleet owners and operators are simultaneously responsible for complying with other CARB regulations, such as the proposed Zero Emission Forklift rule. CARB's zero-emission rules typically rely on a phased-in approach for adoption and implementation, as an acknowledgment of the cost and resources required for compliance. This phase-in approach also ensures a smoother transition for all parties by providing a more gradual 'ramp up' of metering. Using a phased in approach with metering in the LCFS would be consistent and appropriate. □ Agriculture and Processing Industry Issues: Agricultural, food processing, wine, and beverage industries have several operational constraints relevant to developing hardware, connectivity solutions, and deploying meters. For example, many post-harvest and food processing facilities operate equipment within environments with a high level of dust that may require specific hardware enclosure designs. Similarly, cold storage facilities may challenge typical hardware specifications and require time to adapt specifications. Additionally, during harvest/post-harvest seasons (which can last one to two quarters), many facilities operate around the clock and do not have staff resources nor fleet down-time that would be required to deploy meters. Many of these facilities are large and forklift charging equipment is dispersed at many locations; it is common for facilities not to have reliable Wi-Fi reach throughout these dispersed locations, meaning that additional time and cost is required to deploy routers solely for use by energy measurement devices. PineSpire represents dozens of agricultural and food processing businesses across California, responsible for thousands of acres of farmland, and millions to billions of dollars of food production. If CARB has specific questions for these types of facilities, we are happy to put you in touch with facility managers to discuss further. □ Long-term commitment vs. short-term rentals: Participating in the LCFS program requires sustained resource investment (understanding the program, compiling registration information, regular reporting updates, etc.). Rental forklifts are frequently a short-term business solution for operators. The long-term investment in the purchase, maintenance, repairs of a rental forklift is made by the rental fleet owner, therefore the long-term benefits that come from the LCFS program should also accrue to the owner. □ Data Management: In the current framework, the "credits generator" is the facility owner (i.e., the rental operator) who may not have permission



to add metering to chargers or forklifts, even in the rare long-term rental case where it makes financial sense. This mismatch creates issues with the ability to implement metering, access data, and reporting for most rental forklifts as proposed under the amendment. □ Does not achieve CARB's stated goal of eliminating registration burdens: The reality of forklift ownership and operation is that a significant portion of all facilities operate both owned and rented equipment simultaneously. For example, the majority of rental lift trucks come with a rental charger that would not be picked up by the fleet operator's metering. We recommend reconsidering options for modifying registration requirements that better align with the realities of mixed-fleet ownership, and metering implementation. We do appreciate there are a range of scenarios of ownership and operation, however we caution against moving ahead with updates that would not reduce the registration burdens. (45d-150.7)

**Comment:** Further, in the Initial Statement of Reasons released with the draft rule in December, Staff states that they are "revising the baseline for battery-electric forklifts by incorporating the 2010 status of forklift electrification into the baseline." If CARB is going to shift the baseline at this late point in the program (more than 14 years after its inception), Staff should implement the same baseline across all technologies. The key point is that a lack of clarity on how other equipment types will be treated under the LCFS as they gain traction may result in reduced investment in these technologies, making it more difficult for the program to achieve its long-term goals. (Apr-128.6)

**Comment:** A methodology for phasing out mature technologies is vital to keep LCFS a technology-neutral program.

- ARB should establish clear criteria for what warrants a specific technology or fuel being phased out of the program.
- It is unclear whether an EER adjustment is only a mechanism for electricity-based crediting, as such a change has not been suggested for renewable diesel which is currently 40% of the diesel pool in California. ARB should clarify if it intends to apply a similar restructuring of credits from renewable diesel if renewable diesel grows to represent 50% or more of the diesel pool in California. Any proposal to phase out specific fuels or technologies should be applied equally to all fuels in the program, not just to electric vehicles.
- We also request that CARB establish clear rules on "how" technologies will be phased out. The LCFS should provide an off-ramp or other provision geared at a smooth and predictable transition out of the program. These provisions ensure market certainty for ZEV manufacturers and market participants.
- CARB will also need to assess any broader impacts to the program if specific credit-generating technologies or fuels are phased out of the program but the deficit-generating fuels that these technologies replace continue to be regulated in the program. In conclusion, we again caution dropping the EER by 50% has far-reaching implications, and its implementation, if at all, should only take place after careful collaboration and dialogue with the aggregators. (Apr-195.1f)

**Agency Response:** No changes were made in response to these comments. The EER adjustment was made based on the population characteristics of forklift fleets at the

time the LCFS program began. Population characteristics of other vehicle types at that time were nearly completely fossil fuel based. The EER for renewable diesel is 1, so its significant use merits no EER adjustment. See also Response C-11 with regard to the concept of fractional displacement and adjusting baselines over time.

## **Y. eTRU**

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### **Y-1 *Support eTRU Changes for FFRE/FSE***

**Comment:** PineSpire strongly supports the proposed updates to eTRU credit generation to align with the realities of eTRU operations and ownership. TRUs are more similar to on-road EVs, moving continually from site to site and frequently not having a direct contractual relationship with their charging location, therefore the proposed changes are the most practical solution to enable wider participation in this sector. (45d-150.8)

**Agency Response:** No change was made in response to this comment. We appreciate your support of the eTRU provisions.

## **Z. Biomethane**

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### **Z-1 *Avoided Methane Crediting***

#### **Z-1.1 *Multiple Comments: Support for Proposed Approach to Phasing out Avoided Methane Crediting***

**Comment:** Promus appreciates that CARB is extending up to three ten-year crediting periods for biomethane avoided emissions crediting for projects that break ground before 2030. (45d-049.3)

**Comment:** Anti-dairy activists continue their misguided efforts to call for a complete change of course on the State's SLCP Reduction goals. Some have called for forced conversion to pasture-based operations, direct regulation of dairy farms, and immediate phase outs of dairy digester incentives. These proposals will not only fail to achieve the desired greenhouse gas emission reductions but will also exacerbate the problem by causing significant emissions "leakage." Command and control measures for SLCP reductions in the dairy industry will accelerate dairies leaving California for states with less costly regulations and less commitment to climate protection. This outcome would be in direct conflict with CARB's mandates to minimize emission leakage in the design of its GHG programs. CARB has wisely rejected calls for immediate phase out of dairy biomethane pathways. We applaud CARB for developing a robust record on the importance of the LCFS to the achievement of SLCP emission reductions. (45d-245.4)

**Comment:** We strongly support the proposed amendment allowing projects that break ground by December 31, 2029 to preserve the current approach of book and claim and the full three, 10 year avoided methane crediting periods to continue to incentivize the growth of the biogas to RNG industry as an integral component of achieving CARB's goals. (45d-252.1)

**Comment:** We are pleased that CARB, via the just-released *Proposed Amendments to the Low Carbon Fuel Standard Regulation*,<sup>1</sup> is proposing to allow projects that break ground by

December 31, 2029 to retain the current approach to book and claim and avoided methane accounting.

<sup>1</sup> “Appendix A-1; Proposed Regulation Order; Proposed Amendments to the Low Carbon Fuel Standard Regulation,” California Air Resources Board, January 2, 2024

(45d-328.2)

**Comment:** CRTA initially commented in 2022 that both the Avoided Methane Accounting and “Book & Claim” provisions in the LCFS, as originally designed, are effective tools to maintain the RNG supply envisioned under the 2022 Scoping Plan Update and to achieve the required reductions of Senate Bill 1383. That said, we support the approach taken by CARB staff in the proposed amendments related to these two provisions. It is a balanced approach that enables RNG to continue providing achievable emission reductions for existing and emerging technologies, resulting in better air quality today and into the future.

The effective and abundant capture of methane today is critical to limiting the planet’s warming to 1.5 degrees Celsius, thus preserving the health of our planet and its inhabitants. Methane is a potent GHG and short-lived climate pollutant that accelerates climate change if left unabated. It accounts for almost 30 percent of the rise in global temperatures in the post-industrial era and is 80 percent more potent than carbon dioxide over a 20-year period.

LCFS has proven to be a key driver for the effective capture and reuse of otherwise unabated methane emissions, particularly from dairy operations. It does this by converting raw methane into RNG for use in transportation and other industry sectors. The use of RNG not only helps to decarbonize internal combustion engines like low NOx natural gas trucks and buses, it also can be used to power and decarbonize battery-electric and hydrogen-based platforms.

Therefore, CRTA strongly supports CARB staff’s recommendation to continue its application of avoided methane accounting and the program’s use of “book and claim” deliverability for RNG projects developed on or before December 31, 2029 that support the transportation sector. By doing so, it restores project planning predictability for investors thereby avoiding stranded assets and incentivizing continued low carbon fuel production. Maintaining strong RNG pathways in the short term maintains its availability for use in other industry sectors as envisioned in the 2022 Scoping Plan Update. We also support CARB staff’s recommendations to provide additional time for RNG-supported hydrogen pathways to boost production of this versatile fuel and capitalize on initial funding for infrastructure and production. (45d-382.4)

**Comment: Adopt the avoided methane credit and “book and claim” provisions outlined in staff’s proposed amendments to LCFS .** LCFS has proven to be a key driver for the effective capture and reuse of otherwise unabated methane emissions, particularly from dairy operations. The use of RNG derived from this process not only helps to decarbonize internal combustion engines like low NOx natural gas trucks and buses, but it can also be used to power and decarbonize battery-electric and hydrogen-based platforms, as envisioned in CARB’s 2022 Scoping Plan Update. Therefore, CRTA supports CARB staff’s recommendation to continue its application of avoided methane accounting ... that support the transportation sector. (Apr-164.5)

**Comment:** We also support CARB staff's recommendations to provide additional time for RNG-supported hydrogen pathways to boost production of this versatile fuel and capitalize on initial funding for infrastructure and production. (Apr-164.7)

**Comment:** CARB must phase out support for biomethane, which is propping up the expansion of polluting factory farms. (15d-011.2)

**Comment:** 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. (15d1-059.5)

**Comment:** 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.

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. (15d1-249.2)

**Agency Response:** Staff appreciates the commenters' support for the proposed changes to avoided methane crediting.

### **Z-1.2 Multiple Comments: *Eliminate Avoided Methane Crediting for Anaerobic Digestion of Methane Emissions from Livestock Manure***

**Comment:** Eliminate "avoided methane crediting" in 2024. (45d-001.3, 45d-27.2, 45d-30.1, 45d-184.2, 45d-230.1, 45d-272.5, 45d-339.1, 45d-381.1, 45d-398.1, 8608-8727.2, 8756-8763.2, Apr-077.3, 15d1-043.1)

**Comment:** 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. (45d-001.4)

**Comment:** Please stop incentivizing factory farm gas and anaerobic digesters. CAFOs are filthy, cruel, and exploitative of humans and animals. Rather than provide an additional revenue stream, we should be disincentivizing CAFOs. (45d-21.1)

**Comment:** Writing to encourage the enactment of the low carbon fuel standard in California. The state's policies impact the largest economy in the nation and one of the largest in the world, and these policies frequently spill over to other states - California should be leader in holding factory farms, already bastions of cruelty, to account for their emissions. (45d-22.1)

**Comment:** Please remove CAFO (factory farm) manure biogas from the clean fuel standard. This "avoided methane credit" is expanding destructive factory farming throughout the country. Rural communities, small farmers, farm animals, and the environment all suffer because of this horrible greenwashing scheme. (45d-23.1)

**Comment:** Please do nothing to incentivize polluting factory farms. We have enough of them in Indiana and I don't want any more. Turn to cleaner energy technology now. (45d-24.1)

**Comment:** Stop permitting FACTORY FARMS. (45d-25.1)

**Comment:** Please stop activity that promotes destructive and polluting CAFOs. Thank you. (45d-26.1)

**Comment:** It is driving the construction of more factory farms and factory farm biogas project in states far from California, causing severe harm to air, water, public health, rural economies, and overall quality of life. (45d-27.1, 8756-8763.1)

**Comment:** Incentivizing digesters to remove methane from manure with very lucrative credits is backfiring. It has spawned a Ponzi scheme for investors in digesters to benefit financially on the overproduction of manure. Stop it please. (45d-28.1)

**Comment:** CARB's Environmental Justice Advisory Committee presented a clear alternative to the dirty status quo, and submitted a resolution calling for an end to the current LCFS policies that reward factory farm polluters.

Please do the right and sustainable thing. (45d-29.1)

**Comment:** \* Stop awarding the biggest polluters!

\* Stop increased GHG emissions as a result of factory farming.

\* Dairy manure contributes to about a third of the nitrate polluting groundwater in the Central Valley and has polluted in many areas 30-40% of private wells.

\* It takes about 2 agricultural acres per head of cattle to sustain just feeding them, which is then not available for feeding people. Incentivizing factory farms makes this worse. Biogas digester promotion aggravates the problem and dairy herds become just the first stage of an industrial money-making scheme that is already severely impacting our public health and our environment.

\* CARB disregards violations of out-of-state rules and regulations. (45d-32.1)

**Comment:** I'm against including factory farm gas in California's Low Carbon Fuel Standard. This will not be a positive solution for our climate crisis. One of the main reasons to nix factory farm gas from the standard is that it will encourage more large factory farms, making it harder for small family farms to prosper while these corporate farms push down market prices with overproduction. More issues with this bill include the fact that multinational large meatpackers will be paid for their pollution, and the bill will create incentives via government subsidies to support anaerobic digesters for factory farm gas.

This would add more factory farms which will lead to more methane, more water and air pollution, more corporate consolidation. I'm in the Midwest and know this will not lead to less carbon release in our atmosphere. Please strike this portion of the amendments. (45d-36.1, 45d-51.1)

**Comment:** Please do not allow the CA Air Resources Board to allow corporate factory farms across the country to sell methane to this misguided system- which is not a solution to our

country's air pollution problem. We must stop allowing big corporate farms to create this hazardous gas in the first place. (45d-38.1)

**Comment:** Please do not include factory farm gas in the new California Low Carbon Fuel standard. Doing so is harmful to the environment by encouraging more factory farms. These are polluting to our land, water and air quality resources.

Corporate out of state and in many cases out of country businesses will profit from this change. (45d-39.1)

**Comment:** This is a bad plan. Corporate livestock operations are massive polluters of air, water, and land. I do not want to incentivise these businesses or attract them to rural Missouri. They are a huge cost to the communities located near them, and massively destructive for wildlife. Vote NO (45d-41.1)

**Comment:** The state's Environmental Justice Advisory Committee (EJAC) was sharp in its criticism of the current LCFS, including the way CARB has evaluated CAFO biogas. In its comment, the Advisory Committee stated, "The LCFS has exacerbated and entrenched harmful pollution in communities near and regions containing large dairies and other confined animal feeding operations by incentivizing the production, storage, and land application of wet manure."<sup>17</sup> EJAC specifically called on CARB to "Conduct a full accounting of GHG and air pollution emissions associated with pathways relying on the production of fuel from livestock and dairy manure"; "Eliminate avoided methane credits effective January 1, 2024;" and "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." EJAC further recommends that CARB take steps to "immediately initiate formal rulemaking for the regulation of livestock methane."

<sup>17</sup> <https://www.arb.ca.gov/lists/com-attach/1-lcfs2024-VjMFaQNjUGABWFA0.pdf>

IATP is supportive of EJAC's recommendations, and we urge CARB to revise its LCFS amendments accordingly. (45d-42.5)

**Comment:** I am truly concerned about having more huge corporate farms moving into our state. (Missouri). And, paying them for the methane they produce would invite MORE to come to our state.

They are often owned by out of country people from China and other places that do not have our best interests at heart.

They raise animals in crowded, unhealthy, unnatural, conditions that are not humane .....

They are harmful to our water supply and harmful to the environment .....

Seems we can do a better job of raising animals on a smaller, more natural basis ..... and more humane. (45d-44.1)

**Comment:** Please stop incentivizing CAFOs by claiming their methane is a renewable resource. It is just like all the waste they want to dump in our rivers--POLLUTION. Please stop. (45d-46.1)

**Comment:** Concentrated manure is a preventable source, and this process is poorly captured. Pipeline losses will also apply to “biogas”. In addition to environmental impacts, community planning for emergency situations is usually under-assessed and under-developed. These become gigantic explosion risks, whether or not the methane is intended to be collected. (45d-52.1)

**Comment:** METHANE/BIOGASSES; LESS THAN IS WAY MORE THAN!

VEGAN, A NOUN, IE. SOMEONE WHO TRULY CARES FOR PLANET EARTH AND ALL ON ITS INHABITANTS. (45d-53.1)

**Comment:** Factory Farm Gas

If we don't get this horrible pollution under control control soon, this planet will never recover (45d-54.1)

**Comment:** California has more industrial dairies than any other state, polluting our rivers, depleting our groundwater, and emitting disastrous greenhouse gasses. Now, factory farm polluters claim they are environmentally friendly because they produce "biogas."

Even worse, they are using our tax dollars to fund this harmful greenwashing. (45d-55.1)

**Comment:** Stop greenwashing by producing harmful Biogas. (45d-59.1)

**Comment:** Please end current Low Carbon Fuel Standard (LCFS) policies that reward factory farm polluters. Investing in biogas means investing in even more factory farm pollution. (45d-60.1)

**Comment:** This is not only harmful to animals, which should be your top priority, it increases pollution and increases carbon in the air. (45d-61.1)

**Comment:** End factory farming. It's what's good for all of us and something we collectively can be so proud to be a part of. (45d-64.1)

**Comment:** Factory farming is the one of the biggest atrocities of modern day living.

We vegans. vegetarians have proven meat is not a necessity at all in the human diet. STOP playing around with regulations that pretend to show you care about the environment. Humans are as much as animals a connecting power to the environment. We are not seperate but a part or partner to it. I have a sort of PTSD from watching a few slaughterhouse videos to help keep me on my track of meatless diet and compassion for our fellow sweet animals like the cows, sheep, goats, pigs, ducks, turkeys, and chickens etc. Man is in a state of CONFUSION in the walls of confinement of buildings, roads, etc. Only an old time native American Indian can tell you what it feels like to know the spiritual tie to the land they were so proudly apart of. Simple living was a direct connection to truth at all times and to all places in time. They could feel the energy from the earth entering their being as some of us awakened can now too. Their intuition was outstanding and their ability to communicate with ancestors. (45d-65.1)

**Comment:** I want to express my opposition to the dairy industry receiving support for its biogas production. These incentives support an industry built on pollution and cruelty. It's a classic example of greenwashing and does not benefit the environment. Biogas capture is

inefficient, costly and does not mitigate atmospheric warming gas production. Ending dairy operations is the most effective way to stop their destructive effects. Please do not support their damaging activities. (45d-66.1)

**Comment:** I AM SOOOO DISAPPOINTED THAT CALIF THE "MOST" FACTORY FARMS ALL OF WHICH PRODUCE BIO GAS

IF THAT IS THE CASE WE NEED TO CHANGE IT

FACTORY FARMS ARE BARBARIAN BIO GAS IS DEADLY (45d-68.1)

**Comment:** Please stop using my tax payer money to fund Factory Farming expenses of any kind. Thank you. (45d-69.1)

**Comment:** Biogas from CAFOs is neither clean nor naturally renewable. It's not a replacement for clean solar, water, wind, and geothermal energy. It does not solve the environmental degradation or the human and other animal suffering caused by factory farming.

This Earth Day, we must reject biogas in favor of energy and agricultural changes that can actually build a sustainable, just future. (45d-70.1)

**Comment Summary:** Stop investing in factory farm gas (45d-72.1, 45d-83.1, 45d-111.1)

**Comment:** Please stop rewarding factory farms for their pollution.

Biogas is unsustainable and unnecessary.

Stop investing in factory farm gas. (45d-73.1)

**Comment:** Please stop the many abuses of factory farms including biogas as harmful to the environment! (45d-75.1)

**Comment:** California has more industrial dairies than any other state so it is polluting rivers, depleting groundwater, and emitting disastrous greenhouse gasses!!

I experienced a NATIONWIDE food recall of California vegetables due to urine and feces run off from cows, into nearby vegetable farms!

Now, factory farm polluters claim they are environmentally friendly because they produce "biogas."

Even worse, they are using tax dollars to fund this harmful greenwashing because the fact is Biogas is unsustainable and unnecessary--it does not reduce the dairy industry's environmental footprint!!

Investing in biogas means investing in even more factory farm pollution. (45d-77.1)

**Comment:** Stop these horrible travesties to animals...despicable treatment (45d-78.1)

**Comment:** Please adopt rules that do not reward pollution producing factory farms. We need to take reasonable steps to fight climate change now. Please end policies that encourage pollution (45d-79.1)

**Comment:** Stop Public Funding for Factory Farm Gas (45d-80.1)



**Comment:** Gas killing Farm Animals

We urge you to end this process of killing Farm Animals (45d-81.1)

**Comment:** When I learned that the CARB wants to include factory farm gas in its Low Carbon Fuel Standard, I became so confused. The science is very clear that methane is not a climate-friendly gas. Everyone is aware that factory farms are nothing but harmful. Allowing factory farms to sell the methane created by housing massive numbers of cows and hogs as a supposedly “carbon negative fuel” is a completely harmful and misguided idea. Please consider the negative consequences of this proposal and scrap it. We can do better. (45d-82.1)

**Comment:** A heinous process that has tortured countless innocent animals. Please stop funding this cruel slaughter of animals. (45d-84.1)

**Comment:** Factory Farm Gassing

The abomination of euthanization by heat and carbon dioxide is beyond cruel and barbaric and has no place in a civilized society in the 21st century. (45d-85.1)

**Comment:** Biogas is unsustainable; I am against funding this harmful practice! (45d-87.1)

**Comment:** The LCFS has been the nation’s primary driver of factory farm biogas development, according to Food & Water Watch. Big Oil and Big Ag behemoths such as Chevron, BP, Shell, Smithfield, Perdue, and Tyson have invested heavily in a national methane production network from livestock waste that generates revenue from so-called “clean energy” renewable biogas under credit trading schemes such as the LCFS.

Such systems are in fact giant sources of pollution featuring vast manure lagoons that increase methane emissions, shoot pollutants such as ammonia and hydrogen sulfide into the air, and sicken communities.

CARB staff appears to have discounted such criticism in preparing its recommendation. When a scientist and former CARB fuel chief criticized CARB’s relationships to gas lobbyists, staff was barred from speaking with him by CARB’s lead climate executive, Rajinder Sahota, according to an article in Capital & Main.

As UCS senior scientist Jeremy Martin, writes, “In my feedback over the last 2 years, I argued CARB should cap support for bio-based diesel made from vegetable oil and phase out credits for avoided methane pollution to wind down what has become, in effect, a poorly run offset program. Bio-based diesel and manure biomethane generate a lot more credits than an accurate assessment of their climate benefits would support and are causing additional problems to boot. Unfortunately, the official proposal ignores the oversupply of low value credits and focuses almost exclusively on increasing demand by accelerating the pace of the program. This won’t work—and will make the LCFS needlessly costly for California drivers, while postponing the needed reforms that would restore the stability of the LCFS.”

The technical complexity of biofuels policy makes it hard for consumers to understand what they are being asked to pay for, and industry benefits from the opacity. Financially

disinterested experts have articulated substantial problems with the program's performance, which staff has ignored. (45d-89.3)

**Comment:** The state of California has long stood as a beacon of progress in environmental protection and ethical standards. However, the continued financial incentives for biogas as a byproduct of factory farming practices are in stark contradiction to these values. Beyond the significant issues of water pollution, groundwater depletion, and greenhouse gas emissions, the system of factory farming inflicts tremendous suffering on countless animals. These sentient beings are confined in overcrowded, unnatural conditions, deprived of their basic instincts and welfare, all in the name of efficiency and profit.

Supporting biogas production under the current LCFS policies not only overlooks but also financially rewards the environmental degradation and animal cruelty inherent in the factory farming model. This approach detracts from the urgent need to shift towards more sustainable and humane agricultural practices. It sends a misleading message that we can mitigate climate change without addressing the root causes of these crises, including the ethical treatment of animals.

I implore you and the CARB to reconsider the implications of supporting biogas production within the LCFS. This is a pivotal moment to align our environmental policies with a broader vision of sustainability that includes animal welfare. We must end the cycle of cruelty and environmental harm by investing in alternatives that respect animal rights and contribute to a healthier planet.

I urge you to take a stand against the greenwashing of factory farming and to lead the way in adopting policies that promote genuine sustainability, respect for animal life, and the wellbeing of our communities. The upcoming review of LCFS policies presents an invaluable opportunity to correct our course and commit to a future that values all forms of life and the integrity of our environment. (45d-90.1)

**Comment:** stop public funding for factory farm gas (45d-91.1)

**Comment:** Factory farms are cruel and inhumane. And they should not be funded with taxpayer dollars. I'm against factory farms and don't want my hard earned money supporting them. (45d-93.1)

**Comment:** Factory Farm Gas

As a nation, we have to do better for our country & our planet (45d-95.1)

**Comment:** Please end current Low Carbon Fuel Standard (LCFS) policies that reward factory farm polluters. No greenwashing. (45d-97.1)

**Comment:** Factory farms are disastrous for the environment and the animals imprisoned within.

What don't you understand? Environmental degradation and extreme animal abuse are unacceptable.

Human greed such as this is totally repugnant. (45d-99.1)

**Comment:** The population of factory farm gas has to be stop. We want California to be a safe, clean and healthy state. Please do so right now!!!! (45d-100.1)

**Comment:** As a nation we spend an inordinate amount of money on corn and bean agriculture and helping confinement feeding operations. Our agricultural policies are having far reaching effects on invasive species. Cattle, goat and sheep producers are having a tough time competing with subsidized CAFO production and invasive are taking over as grassland farmers go out of business. (45d-102.1)

**Comment:** As a person that lives near a giant swine confinement, I protest the building of any more of these factory facilities. This one has devastated my neighborhood and forced many people to move away. Because of the ventilation systems that must be engaged at all times, the collection of methane from this system is incomplete so that much methane escapes. Other pollution includes water pollution after the effluent is spread on fields. Our stream team finds excess nitrogen in the streams every spring. Building more of these giant facilities will only mean more pollution. Don't be fooled by promises that they will produce power that can be used. They don't. (45d-103.1)

**Comment:** CA Biogas is not "good"

Growing research & investigations of Big Dairy & corporate agricultural complicity in polluting air, water, and land add up to greater climate impacts at a time when we require less, and way less! Consumers are finding dairy alternatives due to lacto intolerance & legitimate investigations of inhumane treatment of cows & calves. (45d-104.1)

**Comment:** STOP INVESTING IN FACTORY FARM GAS WITH TAXPAYER MONEY!!!!!! (45d-108.1)

**Comment Summary:** End current Low Carbon Fuel Standard (LCFS) policies that reward factory farm polluters! (45d-109.1, 45d-112.1)

**Comment:** For the sake of the environment. Shut down the dairy industry California. (45d-113.1)

**Comment:** Please consider the use of low carbon fuel for Farms. (45d-115.1)

**Comment:** Biogas

End the greenwashing. (45d-116.1)

**Comment:** Stop all the high-methane, like cow and pig manure from entering the atmosphere. (45d-117.1)

**Comment:** Please do not use public funds to support biogas projects. These projects create more factory farms which produce more climate damage not less. (45d-118.1)

**Comment:** I understand wanting to make air quality better; however, capturing methane gas from farms would exacerbate another problem which is factory farming of animals. This practice abuses farm animals and increases corporate takeover of family farms of US citizens by Chinese and Brazilian corporations and/or governments

It's a horrible idea that only increases corporate profits at the expense of humane farming practices in the US by family farmers. (45d-119.1)

**Comment:** This California law is ruining our Midwestern aquaphers. They have already destroyed Iowa. We in Missouri sit on one of the biggest and most pristine aquaphers in The country. We will NOT STAND BY AND WATCH FACTORY FARMS DESTROY IT! If California wants to make methane then they should move all the factory farms out there and let them continue to destroy Californians environment. See how the people out there that like that methane also like the mess that creates it. (45d-120.1)

**Comment:** Please stop encouraging CAFOs, which is what this proposal will do.

Missouri and the nation need small farmers who care about the land, our communities and our country. Giving preference to large corporations who are often foreign owned and do not care for anything but making money is wrong. Please wake up to what pride of ownership and pride of caring for our land and communities is all about. You are supposed to represent those who elected you, and not those paid to lobby for corporate interests. Please have the courage to stand up and actually represent the people of Missouri rather than multinational corporations. (45d-122.1)

**Comment:** Please do NOT use taxpayer dollars to pay for ANYTHING for farms that harm the environment, especially oil or gas that pollutes our air. Gas should be a thing of the past and certainly not something that taxpayers purchase without our approval. Most Californians do not want to spend our taxes funding factory farms in any way. Thank you for considering those who pay here in the Golden State. (45d-123.1)

**Comment:** end current Low Carbon Fuel Standard (LCFS) policies that reward factory farm polluters! (45d-124.1)

**Comment:** Instead of investing in factory farming biogas, invest in sustainable humane certified farms and dairies. As a progressive and forward-thinking state, Californians are aware of the significant body of research that shows large scale factory farms, dairies and feedlots lead to environmental damage, lower quality food and milk, and unnecessary cruelty to the sentient beings who nourish us. California should be following the example of the various farms within our state and country who truly care about the environment by utilizing regenerative practices while providing a high-quality food supply and treating the animals who feed us with the care they deserve. See Niman Ranch, Clover, Force of Nature, Rancho Llano Seco, Stemple Creek Farm, Hart Dairy, Organic Pastures Dairy, etc. Let's truly be a forward-thinking state by ending factory farming once and for all. Thank you. (45d-125.1)

**Comment:** I am writing to expressly ask you vote against public support for factory farming gas. Factory farms are the biggest contributor to pollution of all water ways. (45d-126.1)

**Comment:** Factory farming is not healthy for humans and is torture for animals and dangerous for employees as the stress for rapid meat production makes employees make careless mistakes that end up in death and limb loss. (45d-128.1)

**Comment:** We need a healthier California!! It is not a wise decision to keep using our tax dollars to invest in biogas when it is polluting the air we breath. You have the opportunity to

adopt new rules and stop rewarding factory farms for polluting our air. I hope you will make an intelligent choice. (45d-130.1)

**Comment:** Don't let California california-cate our farms here in the Midwest (45d-133.1)

**Comment Summary:** Eliminate avoided methane crediting for fuel derived from livestock manure. (45d-134.1, 45d-137.1, 45d-163.1, 45d-272.1, 45d-337.2, 45d-372.3)

**Comment:** factory farm biogas is unsustainable. it does not reduce the dairy industry's environmental footprint. In fact, investing in biogas helps maintain and expand factory farms. Investing in biogas means investing in more factory farm pollution (45d-135.1)

**Comment:** Stop allowing these factory farms.

They are bad for everyone except corporations

You know they are bad yes they build wealth for companies and create jobs instead of small family owned farms (45d-139.1)

**Comment:** I support an end to finding for factory farm gas. (45d-142.1)

**Comment:** Incentivizing by commoditizing factory farm pollution and paying factory farm corporations for the methane they produce would fuel MORE factory farms, causing MORE methane and greenhouse gases, MORE water and air pollution, and MORE corporate consolidation. This proposal would create additional overproduction of pork and dairy, pushing market prices even further down for independent family farms. Currently, overproduction of pork and dairy and resulting low prices have been devastating for independent family farm livestock producers. (45d-145.1)

**Comment:** In this climate crisis we must do all we can to protect our land & water resources & the air we breath. Corporate Farms have no interest in doing this, they ravage the land & take all the water then walk away with profits leaving these areas devastated. As well as causing harm to family farmers & we all suffer from their destruction!

Please stop helping them! (45d-145.2)

**Comment:** Please deny this misguided attempt to export your own emissions through carbon credits. Here's what it will do:

Incentivize more corporate factory farms, harming family farmers, rural communities, and our environment.

Create more corporate consolidation in the U.S. livestock industry.

Commoditize methane production, which would fuel more methane producing practices.

Create additional overproduction of commodities, pork and milk, increasing supply and further pushing down market prices paid to independent family farms.

Pay foreign multinational meatpackers, like Chinese-owned Smithfield and Brazilian-owned JBS, for their pollution.

Create incentives for the public (taxpayer dollars through government subsidies) to fund anaerobic digesters to capture factory farm gas. (45d-146.1)

**Comment: 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.**

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 study<sup>1</sup> 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.

<sup>1</sup> <https://storymaps.arcgis.com/stories/4b708bdc0d2d419ba34cb352ca79b6e3>

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. This calls for a thorough reconsideration of the current approach. (45d-148.1)

**Comment:** To ensure the alignment of incentives with environmental priorities, CARB must discontinue its practice of crediting dairy biogas in the LCFS. (45d-148.2)

**Comment: 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 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.<sup>16</sup> The operating and maintenance costs for a digester project are about \$25 per MMBtu (\$35 per MMBtu if trucking of the gas is required).<sup>17</sup> 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.<sup>18</sup> 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.

<sup>16</sup> 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.

<sup>17</sup> See calculation details at <https://asmith.ucdavis.edu/news/digester-update>

<sup>18</sup> This recommendation should be made together with a phase out of book-and-claim accounting for landfill gas.

(45d-154.11)

**Comment:** 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. (45d-154.12)

**Comment:** No BIOGAS State Subsidies for Factory Farms!

PLEASE: Do not use MY TAX DOLLARS to subsidize inhumane factory farming! (45d-161.1)

**Comment:** Iowa Citizens for Community Improvement urges the Air Resources Board to grant the recent Petition for Rulemaking to Exclude All Fuels Derived from Biomethane from Dairy and Swine Manure and amend the LCFS accordingly. (45d-184.1)

**Comment:** I'm speaking today as a resident of rural America, one who has lived in the shadow of factory farms and biogas digesters. Despite all the promises from DNR, local elected officials, and experts over the years that this farm/biogas digester wouldn't hurt our water quality or way of life....that has not aged well in Emerald, Wisconsin.

I watched several in my neighborhood lose their drinking water - the Town Hall's well which originally had nitrates at 6.9 ppm just a few years ago - now has nitrates consistently near 40 ppm and has spiked to 52 and 62 ppm.

This farm keeps getting larger. We've seen the implementation of biogas digesters become a rationale for increasing herd sizes....yet our drinking water is not getting cleaner - but actually much worse. The biogas digester exploded and burned up after a few years and wasn't replaced, but the damage was already done, and our water has not improved.

My neighbors watched the nitrates rapidly increase over the same time in their private wells, many of which don't drink their water anymore - some won't even give it to their pets. Well drillers have said "we can dig you a well, but we can't guarantee you drinkable water." One neighbor experienced that firsthand when selling his home - a new well 200 feet deep well was still testing at 17 ppm for nitrates. He had to install a reverse osmosis system to get the property sold - but then the new family, with small children, moved away within a year because they were concerned about the water quality.

E.coli has also been found in several wells in our neighborhood over the years - which made turning on my faucet every day a "crap shoot" in my mind. That led to the heartbreaking decision my husband and I finally made to leave our acreage in Wisconsin for safer spaces in Minnesota - a place where we can drink the water and serve it to family and friends without fear.

Clean water is the only driver of economic development in rural areas. No one wants to locate a home, subdivision, or business if clean drinking water is not available. To incentivize manure production over milk production is damaging to our environment. There is no way our soils can absorb that concentrated nutrient load from digestate when they are already 5-6x higher in phosphorus than what is recommended by University of Wisconsin for growing crops. TMDLs are common in many agricultural parts of Wisconsin - green rivers, streams, and lakes by the 4th of July. Nitrates in groundwaters are still rising per a 10-year study in St. Croix County, Wisconsin.

I make the analogy that this feels like these energy companies have come in and raided our kitchens, make a disastrous mess, and leaving us to clean it up and deal with the consequences.

As a resident of the St. Croix River Valley for over 25 years (a Wild & Scenic River, part of the National Park System), I ask that you look at the long-term picture - plan for the next generation and not just the next years' dollars.

As a farmer's daughter, I get that farming has changed....but what has not, or will EVER change, is our need for clean drinking water. (45d-170.1)

**Comment:** We are extremely concerned that the LCFS, which the ARB adopted with the intention to reduce greenhouse gases from California transportation fuels, will perversely incentivize more and larger hog and dairy confinements in Iowa. Over the last several decades, the number of permitted livestock facilities has increased dramatically from 722 (93% hog) in 2001 to over 10,000 in 2017. But recently, the Iowa legislature exempted confinement operations from a permitting requirement for operations greater than 8,500 animal units if an operation installs an anaerobic digester system to capture biogas.<sup>1</sup> The Cedar Rapids Gazette reports that nine Iowa dairies have applied for permits for anaerobic digesters, seven are expanding herd sizes as part of the process, and two are utilizing the exemption because their herd sizes will exceed 8,500 animal units.<sup>2</sup>

<sup>1</sup> Iowa Code § 459.206(2)(c).

<sup>2</sup> Cedar Rapids Gazette, Nine Iowa dairies get digester permits since new law, seven plan expansion, December 3, 2021, available at <https://www.thegazette.com/agriculture/nine-iowa-dairies-get-digester-permits-since-new-lawseven-plan-expansion/>.

The LCFS program has drawn significant interest from factory farms in California and other states with many factory farms taking advantage of lucrative LCFS credits. We do not want to see your transportation fuel policy entrench and enrich corporations like Iowa Select, Smithfield, Tyson, JBS, and Prestage Farms at the expense of our communities, land, air, and water. Even worse, we are extremely concerned that the value of LCFS credits for biomethane from hog and dairy waste will incentivize expansions and even more confinement operations. Right now, Iowa agricultural runoff is contributing approximately 30 percent of the nitrogen load feeding the Gulf Dead Zone off the coast of Louisiana, and that amount has been increasing.<sup>3</sup> And this runoff is polluting our drinking water as well.<sup>4</sup> Turning Iowa factory farms into sources of credits to offset California transportation fuel emissions will inevitably generate more incentives to increase more manure which will further degrade our communities and water quality.

<sup>3</sup> Chris Jones, Grading on a Curve, May 6, 2021, available at <https://cjones.ihr.uiowa.edu/blog/2021/05/gradingcurve>.



<sup>4</sup> Associated Press, Des Moines faces extreme measures to find clean water, July 4, 2021, available at <https://apnews.com/article/des-moines-business-environment-and-natureb7f1e431a601dfb6536452d743012948>.

We hope that you recognize the consequences that your policy choice has inflicted and will inflict. We urge you to amend the LCFS to stop utilizing out-of-state factory farms as a source of offsets for your pollution trading scheme. We also ask that, at a minimum, you amend the LCFS to correct the over-valuation of manure-based credits to include all climate pollution associated with the factory farm system and ensure that credits from non-additional reductions do not continue.

Instead of pitting our states and residents against each other, we should be working together to implement real solutions that protect our communities, our farmers, our workers, and our planet. (45d-184.6)

**Comment:** CARB must acknowledge the significant environmental justice and sustainability concerns around biogas and particularly biomethane, including: (1) the incentivizing of ongoing and expanded, massive dairies and their associated impacts to the air, water, odor, and well-being of local communities; (2) the perpetuation of a polluting natural gas industry via sustained gas infrastructure; and (3) the improper accounting of emissions and emissions reductions from dairies in the state's credit schemes, which additionally allows ongoing oil and gas emissions. (45d-200.1)

**Comment:** Ensure that materials used to produce transportation fuels do not incentivize feedstocks and production practices that result in air quality and water quality degradation. Fuels derived from livestock and dairy manure must be excluded from the LCFS, and the LCFS must be reformed to ensure that its implementation does not negatively impact low-income communities, communities of color, and areas already suffering environmental degradation including areas that are in nonattainment status for state and federal air quality standards. (45d-200.8)

**Comment:** CARB must cease the incentives for factory farm gas and stop paying these industrial polluters to capture methane emissions in a dangerous, ineffective approach to address the climate crisis...

Eliminate "avoided methane crediting" in 2024. (45d-208.1)

**Comment:** Phase out avoided emissions crediting for new projects within three years... (45d-213.2)

**Comment:** Biomethane capture in anaerobic digesters will remain an effective method to reduce methane emissions but it is critical to recognize that the LCFS is often not the driver of this step and digesters are often installed or were installed years ago for other reasons. Thus, phasing out avoided methane crediting in the LCFS as soon as possible will help to "right-size" the value of RNG pathways compared to their genuine effect of reducing lifecycle GHG emissions and displacing fossil fuel consumption. We recommend that CARB phase out avoided methane credits at the end of existing pathways' current 10-year crediting cycle and within three years for new applications to help prevent crediting biomethane pathways that are not additional. It generally takes up to 2 years for developers to plan and construct new

digester projects,<sup>49</sup> so this timeline would offer flexibility to developers that anticipated negative emissions crediting within their project economics.

<sup>49</sup>

<https://www.biogasworld.com/biogasfaq/#:~:text=For%20a%20moderate%20to%20large,have%20a%20functioning%20biogas%20plant>.

(45d-213.16)

**Comment:** Using the Argonne National Lab Greenhouse Gases, Regulated Emissions, and Energy Use in Technologies (GREET) Model, we estimate the emissions for dairy biogas to be approximately 19 gCO<sub>2</sub>/MJ, assuming that the methane reductions and soil carbon sequestration from digestate are not attributable to the LCFS (i.e. that a digester would still have been used in the counterfactual scenario).<sup>51</sup> This change still represents an approximately 80% GHG reduction relative to conventional, petroleum-derived fuels but more accurately reflects the emissions reductions from displacing fossil fuels.

<sup>51</sup> Argonne National Lab, 2021 “Greenhouse Gases, Regulated Emissions, and Energy Use in Technologies Model”, <https://greet.es.anl.gov/>; assuming 100% dairy cow-derived manure, California electricity grid mix, for renewable natural gas as an intermediate fuel.

(45d-213.17)

**Comment:** Although capturing methane from dairy digesters is a laudable goal, there are other methods to meet the 40% reduction target of the SLCP. Changes to manure management practices and livestock diets can help reduce methane reduction at the source.<sup>52</sup> It may also be preferable to implement a regulation with a carbon border adjustment mechanism<sup>53</sup> to ensure that dairy products produced outside of California are treated consistently with those produced in-state. The EPA has detailed strategies that agricultural producers can pursue depending on the size of their operations and relative costs. (45d-213.18)

**Comment:** CARB’s proposed phaseout dates of 2040 for biomethane and 2045 for bio-hydrogen are completely insufficient to prevent avoided methane credits from distorting the climate goals of the LCFS. Though the scenario modeling published by CARB indicates that these pathways will be phased out completely after 2040, this modeling does not take into account the opportunities for existing pathways to recertify for multiple, 10-year periods. For example, RNG pathways with avoided methane emissions credits that are certified before 2030 may qualify for up to three, 10-year credit periods. Furthermore, the Draft analysis does not evaluate the transition from dairy RNG pathways (which are separated in the results) to dairy biomethane electricity and dairy biomethane hydrogen pathways. (45d-213.19)

**Comment:** In summary we recommend that the phaseout of avoided methane emissions crediting takes effect by the end of the 10-year crediting period for certified projects and that avoided methane emissions credits are phased out for new projects within the next 3 years. (45d-213.20)

**Comment:** Because it’s illogical, counterintuitive and harmful, we continue to oppose corporate factory farm gas as a solution to climate change, and we vehemently support LCFS amendments to exclude all fuels derived from dairy and swine factory farm gas from the Low Carbon Fuel Standard.

CARB should not continue to implement a bad and misguided proposal that would allow corporate factory farm dairy and hog operations (anywhere in the country) to sell the methane created in their operations into this system. Specifically, including factory farm gas as a “solution” toward your Low Carbon Fuel Standard Goals would:

- Incentivize more corporate factory farms, harming family farmers, rural communities, and our environment, including increased water and air pollution.
- Create more corporate consolidation in the U.S. livestock industry.
- Commoditize methane production, which would fuel more methane producing practices, creating more destructive greenhouse gases.
- Create additional overproduction of commodities, pork and milk, increasing supply and further pushing down market prices paid to independent family farms.
- Pay foreign multinational meatpackers, like Chinese-owned Smithfield and Brazilian-owned JBS, for their pollution.
- Create incentives for the public (taxpayer dollars through government subsidies) to find anaerobic digesters to capture factory farm gas.

On behalf of our 5,000+ members, we ask that you reform this pollution trading scheme that inflicts harm on our communities. We urge you to reform the LCFS to exclude all fuels derived from factory farm gas. (45d-244.1)

**Comment:** On behalf of Family Farm Defenders, a national grassroots organization based in Madison, WI with over 3000 members in all fifty states, including CA, I am writing to you to express our concern about CAFO biogas digesters being used to offset pollution generated in your state through the Low Carbon Fuel Standard (LCFS)

Pollution trading is fundamentally flawed in that it does not actually require pollution reduction, but allows polluters to instead shift their pollution impact to other communities. Worse yet, many of these supposed offsets have been shown to be bogus, meaning that the over all climate change pollution impact is actually worse.

This is certainly true in the case of CAFO biogas digesters, supposedly offsetting carbon dioxide emissions by reducing methane emissions, but in reality many of these biogas digesters are doing neither. In the case of WI there are over a dozen CAFO mega dairy farms who have long been claiming methane offset credits under the LCFS carbon market trading scheme. Thanks to the diligent oversight of many local citizen activists, we know that many of these WI CAFO biogas digesters are not actually functional as claimed and that methane is not being actually being reduced.

When this corruption was exposed in the media, CA authorities had to work hard to claw back the bogus offset credits from the WI CAFO biogas digesters, but that should not be the belated response if there was proper vetting and accountability mechanisms in place. Concerned private citizens should not have to be the watchdog for taxpayer-subsidized government-created carbon/methane trading offset markets. To be honest, such false offset claims in a pollution trading market is tantamount to wire fraud and should lead to federal prosecution.

Many of the mega dairy WI CAFO biogas digesters implicated in this fraud have a long sordid record of breaking other state and federal laws, including violations of labor laws (some farmworkers have died at these facilities trying to work on the biogas digesters) as well as numerous environmental regulations related to the Clean Water and Clean Air Acts. Some of our WI CAFO biogas digesters have even blown up and been implicated in massive manure leaks contaminating public water supplies, raising potential liability concerns for anyone who may be financially connected - such as those engaged in the CA LCFS carbon trading market.

As a national family farm organization, we would urge you to no longer allow methane offsets in the LCFS market - these are dubious (at best) and the mega dairy CAFOs claiming such credits are causing serious harm to Midwest rural communities.

...

If the State of California is serious about reducing GHG emissions through a pollution trading system, then they should not allow corrupt CAFO operators across the country to take advantage of shoddy oversight and lackadaisical accountability to bilk taxpayers through bogus offsets. We ask that you no longer shift your pollution responsibility onto Midwest rural communities (or anywhere else for that matter) and terminate the methane biogas digester offsets in the LCFS program. (45d-261.1)

**Comment:** At minimum, there should be no “grace period” allowed for such CAFO biogas offset claims - their lousy track record hardly warrants such. The “life cycle” analysis of supposed methane emissions as a possible offset for carbon dioxide emission needs to be seriously reevaluated - especially if the credit claims are egregiously overstated or even totally bogus. (45d-261.2)

**Comment:** The best offset would be giving LCFS credits to rotational grazing dairy operations (which are actually the most economically viable and climate friendly here in the Midwest according to many studies from the UW-Madison Center for Dairy Profitability), but that is sadly not acceptable under the current LCFS carbon trading system. Apparently, if a family farmer does NOT create a methane problem in the first place (by not confining their animals in a building and then putting their manure into anaerobic lagoons) then they can not get any taxpayer subsidized carbon credit for solving the climate crisis. (45d-261.3)

**Comment: Phase out credits for “avoided methane emissions” and limit LCFS carbon intensity scores to no less than zero to wind down what has become in effect a poorly run offset program.** We recently published an analysis of the problems caused by crediting manure digesters with avoided methane emissions, substituting an energy subsidy for a much-needed pollution regulation, and creating what is in effect a poorly run offset program (Attachment 3). Negative carbon intensity scores have no place in the LCFS. The LCFS should support the transition away from fossil fuels and hold all fuel producers accountable for pollution in their own supply chains. (45d-276.7)

**Comment:** We support the intention to eliminate avoided methane emission credits but urge the board to act much sooner than the proposed phaseout at 2040 to limit ongoing incentives for new projects that facilitate more methane production as a means to capture LCFS credits. (45d-277.3)

**Comment:** Correct the over-crediting of livestock biomethane this year...

**Avoided methane crediting for livestock biomethane is distorting the LCFS Program and the economics of the livestock industry, with detrimental consequences for communities and the climate.**

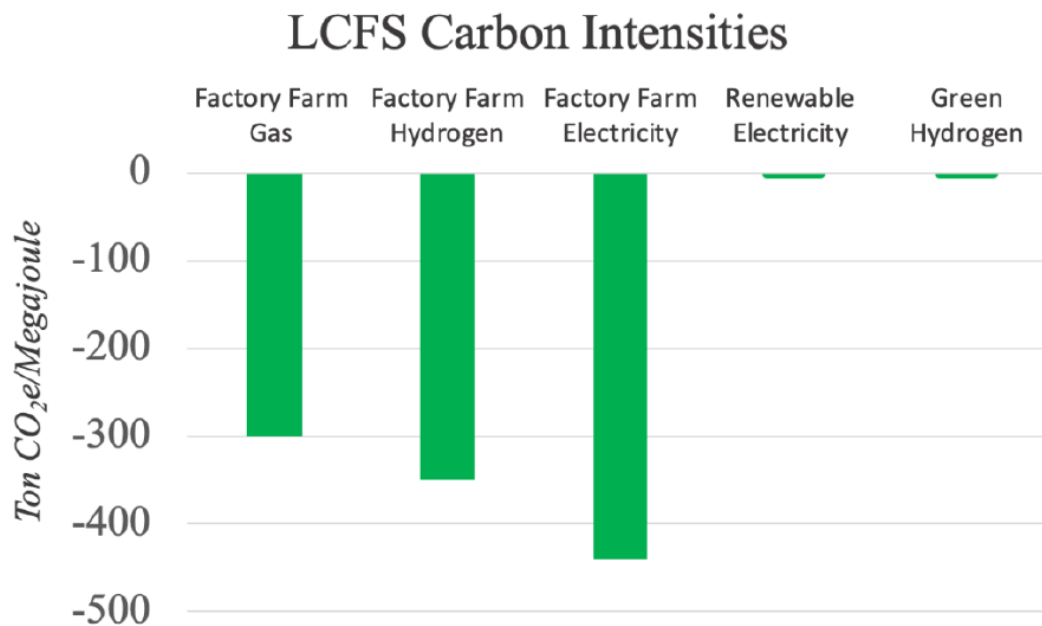
Staff proposes to extend avoided methane crediting for biomethane through 2040 for CNG vehicles and through 2045 for hydrogen production, with these extensions applying for any project that breaks ground before 2030. If approved, this recommendation would lock in the distortionary impacts of avoided methane crediting for decades – undermining California’s clean transportation goals and harming communities that live near concentrated-animal feeding operations (CAFOs) and refineries. Instead, CARB must correct the over-crediting of livestock biomethane by the end of 2024 and utilize its SB 1383 authority to open a new proceeding specifically designed to regulate emissions from the agricultural sector.<sup>6</sup>

<sup>6</sup> Senate Bill No. 1383 (Lara), Health and Safety Code § 39730.5(b)(1) (2016), [https://leginfo.ca.gov/faces/billTextClient.xhtml?bill\\_id=201520160SB1383](https://leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=201520160SB1383).

Today, the LCFS Program provides an outsized “avoided methane credit” to livestock biomethane based on the assumption that manure methane from CAFOs would be released into the atmosphere if not captured in digesters funded by the LCFS Program. This results in livestock biomethane (and fossil hydrogen produced with biomethane credits) receiving outsized carbon intensity (CI) scores that range from negative 300 to negative 400 tons CO<sub>2</sub>e/Megajoule.<sup>7</sup> In comparison, the CI scores of renewable electricity and green, electrolytic hydrogen hover near zero. Since the program’s inception, biomethane has received more than \$1.26 billion (\$2023) in LCFS credits due to avoided methane crediting.<sup>8</sup> This has spawned a digester industry that is reliant on these public resources and provides struggling industrial dairies with a new revenue stream.

<sup>7</sup> Michael Wara et al., Stanford University, “Simulating an “EJ Scenario” for the Low Carbon Fuel Standard Rule update using the ARB CATS Model” (May 31, 2023). Accessible at <https://ww2.arb.ca.gov/sites/default/files/2023-05/Stanford%20Presentation.pdf>.

<sup>8</sup> See Figure 1 above.



*Figure 2: Approximate carbon intensities under current LCFS CI scoring system, based on Stanford University Climate & Energy Policy Program modeling.<sup>9</sup> Source: NRDC*

<sup>9</sup> Michael Wara et al., Stanford University, “Simulating an “EJ Scenario” for the Low Carbon Fuel Standard Rule update using the ARB CATS Model” (May 31, 2023). Accessible at <https://ww2.arb.ca.gov/sites/default/files/2023-05/Stanford%20Presentation.pdf>.

Avoided methane crediting is distorting the LCFS Program. As shown above, the lowest possible CI score for renewable electricity is zero – placing it on an uneven playing field with biomethane and stifling the deployment of EVs and EV charging infrastructure. This results in one compressed natural gas (CNG) truck and three diesel trucks receiving the same amount of LCFS credits as four electric trucks<sup>10</sup> – despite CARB’s objective of 100 percent zero-emission heavy-duty truck sales by 2036.<sup>11</sup> Similarly, under this scoring system, green electrolytic hydrogen with a minimum possible CI of zero receives far fewer credits than fossil hydrogen produced in a refinery that purchases biomethane’s environmental attributes. Avoided methane crediting artificially sweetens the deal for biomethane in the LCFS, even as CARB acknowledges via other policies that biomethane has a negligible role to play in decarbonizing transportation.<sup>12</sup>

<sup>10</sup> Michael Wara, Stanford University, Joint Meeting of CARB and the Environmental Justice Advisory Committee (Sept. 14, 2023) at 12 (citing to Phoebe Seaton’s 7/17/23 presentation to EJAC). Accessible at <https://ww2.arb.ca.gov/sites/default/files/barcu/board/books/2023/091423/ejacpres.pdf>.

<sup>11</sup> See CARB Advanced Clean Fleets Regulation. Accessible at <https://ww2.arb.ca.gov/ourwork/programs/advanced-clean-fleets>.

<sup>12</sup> See, e.g., CARB Scoping Plan at 190, Advanced Clean Cars II Regulation, and Advanced Clean Fleets Regulation.

The LCFS program’s current design is harming communities living near CAFOs and refineries. CARB staff’s proposal will continue to do the same. Outsized incentives for biomethane particularly benefit large livestock operations, which pollute the air and water of the

communities who live near them.<sup>13</sup> Troublingly, recent research finds that dairy biomethane incentives from the LCFS are so large that they may enable increases in herd sizes even as dairy demand decreases.<sup>14</sup> In other words, the LCFS may actually be incentivizing the growth of CAFOs whose main product is not milk, but rather methane that industrial farms can capture and sell as a transportation fuel under the current LCFS framework.

<sup>13</sup> See, e.g., Leadership Counsel for Justice & Accountability, Food & Water Watch, Animal Legal Defense Fund, the Center for Food Safety, Institute for Agriculture & Trade Policy, Association of Irrigated Residents, Campaign for Family Farms & the Environment, Central Valley Air Quality Coalition, Center on Race Poverty and the Environment, Valley Improvement Project, Center for Biological Diversity, Friends of the Earth, Central California Environmental Justice Network, Sierra Club California, and Defensores del Valle Central Para el Agua y Aire Limpio; “Comments on Potential Changes to the Low Carbon Fuel Standard Program” (Mar. 15, 2023). Accessible at <https://www.arb.ca.gov/lists/com-attach/115-lcfs-wkshp-feb23-ws-UzIXPgBoVmtXJQNc.pdf>.

<sup>14</sup> E. Merchant, “A Battle Is Underway Over California’s Lucrative Dairy Biogas Market,” Inside Climate News, (Dec. 2023). Accessible at <https://insideclimatenews.org/news/28122023/milking-it-battleunderway-california-dairy-biogas-market/>.

Proponents of the avoided methane credit for biomethane argue that the LCFS is helping clean up emissions from the agricultural sector. But as a transportation fuels program, the LCFS should drive California towards a zero-emissions transportation future – not direct resources to expensive methane digesters that have little to no role in the clean transportation future. Because the LCFS is designed to be a transportation program, it is also not effective at addressing all of the climate, air, and water emissions from CAFOs. To fix the LCFS Program and meaningfully address agricultural emissions, CARB should remove avoided methane crediting in 2024 and open a new proceeding under CARB’s SB 1383 authority to consider separate, dedicated policies to comprehensively address methane emissions from CAFOs.<sup>15</sup>

<sup>15</sup> Senate Bill No. 1383 (Lara), Health and Safety Code § 39730.5(b)(1) (2016), [https://leginfo.ca.gov/faces/billTextClient.xhtml?bill\\_id=201520160SB1383](https://leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=201520160SB1383).

(45d-279.1)

**Comment:** There has been an explosion of increasing sizes of dairies into industry size numbers and negative community health impacts. We must move away more quickly from combustion period. There should be a cap on the number and location of dairies in relationship to where people live. There needs to be better measurement of leakage and methods moved away from a wet to a dry process for manure. (45d-297.4)

**Comment:** Just as we need to move away from corporate one-crop farming, we need to move away from consolidation of dairy cows just to make it more economical to purchase expensive bio-digestors to capture methane, which it looks like will be with us for a long time. First this report stated that biomethane will be used for injection into our natural gas pipeline system. Let’s call it what it is – FOSSIL GAS. Then you want to use the FOSSIL GAS for hydrogen. With 80% of credits going to a combustion source in one way or the other, there is harm to health regardless of the name. (45d-297.5a)

**Comment:** This “Phase Out” of methane crediting needs a major rollback on the proposed deadlines and extensions. After all, ethanol was first introduced as an additive in automobiles in 1910, and it’s still with us. The credits have lasted for years. (45d-297.6)

**Comment:** The current dairy digester method shouldn't be increased when the amount we already have is causing such harm in our communities. (45d-297.16)

**Comment:** We should honestly be looking to promote consuming less beef and dairy products. If not, we need to move incentives to smaller farms with natural land and diverse products. Less close habitation reduces viruses that wipe out large numbers of animals, similar to the chickens that had to be killed in large numbers recently. It reduces trucking products long distances. (45d-297.17)

**Comment:** Without a rapid phaseout of avoided methane crediting and biomethane combustion crediting for livestock manure, these credits will increase pollution in communities already deeply burdened by fossil fuel pollution.

...

**CARB should end avoided methane crediting and biomethane combustion crediting for livestock manure.**

To start, CARB should rapidly phase out pathways that provide avoided methane crediting and biomethane combustion crediting for livestock manure, including pathways that are linked with hydrogen production. The proposal would extend these pathways through 2040, and through 2045 for projects linked to hydrogen production. In addition to incentivizing livestock pollution management practices that pollute the air and water of agricultural communities, these pathways harm refinery communities. The credits encourage oil refiners and other 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. They also enable oil refiners to offset their compliance burdens using lavish biomethane combustion credits.

CARB has already approved many fuel pathways in which hydrogen producers earn highly valuable credits by matching fossil-based hydrogen with avoided methane credits. For example, Shell Energy has two certified pathways for production of fossil-based hydrogen (produced from natural gas via steam methane reformation) at facilities in Wilmington and Carson (as explained above, these are areas with already exceptionally high fossil fuel pollution).<sup>59</sup> 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 gCO<sub>2</sub>e/MJ—these low carbon intensity values make the pathway more valuable than most electric vehicle pathways.<sup>60</sup> Shell is thus earning highly valuable LCFS credits to produce fossil-based hydrogen in deeply burdened environmental justice communities.

<sup>59</sup> 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](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](https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/comments/tier2/b0349_cover.pdf) (hereinafter "Shell Hydrogen Pathway Applications").

<sup>60</sup> See *LCFS Pathway Certified Carbon Intensities*, CAL. AIR RESOURCES BD., <https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities> (last visited Feb. 20, 2024).



In addition to subsidizing production of fossil-based fuels in environmental justice communities, avoided methane crediting for livestock manure also fails to produce real, additional greenhouse gas emissions reductions as AB 32 requires.<sup>61</sup> First, many of the digesters that produce avoided methane credits were funded by other state and federal programs, which means that the LCFS is claiming credit for reductions that would have occurred anyway. Second, CARB has a legislative mandate in AB 1383 to adopt regulations to directly regulate methane emissions from livestock manure, yet it relies on its failure to act on that mandate as justification for these avoided methane credits. Rather than achieving real emission reductions by requiring reductions from livestock operations (as CARB has clear authority to do under AB 1383), the avoided methane credits function as a convoluted offset program that perversely encourages livestock operations to produce more methane to earn more credits. Third, CARB has a concerning lack of data about livestock operations and the effectiveness of digesters at capturing methane, and research from Food & Water Watch suggests that California digesters receiving LCFS credits allow significant volumes of methane to escape.<sup>62</sup> CARB must carefully analyze the effectiveness of digesters to ensure that the emission reductions it is claiming are real.

<sup>61</sup> 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).

<sup>62</sup> FOOD & WATER WATCH, THE PROOF IS IN THE PLUMING: FACTORY FARM BIOGAS HAS NO PLACE IN THE LOW CARBON FUEL STANDARD (2024), <https://www.foodandwaterwatch.org/2024/02/01/new-analysis-identifiessignificant-methane-releases-at-california-megadairies/#:~:text=A%20new%20Food%20%26%20Water%20Watch,signature%20Low%20Carbon%20Fuel%20Standard.>

(45d-304.5)

**Comment:** 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.<sup>1</sup>

<sup>1</sup> <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>

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 large number of liquid manure systems that exist on 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. (45d-327.2)

**Comment:** *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.<sup>9</sup> Ammonia is a health concern, as it has the potential to form fine particulate matter (PM<sub>2.5</sub>), which can lead to respiratory and pulmonary issues in nearby communities.<sup>10</sup> Ammonia emissions also present an environmental risk contributing to soil acidification and/or eutrophication in downwind ecosystems.<sup>11</sup>

<sup>9</sup> <https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data#doc>

<sup>10</sup> <https://pubmed.ncbi.nlm.nih.gov/20458016/>

<sup>11</sup> <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.

Any tax 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. 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%<sup>4</sup> while a permeable cover is estimated to reduce ammonia by 40-80%.<sup>12</sup>

<sup>4</sup> <https://ecommons.cornell.edu/server/api/core/bitstreams/a725208d-82ba-4b17-aab4-b1305191c377/content>

<sup>12</sup> <https://extension.colostate.edu/topic-areas/agriculture/best-management-practices-for-reducingammonia-emissions-lagoon-covers>

***Crediting should be contingent upon meeting specific standards to further reduce local environmental impacts.***

As discussed, 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. Third-party vetted Nutrient

Management Plans (NMP) and Comprehensive Nutrient Management Plans (CNMP) are utilized in many states to reduce the environmental footprint of livestock operations. In New York State for instance, certified nutrient management planners help farmers create farm plans and verify they are followed throughout the year.<sup>13</sup> This standard goes beyond what EPA requires and adds assurance to communities that best management practices are followed, even in emergencies.

<sup>13</sup> <http://nmisp.cals.cornell.edu/publications/extension/CAFOCNMPNY2023.pdf>

For farmers using digesters, compliance with relevant USDA NRCS standards, including both USDA NRCS Nutrient Management (Code 590)<sup>14</sup> to ensure digestate nutrients are well-managed and USDA NRCS Anaerobic Digester Conservation Practice Standard (CPS) for Anaerobic Digesters (Code 366) is paramount. This guidance outlines standard practices to improve air quality by reducing greenhouse gas emissions and objectionable odors from manure or agricultural waste, and/or to reduce transport of pathogens to surface water.<sup>15</sup> These practices apply where biogas production and capture are components of a waste management system plan or a comprehensive nutrient management plan, and sufficient and suitable organic feedstocks are readily available. This practice outlines standards for system design, cover, etc., as well as gas collection, transfer, control, utilization, and monitoring/safety requirements, including criteria for maintenance of air quality, but does notably leave out the control of ammonia emissions, which should be addressed per earlier information.

<sup>14</sup> <https://datcp.wi.gov/Documents/NM590Standard2015.pdf>

Without these guardrails, programs like LCFS could encourage the build-out of additional digesters with no oversight into how they are managed – potentially leading to harmful methane leaks and other air pollutants, including ammonia, which can negatively affect local air, soil, and water quality and in turn, harm local communities. (45d-327.4)

**Comment:** As Environmental Justice communities in a region with poor air quality, high levels of asthma and other respiratory illnesses, a lack of public health infrastructure, and many of us without clean and affordable drinking water, we demand that CARB eliminate avoided methane crediting and use the power the legislature gave them to initiate a rulemaking to directly regulate emissions from manure.

Below you will find a collection of comments from a few members of Defensores urging you to think about how staff proposals, that did not mention any community concerns, must and should take those concerns into account in this rulemaking.

*“I have lived in Pixley, CA for over 47 years. I have come to this body in Sacramento, over Zoom, the phone, and some of you have even visited Pixley to hear our stories. Unfortunately, it seems like you have not heard or listened to the yells from our community. One mile north of Pixley is a dairy digesters cluster where factory farm gas is being produced. The smell of ammonia and concentrated cow manure has only gotten worse in Pixley. We are surrounded by dairies and their digesters, the truck traffic in our community keeps getting worse, and people in our community are suffering from the air quality impacts. There are three generations of people in my family that use a CPAP machine, my 36-year-old son, my 11-year-old grandson, and myself. Sadly, this is not a unique story in my community, in fact respiratory illnesses have become a “normal” thing for us. This is why we need your leadership more than ever because our communities can not wait.”*

Maria Arevalo, Pixley

*"I live in Santa Nella and was raised in the Central Valley. Since the inception of digesters, there has never been any intention of actually engaging communities in this process. In the past, meetings did not provide translation, outreach was not conducted, and materials were not accessible to non-English speakers. Now, you ask us to attend workshops and you meet with us, only to not mention our concerns in your documents at all. In addition to ignoring what the community has to say and trying to erase us from your record, there was not one mention of public health in your document and the already existing problems many SJV communities face. You are contaminating our air, water, and all for companies that are not even in our communities. We have needs in our communities to improve our local air quality and not line the pockets of investors who have never had to live with the smell day in and out. We ask the board to consider public health for all over profit for some."*

Patricia Ramos-Anderson, Santa Nella

*"CARB must regulate the dairy industry. We have to endure the flies, the odors, and the air quality impacts. Many people in my community live with Asthma. The dairy industry impacts our air and water quality. I worry about our safety and our health. CARB must have regulations on the dairies manure."*

Josefa Gonzalez, Pixley

*"I stand with my partners in community demanding justice for our communities that are already overburdened with pollution. We do not need more mechanisms in our communities to make us sick, you should be investing in community-identified measures to improve the health of our air."*

Tere Ochoa, Los Banos

*"I've been living here since 1960. Hillcrest arrived in 2002 with over 3,000 cows. In 2012 they were out of compliance with Merced County with over 8,000 cows. Our Town population is only a little bit over 4,000. I've gone to the Board of Supervisors in Merced County to complain with a group of citizens as well but it goes and it falls on deaf ears. In January 2024, CARB could start a rulemaking for the regulation of methane, but to this day we have not heard any desire from staff of the board to begin this process. California Regulators have not adequately evaluated this program as to local air and small communities so we implore your help communities, just like Pixley and Planda and any other small town that just want to breathe."*

David Rodriguez, Planada

(45d-331.1)

**Comment:** Around the country, neighbors of these facilities report odors and other health impacts, and losing the ability to spend time outdoors. Anaerobic digesters are touted by the industry as a win-win solution that creates usable energy while reducing the environmental impact from the management of massive quantities of manure. But communities around the country know that this technology is far from a real solution. Instead, digesters allow factory farms to not only remain a burden on surrounding communities, but often to grow even larger.

Unfortunately, California's preference for manure-derived biogas in the LCFS program is driving the expansion and entrenchment of factory farms and dirty biogas projects far beyond California, including into our communities. The LCFS has become a lucrative financing tool for factory farm biogas. It is driving the construction of more factory farms and factory farm biogas projects in states far from California, causing severe harm to air, water, public health, rural economies, and overall quality of life.

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 who live near factory farms and manure digesters. This is in stark contrast to the environmental justice commitment set by California.

CFFE believes that climate change is a serious challenge that requires a dramatic response. This crisis demands more than highly speculative market-based schemes that will allow polluters to keep polluting and let agribusiness pay farmers less for their crops and livestock. A serious plan to address agriculture and climate change must address structural issues, not just attempt minor improvements in environmental performance in a highly consolidated, industrialized factory farm system. Factory farms require huge quantities of feed, water, chemical inputs and energy and manage manure in a way that drives greenhouse gas emissions. California's climate programs must support a dramatic transition in how we raise animals for food that is centered on independent family farms and sustainably managed grazing systems.

Using California's climate programs, including the LCFS, to support expensive manure management projects on confinement operations fails to make this necessary structural change, and instead props up and expands the factory farm system. Prioritizing grazing over factory farm manure management would increase the sequestration of carbon in pastures, and also avoid the emissions from industrialized animal operations' feed production and liquid manure storage. Manure lagoons not only emit high amounts of methane and nitrous oxide, but they are also highly vulnerable to natural disasters such as hurricanes and floods. And confinement operations decouple grazing animals from grasslands, requiring more synthetic fertilizers for feed production, which drives further emissions.

In addition to these overarching concerns about LCFS' support for manure digesters, we urge you to prioritize the following changes to the standard:

- Eliminate "avoided methane crediting" (45d-339.1)

**Comment:** Biofuel have better uses in the soil and I am speaking of manure... (45d-372.1)

**Comment:** While the Low Carbon Fuel Standard (LCFS) has potential to support environmental justice and a transition to renewable fuel sources in California's transportation sector, we are concerned that a specific element of the Proposed LCFS Amendments will negatively impact the health of Californians and Americans alike. Specifically, we believe that the inclusion of the avoided methane credits in the Proposed LCFS Amendments would threaten public health and deepen environmental injustices by incentivizing and further entrenching the industrial food animal production (IFAP) model.

We call on the California Air Resources Board (CARB) to eliminate avoided methane crediting, as recommended by its own Environmental Justice Advisory Committee (EJAC) (CARB 2023).

**The avoided methane credits incentivize growth of and further entrench the industrialized model of food animal production, which has been demonstrated to threaten public health.**

IFAP is a term referring to the predominant system of meat, milk, and egg production in the U.S., characterized by confining thousands of animals in small areas and the resulting concentration of massive quantities of manure. The Environmental Protection Agency (EPA) and Centers for Disease Control (CDC) have documented that these large animal operations pose significant public health and environmental risks, particularly in surrounding communities (US EPA 2013; CDC 2018). These facilities are disproportionately sited in low-income communities, as well as in non-white communities (US EPA 2013; CDC 2018). Public health concerns stem from human exposures to air pollution, as well as drinking water and soil contamination. EPA recently analyzed the literature documenting health effects of direct emissions from animal production facilities and found that residential proximity to them is linked to asthma, decreased lung function, mortality, odor annoyance, and gastrointestinal illness (US EPA 2023).

The Proposed LCFS Amendments state that digester operators that join the program before 2030 can receive payment for the avoided methane credits until 2060, creating an enormous incentive for biodigester expansion in the next six years. Further, evidence suggests that the economic viability of these operations requires a significant number of animals (Anderson et al. 2013, Barbera et al. 2019; US EPA 2023). Given public health concerns related to the operation of these IFAP facilities, such an expansion may have implications for human exposures to IFAP related pollutants.

We are concerned that the avoided methane credits incentivize wet manure management systems, which pose known public health concerns. These systems use pits or tanks to store liquid waste and a connected system of pipes to transport it. The tanks and pipes are both susceptible to failures and breaches—now more common as heavy rainfall and flooding become more frequent and intense due to climate change. These failures and breaches may release pathogens, nitrates, and other pollutants into surface water and groundwater supplies (Burkholder et al. 2007). Exposure to these contaminants have been linked to an increased risk of cancer, diabetes, thyroid disease, and birth defects (Burkholder et al. 2007; Jones et al. 2016; Inoue-Choi et al. 2015; Temkin et al. 2019). Furthermore, wet manure management systems are associated with high levels of nitrous oxide and methane emissions, which contribute to climate change and are associated with increased asthma attacks (Glibert 2020).

Due to the water contamination and air pollution caused by wet manure management systems, the American Public Health Association (APHA) has called on federal and state governments to “prohibit the installation of new liquid manure handling systems, including waste lagoons” and to phase out existing wet manure management at IFAP facilities (APHA 2019). Unfortunately, the Proposed LCFS Amendments, through avoided methane crediting and the resulting negative carbon intensity for biogas, would do the opposite.

## **The avoided methane credits do not reduce burdens on environmental justice communities and workers.**

The avoided methane credits run counter to one of the key intentions of the Proposed LCFS Amendments which is to promote investment and improve air quality in disadvantaged communities (CARB 2023). In a study of North Carolina counties with many IFAP operations, average ammonia concentrations, linked to the health effects listed above, have been found to be two and a half to three times higher in environmental justice communities compared to the entire study region (Quist et al. 2022). Additionally, IFAP operations are associated with declining infrastructure, property values, and sense of cohesion—all of which have the opposite impact of community investment (Donham et al. 2007).

The EJAC, whose membership comes from many disadvantaged communities with significant exposure to air pollution, concluded that IFAP facilities do not promote investment or improved air quality in disadvantaged communities (EJAC 2023). CARB must honor the recommendations of EJAC in order to follow through with its own commitments to reducing pollution burdens in environmental justice communities.

The practice of burning biogas on-site for electricity production poses safety and public health risks to workers. These can include explosions, asphyxiation, and disease from bacteria, viruses, and parasites in manure (Westenbroek and Martin II 2019). Many agriculture workers are not protected by US labor laws (Lydersen 2022); California has the opportunity to protect those workers from these risks by prohibiting the burning of biogas in its LCFS regulations.

**In conclusion**, the California Air and Resources Board must eliminate avoided methane crediting, included in the Environmental Justice Scenario, in order to mitigate the public health risks described above. CARB has stated its commitment to transition to clean fuels and to improve air quality in the transportation sector in California. We believe that a solution to improved air quality in the transportation sector cannot include regulations that harm air quality in the agricultural sector. Given that CARB does not have the authority to implement air quality mitigation measures, it should be particularly cautious about including any measures in the LCFS that pose a public health risk to air quality.

Anderson, Robert C., Don Hilborn, and Alfons Weersink. "An Economic and Functional Tool for Assessing the Financial Feasibility of Farm-Based Anaerobic Digesters." *Renewable Energy* 51 (March 1, 2013): 85–92. <https://doi.org/10.1016/j.renene.2012.08.081>.

APHA. 2019. "Precautionary Moratorium on New and Expanding Concentrated Animal Feeding Operations." American Public Health Association. November 5, 2019.

Barbera, Elena, Silvia Menegon, Donatella Banzato, Chiara D'Alpaos, and Alberto Bertucco. 2019. "From Biogas to Biomethane: A Process Simulation-Based Techno-Economic Comparison of Different Upgrading Technologies in the Italian Context." *Renewable Energy* 135 (C): 663–73.

Burkholder, JoAnn, Bob Libra, Peter Weyer, Susan Heathcote, Dana Kolpin, Peter S. Thorne, and Michael Wichman. 2007. "Impacts of Waste from Concentrated Animal Feeding Operations on Water Quality." *Environmental Health Perspectives* 115 (2): 308–12. <https://doi.org/10.1289/ehp.8839>.

CARB. 2023. "Staff Report: Initial Statement of Reasons." Public Hearing to Consider the Proposed Amendments to the Low Carbon Fuel Standard. Sacramento, CA: California Air Resources Board.

CDC. 2018. "Animal Feeding Operations." Centers for Disease Control and Prevention. October 26, 2018.

Donham, Kelley J., Steven Wing, David Osterberg, Jan L. Flora, Carol Hodne, Kendall M. Thu, and Peter S. Thorne. 2007. "Community Health and Socioeconomic Issues Surrounding Concentrated Animal Feeding Operations." *Environmental Health Perspectives* 115 (2): 317–20. <https://doi.org/10.1289/ehp.8836>.

EJAC. 2023. "Assembly Bill 32 Environmental Justice Advisory Committee (EJAC) DRAFT Recommendations to the California Air Resources Board (CARB) on the Low Carbon Fuel Standard Regulation Updates."

Glibert, Patricia M. 2020. "From Hogs to HABs: Impacts of Industrial Farming in the US on Nitrogen and Phosphorus and Greenhouse Gas Pollution." *Biogeochemistry* 150 (2): 139–80.  
<https://doi.org/10.1007/s10533-020-00691-6>.

Inoue-Choi, Maki, Rena R. Jones, Kristin E. Anderson, Kenneth P. Cantor, James R. Cerhan, Stuart Krasner, Kim Robien, Peter J. Weyer, and Mary H. Ward. 2015. "Nitrate and Nitrite Ingestion and Risk of Ovarian Cancer among Postmenopausal Women in Iowa." *International Journal of Cancer* 137 (1): 173–82.  
<https://doi.org/10.1002/ijc.29365>.

Jones, Rena R., Peter J. Weyer, Curt T. DellaValle, Maki Inoue-Choi, Kristin E. Anderson, Kenneth P. Cantor, Stuart Krasner, et al. 2016. "Nitrate from Drinking Water and Diet and Bladder Cancer Among Postmenopausal Women in Iowa." *Environmental Health Perspectives* 124 (11): 1751–58.  
<https://doi.org/10.1289/EHP191>.

Lydersen, Kari. "Biogas Expansion May Compound Worker Risks." *Energy News Network*, November 16, 2022.

Quist, Arbor J.L., Jill E. Johnson, and Mike Dolan Fliss. 2022. "Disparities of Industrial Animal Operations in California, Iowa, and North Carolina." *Earthjustice*.

Temkin, Alexis, Sydney Evans, Tatiana Manidis, Chris Campbell, and Olga V. Naidenko. 2019. "Exposure-Based Assessment and Economic Valuation of Adverse Birth Outcomes and Cancer Risk Due to Nitrate in United States Drinking Water." *Environmental Research* 176 (September): 108442.  
<https://doi.org/10.1016/j.envres.2019.04.009>.

US EPA. 2013. "Literature Review of Contaminants in Livestock and Poultry Manure and Implications for Water Quality." 4304T EPA 820-R-13\_002. Office of Water. United States Environmental Protection Agency.

US EPA. 2023. "Technical Background Document for EPCRA Animal Waste ANPRM." Washington, DC: U.S. Environmental Protection Agency.

Westenbroek, Patricia A., and Jerry Martin II. 2019. "Anaerobic Digesters and Biogas Safety – Farm Energy." Farm Energy. April 2, 2019.

(45d-359.1)

**Comment:** Second, the proposed Amendments continue to ignore the true carbon intensity of factory farm gas production.

...

CARB must make changes to the proposed LCFS amendments. First, CARB must account for the true carbon intensity of factory farm gas.

...

CARB further distorts the CI of factory farm fuels by failing to account for significant up and downstream GHG emissions directly associated with production of the fuel. The Amendments fail to address this flawed system boundary and continue to leave out known and significant emissions.<sup>122</sup> Ignoring GHG emissions directly associated with factory farm gas production arbitrarily pushes CI values for these fuels even lower and in effect infuses the LCFS with bogus credits that do not represent real emissions reductions.

<sup>122</sup> CARB has adopted portions of the Compliance Offset Protocol Livestock Projects established under the California Cap-and-Trade program, including the LCA system boundary, and those parameters are manifested in the Tier 1 simplified calculators and CA-GREET4.0. See Ex. 54, CAL. EPA, COMPLIANCE OFFSET PROTOCOL LIVESTOCK PROJECTS Fig. 4.1 (Nov. 14, 2014), <https://perma.cc/B3HF-F353>.

Both up and downstream GHG emissions must be added to the LCA for factory farm gas fuels. Emissions from factory farm operations upstream of liquid manure collection must be included in the LCA because the LCFS regulations define a "fuel pathway" to include "a complete well-to-wheel analysis."<sup>123</sup> And when a project applies for an LCFS Tier 2 pathway, the



application's life cycle analysis must take into account "feedstock production."<sup>124</sup> For factory farm gas production, "feedstock" is manure from confined animals and thus "feedstock production" must include consideration of the processes and animals that produced the methane-emitting manure. CARB may believe that upstream emissions are attributable to other products from factory farming, like milk or meat, but the "manure gold rush" now in effect mandates that CARB treat liquified manure emitting methane as a co-product of raising animals in these conditions, especially when the LCFS distorts agricultural markets such that herds may be larger than justified by agricultural production alone.<sup>125</sup>

<sup>123</sup> Cal. Code Regs. Tit. 17 § 95481(a)(66).

<sup>124</sup> Cal. Code Regs. Tit. 17 § 95488.7(a)(2)(B).

<sup>125</sup> See Ex. 55, Jeremy Martin, *Something Stinks: California Must End Manure Biomethane Accounting Gimmicks in Its Low Carbon Fuel Standard*, UNION OF CONCERNED SCIENTISTS, THE EQUATION (Feb. 15, 2024), <https://perma.cc/5DRT-KTE7>.

But CARB has failed to require a full upstream LCA and arbitrarily refuses to correct that in the proposed Amendments. Under staff's proposal, the system boundary for these fuels would continue to exclude all emissions associated with raising, feeding, housing, and otherwise sustaining the concentrated and confined herds that produce factory farm gas feedstock. These emissions include but are not limited to enteric emissions and those from the production, transport, and storage of animal feed. Without manure collection at animal confinement facilities, there is no gas production; and with no animals in confinement there is no manure collection. Therefore, factory farm operations and particular manure management systems are inextricably part of "feedstock production."

Downstream emissions must be included in the LCA because anaerobic digestion of manure results in digestate that is more prone to emitting GHGs than undigested manure. The LCFS regulations require consideration of "waste generation, treatment and disposal."<sup>126</sup> Yet, CARB has failed to include emissions from the "generation, treatment and disposal" of digestate in factory farm gas fuels' CI values. As the U.S. Department of Agriculture's Natural Resources Conservation Service recognizes in its Conservation Practice Standard for anaerobic digestion, "digestate has increased potential for some air and nutrient emissions compared to raw manure."<sup>127</sup> This includes up to a threefold increase in methane emissions during digestate handling and storage,<sup>128</sup> as well as increased nitrous oxide emissions.<sup>129</sup> Despite Commenters and others repeatedly presenting compelling scientific evidence to CARB staff that the storage and land application of digestate can increase nitrous oxide and other emissions, the proposed Amendments retain an exclusion of nitrous oxide emissions from storage or land application of digestate that is arbitrary and not supported by any evidence.<sup>130</sup>

<sup>126</sup> Cal. Code Regs. Tit. 17 § 95488.7(a)(2)(B).

<sup>127</sup> CONSERVATION PRACTICE STANDARD CODE 366: ANAEROBIC DIGESTER, *supra* note 24.

<sup>128</sup> Ex. 56, Lena K.K. Rodhe et al., *Greenhouse Gas Emissions from Storage and Field Application of Anaerobically Digested and Non-Digested Cattle Slurry*, 199 AG., ECOSYSTEMS & ENV'T 358 (Jan. 2015), <https://perma.cc/LE8UW87U>; Ex. 57, Hambaliou Baldé et al., *Methane Emissions from Digestate at An Agricultural Biogas Plant*, 216 BIORESOURCES TECH. 914 (Sept. 2016), <https://perma.cc/BVQ9-XKN2>.

<sup>129</sup> Ex. 58, Michael A. Holly et al., *Greenhouse Gas and Ammonia Emissions from Digested and Separated Dairy Manure During Storage and After Land Application*, 239 AGRIC, ECOSYSTEMS & ENV'T 410, 411 (Feb. 2017), <https://www.sciencedirect.com/science/article/pii/S0167880917300701>.

<sup>130</sup> COMPLIANCE OFFSET PROTOCOL LIVESTOCK PROJECTS, *supra* note 122, at 16; Ex. 59, CARB, TIER 1 CI CALCULATOR FOR DAIRY AND SWINE MANURE BIOMETHANE, INSTRUCTION MANUAL (proposed Dec. 19, 2023), <https://perma.cc/AY6F-Y6UP> (only discussing avoided emissions from land application without reference to potentially increased emissions).

CARB's deliberate indifference to these known, increased GHG emissions resulting from factory farm gas production is arbitrary and without support. (45d-368.3)

**Comment:** Finally, the amendments will continue and intensify CARB's discrimination against rural, low-income, Latino/a/e communities in the San Joaquin Valley both by incentivizing herd consolidation and by increasing pollution associated with the production and use of factory farm gas.

...

As discussed throughout these comments, the proposed Amendments will continue to contribute to herd expansion and the concentration of milk cows and manure in the San Joaquin Valley.

...

The LCFS and the proposed Amendments will encourage further concentration of dairy herds, dairy cows, and wet manure in the San Joaquin Valley.<sup>213</sup> In doing so, it will disproportionately impact Latino/a/e communities and people. Specifically, Latino/a/e communities and people will disproportionately suffer (a) increased discharge of nitrate to groundwater within the localized zone of contribution;<sup>214</sup> (b) decreased groundwater levels within the localized cone of depression;<sup>215</sup> (c) increased air pollution, including exposure to ammonia, ozone, and pm 2.5;<sup>216</sup> and (d) increasing and exacerbating impacts to odor and flies.<sup>217</sup> They will also experience higher rates of the associated health impacts, as stated above.<sup>218</sup>

<sup>213</sup> See *supra* section II(E) (discussion of the ways in which the LCFS's treatment of dairy digesters creates an incentive for concentrated herds and liquid manure management).

<sup>214</sup> See *supra* section II.C.3 (discussion of nitrate impacts); see also Balazs et al., *supra* note 28; Ex. 82, Anne Weir Schechinger, *In California, Latinos More Likely to Be Drinking Nitrate-Polluted Water*, ENVTL. WORKING GROUP (Oct. 2020), <https://perma.cc/WR6T-SVZP>.

<sup>215</sup> See *supra* section II.C.4 (discussion of groundwater depletion); see also Louwyck et al., *supra* note 37; Ex. 83, LAURA FEINSTEIN ET AL., DROUGHT AND EQUITY IN CALIFORNIA 21 (Jan. 2019), <https://perma.cc/5TNC-Q9FS> ("Low income communities and communities of color in the Central Valley rely disproportionately on private wells because adequate public services were not developed in those communities."); Ex. 84, CHIONE FLEGEL ET AL., CALIFORNIA UNINCORPORATED: MAPPING DISADVANTAGED COMMUNITIES IN THE SAN JOAQUIN VALLEY 29 (2013), <https://www.policylink.org/resources-tools/california-unincorporated-mapping-disadvantaged-communities-in-the-san-joaquin-valley> ("low-income households, people of color, and communities already burdened with environmental pollution suffered the most severe impacts [from drought]").

<sup>216</sup> See *supra* sections II.C.1–3 (discussion of ammonia emissions and exposure, fine particulate matter, and ozone); see also Casey et al., *supra* note 9 ("Unadjusted models showed racial/ethnic and SES disparities in the odds of living in close proximity to methane super emitters and intensity of exposure based on multiple industry categories and total methane emissions. In adjusted models, the associations with race/ethnicity persisted.... Further, subanalyses restricted to dairies/manure management facilities and oil and gas production revealed similar racial disparities as the main analysis.").

<sup>217</sup> See *supra* section II.C.6 (discussion of odor and flies).

<sup>218</sup> See *supra* section II.C. According to a study by UC Davis, Madera County already has the highest asthma-related emergency room visit rates for children in the state, with Merced County following close behind. In addition, 11.3% of children in Madera County have been diagnosed with asthma. In Merced County, a staggering 32.5% of children—*nearly one in three*—have been diagnosed with asthma. Ex. 85, U.C. DAVIS, CENTER FOR REGIONAL CHANGE, CALIFORNIA'S SAN JOAQUIN VALLEY: A REGION AND ITS CHILDREN UNDER STRESS (Jan. 2017), <https://perma.cc/TB42-F9MG>.

CARB itself has facilitated growth and intensification of dairy operations through the Low Carbon Fuel Standard which provides preferences for large-scale dairy operations and encourages the production of manure and liquified manure management techniques and by failing to initiate rulemaking to directly regulate livestock methane. Other state agencies have similarly provided incentives for the intensification of dairy operations in the San Joaquin Valley by providing grant funds for the development of digesters and associated factory farm gas infrastructure. (45d-368.6)

**Comment:** And conversely, the LCFS disincentivizes conditions or practices that simply do not produce meaningful methane emissions to begin with. This is predictable as projects that include the largest, most polluting factory farms receive the most lavish Carbon Intensity values and thus credit generation opportunities. In California, nearly all dairies large enough to benefit from LCFS subsidies are disproportionately located in or near Latino/a/e communities.<sup>53</sup>

<sup>53</sup> See *supra* section II.B (discussion of manure management and California's dairy herd). Approximately 86% of LCFS pathways approved for fuel derived from livestock manure in California are located in the San Joaquin Valley while over 99% of digesters funded by the state's Dairy Digester and Research Development Program are in the San Joaquin Valley. DAIRY DIGESTER RESEARCH AND DEVELOPMENT PROGRAM: PROJECT-LEVEL DATA, *supra* note 8.

(45d-368.9)

**Comment:** Pairing that increased value with staff's proposal for avoided methane crediting ramps up the incentives even more. The Amendments would create a "break ground" date of December 31, 2029, where projects that break ground prior to that date can receive up to 30 years of avoided methane crediting.<sup>57</sup> But for factory farm CNG or LNG projects that do not break ground before December 31, 2029, the Amendments would eliminate their credit generation potential as of December 31, 2040.<sup>58</sup> Similarly, pathways for biomethane used to produce hydrogen that break ground before December 31, 2029, are eligible for up to 30 years of avoided methane crediting, while those that do not will be limited to credit generation through 2045.<sup>59</sup>

<sup>57</sup> *Id.* at 29–31.

<sup>58</sup> *Id.* at 30; Appx. A-1 at 34.

<sup>59</sup> *Id.* at 30.

...

The facts CARB acknowledge include the minor role manure-based fuels play among California's transportation fuels and the major contribution those fuels make as credit-generating fuels. ...

Despite the acknowledged lack of market demand for biomethane fuels, CARB nevertheless proposes to inject steroids in avoided methane crediting. CARB proposes to retain avoided methane crediting – regardless of the EJAC recommendations to terminate the policy – and convey a strong market signal for biogas companies to get their pathways certified or break ground on their digesters before the end of this decade. If they do, they can receive up to **30 years of avoided methane credits**. "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."<sup>196</sup> Fuel pathways that

produce electric vehicle fuel using biogas combusted on-site at dairy and swine operations could conceivably enjoy the benefits of avoided methane crediting in perpetuity under the plain language of the Amendments.

<sup>196</sup> *Id.* at 30.

(45d-368.11)

**Comment:** This outsized benefit would be even greater for burning factory farm gas for electricity since a project could be eligible for 30 years of avoided methane crediting even if the project broke ground in 2040, all while the value added for most other fuels in the program declines into negative terrain by then.<sup>60</sup> These projections buttress staff's scheme to use the LCFS to prop up a factory farm gas economy in perpetuity by continuing to lavishly reward factory farm gas to electricity pathways without end and subsidizing factory farm gas infrastructure so that it is available for "hard to decarbonize" stationary sources beyond 2045.

<sup>60</sup> See *id.* at 79, Tbl. 15.

(45d-368.13)

**Comment:** The proposed rulemaking package dramatically miscalculates the carbon intensity ("CI") of factory farm gas, resulting in extremely negative CI values that bear little relationship to the real-world climate footprint of these fuels. CARB has certified some factory farm gas projects with CIs lower than -750 gCO<sub>2</sub>eq/MJ.<sup>111</sup> This flawed accounting distorts the LCFS and causes severe consequences for human health, the state's clean transportation goals, and agriculture. The extremely negative CIs for factory farm gas fuels are based on avoided methane crediting and an artificially truncated lifecycle analysis ("LCA"). To remedy these problems, CARB must eliminate avoided methane crediting in this rulemaking and revise the LCA parameters in the proposed simplified Tier 1 calculators and CA-GREET4.0.

<sup>111</sup> *E.g.*, Ex. 48, CARB, TIER 2 PATHWAY APP. B016301 (certified June 21, 2021), <https://perma.cc/L982-4M9H>.

(45d-368.36)

**Comment:** In fact, staff intends this rulemaking to supercharge the number of factory farm gas fuel producers that will benefit from this faulty accounting for years to come. Were CARB to adopt staff's proposal it would do so counter to science and common sense and would make the perverse incentives that currently plague the LCFS even worse. (45d-368.37)

**Comment:** And CARB knows there are feasible, available, and more effective ways to reduce manure methane emissions than attempting to capture and burn emissions after the fact.<sup>114</sup>

<sup>114</sup> For example, CARB knows that solid separation before lagoon or digester storage effectively reduces methane and that "when dry systems are used ... emissions can be dramatically reduced – perhaps by more than 90 percent." Ex. 49, CAL. DEPT. FOOD & AGRIC., RECOMMENDATIONS FOR SHORT-LIVED CLIMATE POLLUTANTS: AN AGRICULTURAL WORKGROUP REPORT FOR THE CALIFORNIA AIR RESOURCES BOARD AND CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE 12–13 (June 2015), <https://perma.cc/9CEA-U4NX>.

(45d-368.38)

**Comment:** Meanwhile, increasingly extravagant claims of avoided methane allow the LCFS to function as a more lucrative, less regulated offset program, even as CARB ignores the Legislature's mandate in Senate Bill 1383 to adopt regulations and directly reduce methane

from manure management at industrial livestock operations in the State. Moreover, these fuel pathways provide no additive emissions benefits (the reductions are not additional), because their digesters were demonstrably funded through state grant programs, the Aliso Canyon Mitigation Agreement, and the Federal Renewable Fuel Standard. (45d-379.3)

**Comment:** Livestock operations benefitting from lucrative credits for their supposed methane reductions are incentivized to maintain or even intensify their polluting management practices that foul the air and drinking water of local communities. Smaller and more sustainable farms that manage manure through practices that largely avoid methane creation cannot convert those beneficial practices into revenue through the LCFS, perversely creating a competitive advantage for massive livestock operations. (45d-379.5)

**Comment:** Furthermore, “carbon negative” factory farm gas facilitates and even encourages the polluting production of dirty hydrogen at refineries. (45d-379.6)

**Comment:** It bears noting that CARB ignored the data-backed concerns raised by people living near industrial dairies and refineries utilizing factory farm gas credits to produce carbon negative hydrogen from fossil fuel in their “environmental justice” section. (45d-379.7)

**Comment: The proposed policy changes further lock Californians into subsidizing biogas for decades to come.**

The staff proposal allows for biogas-based natural gas and hydrogen to generate credits and enjoy avoided methane crediting for up to 30 years and biogas-based electricity to generate credits and enjoy avoided methane crediting beyond in perpetuity. This demonstrates that CARB has no intention of phasing out avoided methane crediting and, furthermore, signals to investors that they will be able to rely on revenues associated with avoided methane crediting for decades. This, in turn, will lead CARB to maintain subsidies for biogas production to guard against “stranded assets,” one of CARB’s justifications for maintaining subsidies for biogas. Unfortunately, the staff proposal threatens to sustain CARB’s commitment to ensuring adequate return on investment for investors above their role of supporting a transition to clean transportation fuel and a sustainable agricultural sector. (45d-379.9)

**Comment:** Eliminating avoided methane crediting upon the adoption of the updated regulations. Livestock operators have profited for more than a decade from exaggerated claims of “negative” emissions based on the assumption that they are free to dump methane into the atmosphere. That assumption must be eliminated starting upon adoption of the amendments, consistent with CARB’s mandatory legal duty to adopt, and clear regulatory authority to implement, regulations to address livestock manure methane emissions. (45d-379.13)

**Comment:** End avoided methane crediting for new pathways. (45d-383.2)

**Comment: Summary of Problem:** Avoided methane crediting extravagantly rewards an unregulated industry with accounting that distorts the LCFS program, undermines transportation goals, and worsens environmental injustices for frontline communities.

### **Earthjustice Recommendations:**

- New project avoided methane credit phase out in 2025, and

- Existing project avoided methane credit phase out at the end of their current crediting period.

### **Why Staff Proposal Is Inadequate:**

Staff propose to allow the market distortions and harms caused by avoided methane crediting to continue for decades.

Specifically, Staff propose:

- New project avoided methane credit phase out in 2040 (2045 for hydrogen). Projects that break ground after 2030 are also guaranteed 10 years of avoided methane crediting, or 15 years for hydrogen pathways.
- Existing project avoided methane credit phase out in 2060. No restrictions on avoided methane crediting for projects initiated by 2030 (regardless of date of certification). These projects can receive up to three renewals for 10-year crediting periods.

These timelines will perpetuate pollution harms and undermine the program's support for ZEVs and green hydrogen. (45d-383.25)

**Comment:** Awarding avoided methane credits relies on an assumption that is unjustified on its face—the assumption that, absent the LCFS, livestock operators would be free to vent their methane into the atmosphere. The fact that California is required to achieve economy-wide carbon-neutrality generally, and reduce emissions of short-lived climate pollutants (SLCPs) 40% by 2030 in particular, makes this assumption unreasonable. There is simply no realistic scenario in which the State would allow this controllable fugitive methane to persist while meeting statutory obligations.

Most notably, in SB 1383, the Legislature gave CARB clear authority to begin implementing direct regulations on this source of pollution on January 1, 2024, nearly 2 months ago. And CARB itself recognized as far back as 2016 that “regulations will be necessary to ensure manure management practices lead to lasting emission reductions” and stated their intention to “initiate a rulemaking process to reduce manure methane emissions from the dairy industry” in-line with their SLCP strategy.<sup>39</sup> Nearly a decade later, CARB has failed to initiate so much as a pre-rulemaking workshop under SB 1383 to explore regulatory options. CARB is uniquely responsible for livestock operators remaining free to dump their methane into the atmosphere. The fact that CARB has abdicated its clear authority cannot justify rewarding polluters. Nothing about livestock methane’s chemistry makes it better than landfill or wastewater methane at fighting climate change. Instead, it receives extreme, outlier carbon intensity scores purely because CARB has neglected to treat agriculture the way it treats virtually every other major source of GHG emissions. CARB has used an ineffective carrots-only approach to livestock methane for more than a decade, and it has offered no public justification for granting decades more of immunity to this major pollution source.

<sup>39</sup> CARB, Proposed Short-Lived Climate Pollutant Reduction Strategy (Apr. 2016) at 68, <https://ww2.arb.ca.gov/sites/default/files/2021-01/ProposedStrategy-April2016.pdf>.

Even if CARB conclusively declined to regulate livestock operations, the State’s climate commitments would require some alternative mechanism for controlling methane from California dairies and multiple, overlapping subsidies are already in place for precisely this purpose. Indeed, as Earthjustice and many other parties have repeatedly pointed out, the

LCFS regularly awards credit for operations that have already been capturing their methane through a mix of subsidies prior to and independent from the LCFS.<sup>40</sup>

40 Indeed, the Coalition for Renewable Natural Gas has identified the potential for double-counting biomethane and pointed to the fact that there is no central tracking required for biomethane from production to end use. See Coalition for Renewable Gas, Comments on February 22, 2023 Staff Workshop (March 15, 2023) at 10, <https://www.arb.ca.gov/lists/com-attach/88-lcfs-wkshp-feb23-ws-BjRXYgQ1VjZQZwYz.pdf>.

(45d-383.26)

**Comment: Extreme, Outlier CI Scores Distort the LCFS Market and Undermine the State's Goals.**

The strategy of relying on extravagant transportation subsidies to tame industrial livestock pollution has delivered poor results. As UC Davis agricultural economist Aaron Smith recently concluded, “[a] good rule in policy is to directly target the problem you are trying to solve... Negative crediting in the LCFS is a convoluted solution with numerous drawbacks.”<sup>41</sup> We agree. Even if CARB believes that subsidizing methane capture from dairies is a worthy strategy, it is clearly counterproductive to do so in a manner that undermines the agency’s ZEV goals.

<sup>41</sup> Aaron Smith, Cow Poop is Now a Big Part of California Fuel Policy (Jan. 22, 2024), <https://asmith.ucdavis.edu/news/cow-poop-now-big-part-california-fuel-policy>.

Despite making up less than 1% of fuel energy used in the state, livestock methane’s extremely negative, outlier CI scores has allowed it to receive almost 20% of the credits in the LCFS program to date.<sup>42</sup> In other words, livestock methane significantly dilutes the supply of LCFS credits relative to the actual fossil fuel displaced.

<sup>42</sup> *Id.* [<sup>41</sup> Aaron Smith, Cow Poop is Now a Big Part of California Fuel Policy (Jan. 22, 2024), <https://asmith.ucdavis.edu/news/cow-poop-now-big-part-california-fuel-policy>.]

(45d-383.27)

**Comment:** Apart from exacerbating the surplus of credits, which undermines the support available for ZEVs, this distorted accounting sends market signals that are completely misaligned with CARB’s own policies. In particular, the following distortions are caused by the LCFS program’s avoided methane crediting:

- **The LCFS diverts biomethane to the on-road transportation sector, despite the overwhelming consensus that this is the wrong application.** There is consensus across CARB’s Scoping Plan, Mobile Source Strategy, and State Implementation Plan that biomethane should not play a significant long-term role in transportation. A report on the role of bioresources in economy-wide decarbonization by the independent think-tank Energy Transitions Commission specifically advises against even a transitional role for bioenergy in road transportation, stating that policies that support road transport applications “create significant stranded asset threat, driving inefficient investment allocation and creating a powerful lobbying group in favor of existing policy.”<sup>43</sup> Unfortunately, avoided methane credits in the LCFS do precisely this. As the CEC explains, “[t]he LCFS credits can be three times higher than the cost to produce the fuel.” Until CARB eliminates avoided methane credits, the LCFS will continue to divert biomethane toward applications where its use has been criticized.

(45d-383.28)

**Comment: The LCFS offers lavish subsidies exclusively to large, polluting concentrated animal feeding operations (CAFOs) and disadvantages smaller, more sustainable livestock operations.** A sensible and just climate strategy would target incentives toward dairy farms that already use more sustainable management practices and maintain more sustainable herd sizes, while increasing the costs of business for the largest, highest—revenue generating, most polluting operations. CARB takes the opposite approach. Small farms or those that avoid producing methane in the first place are excluded from the LCFS, while the largest, industrialized CAFOs that have chosen to rely on manure lagoons are able to unlock extravagant new revenue streams. A California Assembly Oversight analysis raised alarms that the State’s policies could “provide the largest 225 dairies with a subsidized competitive advantage over smaller dairies” and warns that the State “may be going down a dangerous path for smaller dairies, where these projects don’t seem viable.”<sup>46</sup>

<sup>46</sup> California Assembly Budget Committee, Subcommittee Hearing No. 3 on Resources and Transportation (Apr. 19, 2017) at 20, <https://abgt.assembly.ca.gov/sites/abgt.assembly.ca.gov/files/April%2019%20-%20Toxics%20Recycling%20Ag.pdf>.

(45d-383.31)

**Comment:** California’s approach stands in contrast to the Federal Government’s treatment of biomethane. In its proposed guidance for the federal 45V hydrogen production tax credits, the U.S. Treasury Department (Treasury) recently recognized the imperative to avoid precisely the kind of double-counting in the biomethane space that the LCFS allows. In its proposed guidance, Treasury established the requirement that biomethane could only be treated with a CI lower than fossil gas if use for hydrogen constituted the “first productive use” of the biomethane.<sup>51</sup> It explains that [t]his proposal would limit emissions associated with the diversion of biogas or RNG from other pre-existing productive uses.”<sup>52</sup> Treasury also made clear its intention to establish requirements to “reduce the risk that entities will deliberately generate additional biogas” for the purpose of receiving the tax credit, “for example by generating biogas through the intentional generation of waste.”<sup>53</sup>

<sup>51</sup> Section 45V Credit for Production of Clean Hydrogen, 88 Fed. Reg. 89238 (Dec. 26, 2023).

<sup>52</sup> *Id.* at 89239.

<sup>53</sup> *Id.*

(45d-383.34)

**Comment:** By contrast, **California has no requirements that prevent intentional production of additional methane**, nor does it monitor methane levels or publicly disclose methane volumes or herd sizes. California also lacks restrictions on use of biomethane that has previously been captured for other productive uses, making it easy for pathways to receive significant avoided methane credit value for little or no additional climate benefit, and without safeguards against intentionally producing *more* methane.

Therefore, California’s strategy of trying to entice polluters to capture their methane through transportation subsidies, instead of direct regulation, has not only come at significant cost to attainment of our State’s climate goals, but it has also grossly under-delivered on its one



purported methane-reduction benefit and perpetuated a system of false GHG accounting that federal policymakers are rightly rejecting. (45d-383.35)

**Comment: Changes to Biomethane Crediting Run Counter to Board Direction.**

While Earthjustice objected to CARB's initial proposal for delaying until 2030 the phase out of avoided methane crediting during the workshop process, we note that even CARB Staff acknowledged the need to discontinue the practice. Alarming, between the SRIA and the December release of the ISOR, it appears that Staff is now further delaying this already overdue phase out. The September draft allowed one 10 year crediting period with avoided methane credits for pathways certified prior to 2030, and would allow a 5 year crediting period for pathways certified between 2030 and 2034 (implying that the practice would finally end for new pathways in 2035).

The new proposal inexplicably abandons these distant restrictions. It 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) and allows up to 3 10-year crediting periods for all those projects that break ground prior to 2030. For those that break ground after 2030, the crediting period is extended from 5 years to until 2040, or until 2045 if they choose a hydrogen pathway.

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:

- **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"<sup>54</sup>  
<sup>54</sup> 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).
- **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."<sup>55</sup>  
<sup>55</sup> *Id.* at 318-319.
- **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."<sup>56</sup>  
<sup>56</sup> *Id.* at 322.

- **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 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 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.”<sup>57</sup>

<sup>57</sup> *Id.* at 325 (emphasis added).

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. Staff 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. (45d-383.36)

**Comment:** Credits for digester biogas should also be eliminated. These credits are encouraging expansion of the dairy industry which is responsible for substantial air and water pollution; the industry should be fined, not subsidized. (45d-389.10)

**Comment:** Assumptions around avoided methane credits from livestock digesters. A range of factors including policy, consumer preference, improved technology, voluntary agreements, legal settlements, and others is contributing to broad change across the livestock industry. Assuming that uncontrolled lagoons are, and will always be the alternative to LCFS-supported digesters is similarly problematic. (45d-391.13)

**Comment:** As a California resident, I am writing to urge you to stop using taxpayer dollars to fund factory farm biogas projects, which threaten the well-being of animals, people, and the planet. Funding biogas production under the Low Carbon Fuel Standard (LCFS) incentivizes the consolidation and growth of the notoriously harmful factory farming industry. (8608-8727.1)

**Comment:** Including factory farm gas in California's Low Carbon Fuel Standard would:

- > Incentivize more corporate factory farms, harming family farmers, rural communities, and our environment.
- > Create more corporate consolidation in the U.S. livestock industry.

- > Commoditize methane production, which would fuel more methane producing practices.
- > Create additional overproduction of commodities, pork and milk, increasing supply and further pushing down market prices paid to independent family farms.
- > Pay foreign multinational meatpackers, like Chinese-owned Smithfield and Brazilian-owned JBS, for their pollution.
- > Create incentives for the public (taxpayer dollars through government subsidies) to fund anaerobic digesters to capture factory farm gas.

Please don't do it! (45d-8746-8755.1)

**Comment:** Including factory farm gas in California's Low Carbon Fuel Standard would:

...

Pollute our water resources with waste from factory farms (CAFOs) (45d-8750.2)

**Comment:** Please exclude factory farm gas from this proposal!!!

The California Air Resources Board (CARB) has proposed rules that allow corporate factory farm dairy and hog operations (anywhere in the country) to sell the methane created in their operations into this system as a supposedly "carbon negative" fuel. METHANE IS NOT CARBON NEGATIVE?!?!?

The current CARB counter-intuitive proposal:

- Commoditizes methane production, legislating publicly-funded (taxpayer dollars through government subsidies) support for gas-polluting practices to grow.
- Incentivizes the expansion of confined animal feeding operations.
- Institutionalizes corporate consolidation in the U.S. livestock industry, out-competing and impeding family farmers.
- Continues the overproduction of remote commodities, flooding the market and pushing down prices that would otherwise be invested into local, independent family farms, rural communities, and more effective and palpable responses to climate change.
- Pays foreign multinational meatpackers, like Chinese-owned Smithfield and Brazilian-owned JBS, for their pollution.

Your board knows exactly what they are doing and WE SEE YOU FOR WHAT YOU ARE. Carbon trading has NEVER been a viable solution and only proves "logical" when theoretical economics is the only consideration, leaving out "externalities". In practice, these theories about the economy are proven OVER AND OVER AND OVER AGAIN TO FAIL.

I am sick of your empty words and broken policy and I am sick of corporations seemingly pulling one over the eyes of misguided and oftentimes ignorant "boards of professionals". It's obnoxious and embarrassing. (Apr-007.1)

**Comment:** Throughout IATP's history, we have seen firsthand the economic and environmental harm the transition to large-scale confined animal feeding operations (CAFOs) has caused to rural communities in Midwest states. California's LCFS, unfortunately, has contributed to the further expansion of the CAFO system in Midwest states, such as Minnesota and Wisconsin, through its skewed emissions intensity scoring and associated credits for CAFO-derived biogas. An analysis by CoBank concluded that incentives and credits generated through California's LCFS "are the main source of revenue for dairy digester projects."<sup>1</sup> We do not believe biogas projects that subsidize Midwest CAFOs are consistent with California's LCFS intention and purpose: to reduce California's GHGs through its transportation sector by requiring cleaner fuels.

<sup>1</sup> <https://sso.cobank.com/documents/7714906/7715329/Interest-in-California-Dairy-Manure-Methane-Digesters-Follows-the-Money-Aug2020.pdf/be11d7d6-80df-7a7e-0cbd-9f4ebe730b25?t=1603745079998>

(Apr-010.1)

**Comment:** The "avoided methane" crediting policy assumes that open air flaring is the only option for dairy, beef or hog producers and that captured methane is an "avoided emission." This ignores alternative approaches to raising animals (such as on appropriately scaled, pasture-based systems that avoid giant liquid manure lagoons all together) and better manure management (such as lower-emitting dried manure systems). In other words, the CAFO system itself and its management of manure is demonstrably avoidable. (Apr-010.3)

**Comment:** Exclude factory farm gas from the Low Carbon Fuel Standard.

Please consider the unintended negative consequences of California's policies on Americans throughout the U.S. (Apr-011.1)

**Comment:** Including factory farm gas in California's Low Carbon Fuel Standard would:

Incentivize more corporate factory farms, harming family farmers, rural communities, our environment and climate, in Missouri, the Midwest and across the U.S.

Create more corporate consolidation in the U.S. livestock industry.

Commoditize methane production, which would fuel more methane producing practices.

Create additional overproduction of commodities, pork and milk, increasing supply and further pushing down market prices paid to independent family farms.

Pay foreign multinational meatpackers, like Chinese-owned Smithfield and Brazilian-owned JBS, for their pollution.

Create incentives for the public (taxpayer dollars through government subsidies) to fund anaerobic digesters to capture factory farm gas.

Please consider the unintended negative consequences of California's policies on Americans throughout the U.S. (Apr-012.1, Apr-021.1)

**Comment:** I urge you to exclude factory farm gas from the Low Carbon Fuel Standard. I live in Missouri. Just north of me, JBS has a meat packing plant that this year caused egregious water pollution in the city of Moberly, MO.

Years ago, our state legislature put an initiative on a statewide ballot called “right to farm”. Who could argue with that sentiment? It passed. What it really meant was that foreign enterprises could buy Missouri farm land. And they did. Our aquifers and soil are suffering because of it. Now, the state legislature is trying to codify the opposite into state law.

We must start doing the hard work of reversing climate change. The biosphere is collapsing. Excluding factory farm gas from the Low Carbon Fuel Standard is a positive step. (Apr-013.1)

**Comment:** Calif. should NOT allow factory farm gas to be a part of the low carbon fuel standard. To allow it would be to incentivize more factory farms which would have a negative effect on small farmers and rural communities, as well as our environment and the climate. More factory farms would mean more foreign corporations in Calif and across the country, and then we would be paying them for their pollution.

Please consider the unintended consequences throughout the country.

Do not allow “biomethane” to be included in the Low Carbon Fuel Standard. (Apr-014.1)

**Comment:** Because of many negative consequences fuels produced by factory farms should not be included in the Low Carbon Fuels Standards. This would defeat the purpose of the standards. (Apr-015.1)

**Comment:** Exclude “factory” farm gas from the proposed California “Low Carbon Fuel Standard.” The California policy would fuel MORE Factory Farms in the Midwest that are for all practical purposes unregulated with no health protection for the persons living close to them. We do not want unregulated Factory Farms/CAFOs, so don't encourage that. (Apr-016.1)

**Comment:** Factory farming is a proven recipe for disaster!

China's profits-VS- American sustainability and health.

Who wants meat that stinks like a factory farm evaporation pit anyhow?

Open and smell a package Smithfield meat like i just did and barf reflexes are the result.

More fuel wasted over having to return garbage!

Only The best for my family (sustainability raised meats and organic foods) flavorful and healthy for OUR Country.

Reward sustainable farming practices and not foreign investors seeking to repeat environmental disasters.

Elected officials, Visit a factory farm downwind from the evaporation fountains that spew a mist stinking up nearby towns for hundreds of miles. (Apr-017.1)

**Comment:** Please do not enact rules that allow methane gas created in CAFO dairy and hog operations to be sold into your system as a carbon negative commodity. This is a misguided move which will incentivize the expansion of such operations and compound detrimental environmental and community impacts. (Apr-018.1)

**Comment:** Including factory farm gas in California's Low Carbon Fuel Standard would:

Incentivize more corporate factory farms, harming family farmers, rural communities, our environment and climate, in Missouri, the Midwest and across the U.S.

Create more corporate consolidation in the U.S. livestock industry.

Commoditize methane production, which would fuel more methane producing practices.

Create additional overproduction of commodities, pork and milk, increasing supply and further pushing down market prices paid to independent family farms.

Pay foreign multinational meatpackers, like Chinese-owned Smithfield and Brazilian-owned JBS, for their pollution.

Create incentives for the public (taxpayer dollars through government subsidies) to fund anaerobic digesters to capture factory farm gas.

Please consider the unintended negative consequences of California's policies on Americans throughout the U.S.

There are many negative consequences that come from this illogical and counterintuitive proposal, and here are two of the big ones:

By commoditizing factory farm pollution in California's "Low Carbon Fuel Standard" policy, California would be incentivizing factory farm corporations to continue, and even increase, their methane production causing MORE methane and greenhouse gases, MORE factory farm expansion, MORE water and air pollution, and MORE corporate consolidation.

This proposal would create additional overproduction of pork and dairy, pushing market prices even further down for independent family farms. Currently, overproduction of pork and dairy and resulting low prices have been devastating for independent family farm livestock producers. (Apr-019.1)

**Comment:** By commoditizing factory farm pollution in California's "Low Carbon Fuel Standard" policy, California would be incentivizing factory farm corporations to continue, and even increase, their methane production causing MORE methane and greenhouse gases, MORE factory farm expansion, MORE water and air pollution, and MORE corporate consolidation. This proposal would create additional overproduction of pork and dairy, pushing market prices even further down for independent family farms. Currently, overproduction of pork and dairy and resulting low prices have been devastating for independent family farm livestock producers. (Apr-020.1)

**Comment:** Do not include factory farms in the low carbon fuel standard. We also do not want our waters polluted like Iowa from Cafo farms. Small family farms are more sustainable for all. (Apr-022.1)

**Comment:** MRCC strongly urges the California Air Resources Board to exclude all fuels derived from biomethane from dairy and swine concentrated animal feeding operations (CAFOs) from California's Low Carbon Fuel Standard.

Missouri family farmers and rural communities have been displaced, hollowed-out, and depopulated as a result of the corporate consolidation in, and their control of, our food system and U.S. livestock markets, specifically by way of corporate industrial livestock operations.

There are many negative consequences that come from this counterintuitive proposal, and here are two of the big ones:

- By commoditizing factory farm pollution in California's "Low Carbon Fuel Standard" policy, California would be incentivizing factory farm corporations to continue, and even increase, their methane production causing MORE methane and greenhouse gases, MORE factory farm expansion, MORE water and air pollution, and MORE corporate consolidation.
- This proposal would create additional overproduction of pork and dairy, pushing market prices even further down for independent family farms. Currently and over the last 3 decades, corporate overproduction of pork and dairy have resulted in consistently low farm gate prices that have been devastating for independent family farm livestock producers and put hundreds of thousands of U.S. family farm livestock producers out of business.

Furthermore, including factory farm gas in California's Low Carbon Fuel Standard would:

- Pay foreign multinational meatpackers, like Chinese-owned Smithfield and Brazilian-owned JBS, for their pollution.
- Create incentives for the public (taxpayer dollars through government subsidies) to fund anaerobic digesters for multinational extractive corporations to capture factory farm gas.

The Air Resources Board should not further entrench CAFO pollution in our communities and further tilt the scales against family farmers struggling to hold onto what meager share of the livestock market they have left.

On behalf of our 5,000+ family farm members, we ask that you reform this pollution trading scheme that inflicts harm on our communities. We urge you to reform the LCFS to exclude all fuels derived from factory farm gas. (Apr-023.1)

**Comment:** Exclude Factory Farm Gas from California's "Low Carbon Fuel Standard" legislation:

To include this would create and bolster incentives to generate more methane gas! And at a time, ironically, when we have come to realize its massive deleterious effects on the earth's health. Inherently harmful, the methane incentive would additionally, reward Chinese-based Smithfield and Brazilian -based JBS for their pollution! We would be paying them to pollute more!

This would also harm California farmers by consolidating corporate farming and bringing prices down by flooding the market even further than currently.

Our factory-farming is a deplorable industry already, so cruel and embarrassing as a enlightened population - California must do what it does best: LEAD THE NATION , remain in the vanguard showing and teaching the moral way to live. (Apr-027.1)

**Comment:** Alternatively, the LCFS could simply eliminate all avoided emissions credits, except for existing contracts, starting in 2025. This is fully justified based on the fact that the many government and private subsidies, including LCFS, have turned livestock biogas into a commodity. Capture of biogas has become “business-as-usual” and thus should not qualify for avoided emissions CI scores. (Apr-030.2)

**Comment:** LCFS “avoided emissions credits” are a disincentive to developing a green hydrogen industry in California

California’s goal should be, like that of the federal government, to incentivize green hydrogen. What is meant by green hydrogen? The Treasury has provided several tiers, with much higher incentives for electrolytic hydrogen powered by new renewables (additionality) that are co-located and matched in time with production. Unfortunately, the LCFS has none of the guard rails that Treasury is considering and as a result is incentivizing fossil-based hydrogen but not green electrolytic hydrogen. It should not matter that LCFS incentivizes hydrogen production in the specific context of transportation. There should be *one* California-wide policy to incentivize green electrolytic hydrogen that follows the three pillars.<sup>6</sup>

<sup>6</sup> Additionality, co-location and time-matching are referred to as “the three pillars,” and they appear to be certain in the Treasury Departments 45V rules for the highest tier of subsidies (\$3 per kg of H<sub>2</sub> with a carbon intensity of 0.45 kgCO<sub>2</sub>e/kg H<sub>2</sub>). The lowest tier eligible for subsidies earns only \$0.60 and must meet a 4 kg CO<sub>2</sub>e/kg H<sub>2</sub> standard. See: <https://www.resources.org/common-resources/how-can-hydrogen-producers-show-that-they-are-clean/> The carbon intensity common for SMR hydrogen is in the neighborhood of 9 kg CO<sub>2</sub>e/kg H<sub>2</sub>. <https://www.iea.org/data-and-statistics/charts/comparison-of-the-emissions-intensity-of-different-hydrogen-production-routes-2021>

It is arguable whether, as in the IRA, somewhat higher carbon intensity production methods should also be incentivized but to a lower extent. Hydrogen made from methane using SMR has a carbon intensity of double what the IRA will incentivize. So that should clearly not be a candidate, but hydrogen made from gasification of woody biomass from forest residues might be a candidate based on lower carbon intensity and social usefulness. Through the wonders of chemistry there are actually many pathways with lower carbon intensity than SMR-based hydrogen. Climate Action California, however, believes that only green electrolytic hydrogen should be *incentivized* by the state of California. That is the only way the clean hydrogen industry we need will come into being.

Under the LCFS currently, hydrogen producers using SMR and other carbon intensive production methods are incentivized because they can buy avoided emissions credits allowing them to offset the emissions associated with carbon intensive hydrogen production which otherwise entail penalties or they can use dairy biomethane as a feedstock.

Table 1, below, shows the feedstocks used in producing hydrogen credited under the LCFS.<sup>7</sup> Each feedstock is associated with a particular average carbon intensity. Those using methane from livestock digesters have an average negative carbon intensity of at least -200. Note that of the 116 pathways, only one is for green electrolytic hydrogen and its carbon intensity is rated at zero, far above the negative scores for manure feedstocks. Of the 116 facilities 89% are in California.

<sup>7</sup> The data in Table 1 and Table 2 are from the publicly available LCFS files, accessed December 6, 2023: [https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/current-pathways\\_all.xlsx](https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/current-pathways_all.xlsx)



**Table 1: Carbon intensity<sup>8</sup> of LCFS pathways<sup>9</sup> for hydrogen, by feedstock**

Feedstock	N	Mean of Carbon Intensity
Any Other Feedstock (998)	1	88
Dairy Manure (026)	39	-202
Fossil NG & Landfill Gas	2	44
Grid Electricity (039)	2	164
Landfill Gas	2	-9
Landfill Gas (025)	24	112
North American Fossil NG (031)	30	142
North American NG	1	166
North American Natural Gas	1	151
Sodium Chlorate Production Process	1	56
Solar Electricity via Electrolysis	1	0
Swine Manure (044)	6	-354
Wastewater Sludge (030)	2	93
Zero-CI Sources (037)	4	11
<b>Total</b>	<b>116</b>	<b>-17</b>

<sup>8</sup> \*Energy Economy Rate-adjusted Carbon Intensity (gCO<sub>2</sub>e/mj) – amount of carbon emitted in producing and consuming a megajoule of energy.

<sup>9</sup> For the purposes of this analysis we used all of the LCFS data. Many of these pathways, however, have been retired, including 37 whose fuel category is “hydrogen.” In short, the tables show an overview of the history of the program, not just the currently active pathways.

Above, 45 of 116 hydrogen pathways use livestock manure as a feedstock (39%). Though comprising less than half of the pathways, it is enough to make the whole hydrogen production system in the LCFS have a mean negative carbon intensity score.

Below we present the same table limited to those pathways where hydrogen is made by steam methane reformation.

**Table 2: Carbon intensity and feedstock for the 74 pathways using Steam Methane Reforming to produce hydrogen.**

Feedstock	N	Mean of Carbon Intensity
Dairy Manure (026)	30	-201
Landfill Gas (025)	16	107
North American Fossil NG (031)	19	141
North American Natural Gas	1	151
Swine Manure (044)	6	-354
Wastewater Sludge (030)	2	93
<b>Total</b>	<b>74</b>	<b>-46</b>

Livestock manure is a feedstock for 49% of hydrogen producers using SMR.

The difference in carbon intensity between using fossil methane and methane from manure is extreme, showing the effects of a mistaken “avoided emissions” counterfactual. There is no difference in the physical methane used as a feedstock or the hydrogen produced – just the “magic” of avoided emissions crediting if the feedstock is manure. (Apr-030.3)

**Comment:** Avoided emissions credits are not necessary for preserving or incentivizing capture of methane by California dairies.

Advocates of the dairy/biomethane industrial complex, like Michael Boccadero, say that digesters would not be feasible without the avoided emission negative carbon intensity scores. This is not true. Before the LCFS negative CI scores for biomethane, the cap-and-trade program funded hundreds of digesters around the country, most producing heat and electricity as well as products made from digestate. That much more future-friendly model has been eclipsed by the biomethane boom which in turn reflects the avoided emission scores.

“Renewable natural gas,” even without the avoided emission negative scores has a carbon intensity about half that of fossil methane, so biomethane sold via the LCFS can still be profitable. Dairy Cares reports there are 120 digesters operating and 236 digesters funded in California.<sup>29</sup> Only 58 are currently part of LCFS, so clearly the avoided emissions credits are not necessary for digesters to be profitable. Existing digesters have a contractual ten years of assured payment through LCFS. These agreements can be honored.

<sup>29</sup> <https://www.dairycares.com/dairy-digesters>

In short, not only does the counterfactual for using “avoided emissions” negative CI scores fail, but these scores are also not necessary. (Apr-030.5)

**Comment:** Two well-respected policy analysts, Danny Cullenward and Elizabeth Grubert, have argued that the high carbon intensity scores awarded “avoided emissions” for dairy biogas amounts to a “methane offset.” And that in the context of Treasury’s upcoming rules on 45V tax credits, these may be pernicious.

The logic goes like this: If someone else was going to emit methane to the atmosphere, but agrees instead to capture and inject it into a gas pipeline network, then a hydrogen producer can buy a certificate from that other methane producer representing that same captured gas and potentially treat their *own* fossil gas as negative emissions....Because methane is considered almost 30 times more impactful than CO<sub>2</sub> over a 100-year period, the CO<sub>2</sub>- equivalence of avoiding methane emissions is larger than the project’s direct CO<sub>2</sub> emissions, and therefore the resulting hydrogen production process gets a negative carbon intensity score.

“Without methane offsets, fossil hydrogen projects couldn’t benefit much from the hydrogen [IRA 45V] tax credit; even with strict carbon capture and storage pollution controls, they can’t meet the life cycle requirements for the top tier and would likely prefer to claim a smaller carbon storage tax credit instead. But if projects can use methane offsets, they can easily reduce their calculated emissions to qualify for the top tier of the hydrogen production tax credit. This would also mean these fossil projects could undercut truly clean hydrogen projects.

“Remarkably, a fossil hydrogen project without carbon capture could qualify for the top production tax credit by offsetting just 25% of its fuel use. And a fossil hydrogen project that abates 90% of its CO<sub>2</sub> emissions could earn the top tier of the tax credit if it bought offsets for just 4% of its fuel use.”<sup>5</sup>

<sup>5</sup> Emily Grubert & Danny Cullenward. “The New Hydrogen Rules Risk Opening the Door to Methane Offsets: Having a true green hydrogen industry depends on that not happening.” February 09, 2024. <https://heatmap.news/climate/hydrogen-tax-credit-final-methane-offsets>

Cullenward and Grubert are making this point in the context of tax credits for hydrogen producers when the goal is to get a brand-new industry of green electrolytic hydrogen off the ground in only a few years. Methane offsets, pre-eminently those of the LCFS, threaten to allow fossil fuel companies to divert these tax credits to hydrogen produced by steam methane reformation (SMR). Thus, what began as a well-intentioned attempt to reduce transportation emissions in California while also abating agricultural methane has turned into a model that threatens the national development of green electrolytic hydrogen! (Apr-030.10)

**Comment:** Low carbon fuel standard should not include factory farm gases.

This will incentivize more corporate control of factory farms, harming family farmers, rural communities, our environment and climate, in Missouri, the Midwest and across the U.S.

Will create more corporate consolidation in the U.S. livestock industry.

Will commoditize methane production, which would fuel more methane producing practices.

Create additional overproduction of commodities, pork and milk, increasing supply and further pushing down market prices paid to independent family farms driving them out of business.

Pay foreign multinational meatpackers, like Chinese -owned Smithfield and Brazilian owned JBS, for their pollution.

It would create incentives for the public ( taxpayers dollars through government subsidies) to fund anerobic digestors to capture factory farm gas. Using public funds for private greed with this false solution.

Recent studies have shown that methane gas contributes to CO<sub>2</sub> in the atmosphere when feedback losses and use from production to be comparable to coal use.

Please consider the unintended negative consequences of California's policies on Americans throughout the U.S. (Apr-042.1)

**Comment:** CARB staff's current proposal suggests a 2040 phase-out date for avoided methane crediting, this delayed date a product of the timeline of transitioning to non-combustion vehicles as shared in the 2022 Scoping Plan Update. While we understand the longevity of demand for fuels such as biomethane as certain sectors are slower or more difficult to decarbonize, we urge staff to reconsider the precedent this credit has established.

Dairies account for over half of methane emissions in California yet the only incentive to capture emissions is avoided methane crediting. This model created a perverse incentive where increased herd sizes allow digester operators to capitalize off captured emissions. The livestock waste management associated with digester operation is not the lowest-emissions

pathway, given the option for dry handling, however it is perpetuated due to the appeal of maximizing credit generation.

As of January 1, 2024, the regulation of dairy methane emissions is now on the table. In tandem with the ongoing LCFS update process, we are calling on CARB to fortify the current short-lived climate pollutant strategy by kickstarting this regulatory process. Dairy emissions need to be treated similarly to that of landfills and oil and gas, instead of operating with only rewards as an incentive. (Apr-055.6)

**Comment:** Including factory farm gas in California's Low Carbon Fuel Standard would incentivize more corporate factory farms, harming family farmers, rural communities, our environment and climate, in Missouri, the Midwest and across the U.S.

The LAST thing this planet needs is more CAFOs!!! (Apr-068.1)

**Comment:** The push to build digester infrastructure around the country, that is fueled in large part by California's LCFS incentives, is exacerbating damaging trends of consolidation and increased corporate control of the food system that have already wreaked havoc on independent family farms and rural economies. The investment of huge amounts of public money into manure digesters is propping up the largest industrialized livestock operations, and causing them to expand. Subsidies from the LCFS allow these large corporate-controlled operations to survive low commodity prices with funding from manure-derived biogas that small operations cannot access.

Our members have witnessed the shift in the structure of the livestock sector away from independent diversified farms to industrialized animal feeding operations in their communities. These factory farms concentrate animals and their waste, burdening surrounding communities with air and water pollution. Around the country, neighbors of these facilities report odors and other health impacts, and losing the ability to spend time outdoors. Anaerobic digesters are touted by the industry as a win-win solution that creates usable energy while reducing the environmental impact from the management of massive quantities of manure. But communities around the country know that this technology is far from a real solution. Instead, digesters allow factory farms to not only remain a burden on surrounding communities, but often to grow even larger.

Unfortunately, California's preference for manure-derived biogas in the LCFS program is driving the expansion and entrenchment of factory farms and dirty biogas projects farm beyond California, including into our communities. 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 who live near factory farms and manure digesters. This is in stark contrast to the environmental justice commitment set by California.

CFFE believes that climate change is a serious challenge that requires a dramatic response. This crisis demands more than highly speculative market-based schemes that will allow polluters to keep polluting and let agribusiness pay farmers less for their crops and livestock. A serious plan to address agriculture and climate change must address structural issues, not just attempt minor improvements in environmental performance in a highly consolidated, industrialized factory farm system. Factory farms require huge quantities of feed, water,

chemical inputs and energy and manage manure in a way that drives greenhouse gas emissions. California's climate programs must support a dramatic transition in how we raise animals for food that is centered on independent family farms and sustainably managed grazing systems.

Using California's climate programs, including the LCFS, to support expensive manure management projects on confinement operations fails to make this necessary structural change, and instead props up and expands the factory farm system. Prioritizing grazing over factory farm manure management would increase the sequestration of carbon in pastures, and also avoid the emissions from industrialized animal operations' feed production and liquid manure storage. Manure lagoons not only emit high amounts of methane and nitrous oxide, but they are also highly vulnerable to natural disasters such as hurricanes and floods. And confinement operations decouple grazing animals from grasslands, requiring more synthetic fertilizers for feed production, which drives further emissions.

Factory farm biogas production poses grave environmental, public health and economic risks, yet CARB staff chose to ignore this environmental injustice. This is unacceptable and undermines CARB's credibility as a regulatory body.

...

The LCFS may be a California policy, but it is driving the expansion and entrenchment of factory farms and dirty biogas projects far beyond California, including in our communities in the Midwest. In addition to concerns about our communities in the Midwest, we stand with the impacted communities in California's Central Valley who are disproportionately impacted by the public health burdens of digesters that extend the life of massive dairy factory farms.

CFFE urges board members to rein in CARB staff and ensure that the LCFS stops incentivizing harmful factory farm biogas production in California and beyond. (Apr-077.2)

**Comment:** Stop double counting by allowing factory farm gas projects paid for and claimed by other programs to sell LCFS credits as well. (Apr-077.7)

**Comment:** Ending lavish incentives to factory farms across the country to produce methane and factory farm gas that California does not need. (Apr-154.2)

**Comment:** Ending lavish incentives to factory farms across the country to produce methane and factory farm gas that California does not need. Not only is methane-producing liquified manure management a choice but also CARB has an obligation to regulate that methane rather than subsidize its creation. (Apr-159.3)

**Comment:** As an advocate for the environment and the rights of communities impacted by these policies, I urge Governor Newsom and the CARB board members to take immediate corrective measures. It is essential to ensure that the LCFS does not continue to promote harmful factory farm biogas production under the guise of sustainable development. (Apr-196.2)

**Comment:** The Low Carbon Fuel Standards amendments should cover pollution from factory farms. Obviously. But you recently chose to turn a blind eye to the adverse effects of this health-harming and planet-warming biogas.

In spite of years of strong advocacy by the people who feel the deleterious effects the most, you are protecting business profits.

Without change, your policy is driving expansion and entrenchment of factory farms in my state of Oregon. Communities don't want them.

Don't export your dirty energy policy to rural communities without regard for local impact. (Apr-197.1)

**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. (15d1-010a.3, 15d1-010b.3)

**Comment:** 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 farms<sup>1</sup>, causing harmful effects on the health of surrounding communities, including increased release of ammonia, water pollution, and increased truck traffic<sup>2</sup>; encourages the inevitable leakage of methane during storage and transportation<sup>3</sup>; and generates greenhouse gas emissions created by combustion of the product. We urge you to phase out support for biomethane as rapidly as possible<sup>4,5</sup>

1. Lee, Hyunok and Daniel A. Sumner. “Dependence on policy revenue poses risk for investment in dairy digesters.” *California Agriculture*. Vol. 72, No. 4 December 17, 2018.

2. Son, JY., Bell, M.L., “Concentrated animal feeding operations (CAFOs) in relation to environmental justice related variables in Wisconsin, United States,” *Journal of Exposure Science and Environmental Epidemiology*, September 9, 2023.

3. Thomas K. Flesch, Raymond L. Desjardins, Devon Worth, “Fugitive methane emissions from an agricultural biodigester.” *Biomass and Bioenergy*, October 2011.

4. Waterman, C. & Armus, M. “*Biogas or Bull\*\*\*\*? The Deceptive Promise of Manure Biogas as a Methane Solution*,” 2024. [https://foe.org/wp-content/uploads/2024/03/Factory-Farm-Gas-Brief\\_final.pdf](https://foe.org/wp-content/uploads/2024/03/Factory-Farm-Gas-Brief_final.pdf)

5. Food & Water Watch, “*Big Oil and Big Ag Ponzi Scheme: Factory Farm Biogas*,” January 2024. [https://foe.org/wp-content/uploads/2024/03/Factory-Farm-Gas-Brief\\_final.pdf](https://foe.org/wp-content/uploads/2024/03/Factory-Farm-Gas-Brief_final.pdf)

(15d1-023.2)

**Comment:** 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. (15d1-025.1)

**Comment:** 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.<sup>1</sup>

<sup>1</sup> <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>

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. (15d1-067.1)

**Comment:** *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.<sup>2</sup> Ammonia is a health concern, as it has the potential to form fine particulate matter (PM2.5), which can lead to respiratory and pulmonary issues in nearby communities.<sup>3</sup> Ammonia emissions also present an environmental risk contributing to soil acidification and/or eutrophication in downwind ecosystems.<sup>4</sup>

<sup>2</sup> <https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data#doc>

<sup>3</sup> <https://pubmed.ncbi.nlm.nih.gov/20458016/>

<sup>4</sup> <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%<sup>Error! Bookmark not defined.</sup> while a permeable cover is estimated to reduce ammonia by 40-80%.<sup>5</sup>

<sup>5</sup> <https://extension.colostate.edu/topic-areas/agriculture/best-management-practices-for-reducing-ammonia-emissions-lagoon-covers>

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. (15d1-067.2)

**Comment:** 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 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. (15d1-068.3)

**Comment:** Remove the incentives to pollute that occur as a result of subsidies for avoiding methane emissions. (15d1-201.2)

**Comment:** 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. (15d1-201.3)

**Comment:** 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. (15d1-211.1)

**Comment:** Commenters urge CARB to (1) immediately eliminate avoided methane crediting for all pathway types; (15d1-211.2)

**Comment:** 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.<sup>6</sup> 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.

<sup>6</sup> 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](https://www.arb.ca.gov/lispub/comm/iframe_bccomdisp.php?listname=lcfs2024&comment_num=6969&virt_num=299).

(15d1-211.7)

**Comment:** 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.<sup>9</sup> 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.<sup>10</sup> 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.

<sup>9</sup> 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>.

<sup>10</sup> Initial Comments at 10.

(15d1-211.8)

**Comment:** 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 emissions<sup>3</sup>, we should instead be putting greater emphasis on implementing thorough and multifaceted mitigation strategies. Community members who live in proximity to dairy operations have shared their experiences with air and water quality issues, as well as lasting health strategy. This distant date is incongruent with our state climate goals as well as commitment to environmental justice. 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.

<sup>3</sup> “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](https://ww2.arb.ca.gov/sites/default/files/2024-08/CARB_Dairy_Sector_Workshop_Staff_Presentation_08-22-2024.pdf)

(15d1-221.7)

**Comment: 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. (15d1-222.3)

**Comment: 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.**

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:

- **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”<sup>13</sup>  
<sup>13</sup> 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).
- **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.”<sup>14</sup>

<sup>14</sup> 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).

- **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.”<sup>15</sup>

<sup>15</sup> 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).

- **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 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.”<sup>16</sup>

<sup>16</sup> 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).

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. (15d1-222.20)

**Comment:** (2) End avoided methane crediting for biomethane used in hydrogen production starting in 2025. (15d1-222.29)

**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. (15d1-225.1)

**Comment:** And imagine what their response will be upon further learning that a good portion of the added cost is the result of CARB support for:... dairies that capture their own methane pollution and “deliver” it to California, even after staff have been informed by UC economist Aaron Smith and stakeholders (see page 9 of the 45-day comments) using data provided by the dairy industry that “after the first 10 years, once capital costs have been paid, there is little economic justification for digesters to receive prevented methane LCFS credits”,... (15d2-183.6)

**Comment:** The continued allowance of credits for renewable methane not only affects communities far from California but go against CARBs CEQA recommendations: As a general rule, offsets purchased in the general area of the Project are preferred if onsite mitigations are insufficient as shown in the CARB Scoping Plan GHG Reduction and Mitigation Hierarchy shown on the right.<sup>1</sup>

<sup>1</sup> Office of Planning and Research. CEQA 202 Series: Greenhouse Gas Emissions. 4.18.2023. Accessed [https://opr.ca.gov/ceqa/docs/20230517-CEQA\\_202\\_GHGAnalysis\\_Slides.pdf](https://opr.ca.gov/ceqa/docs/20230517-CEQA_202_GHGAnalysis_Slides.pdf)

(15d2-205.2)

**Comment:** Changes made in the second 15-day package now propose that the certified carbon intensity of biomethane projects that break ground before 2030 are eligible for up to two additional crediting periods (equivalent to 20 years) regardless of whether binding methane capture regulations take effect. The Notice of Public Availability document indicates that this leniency was granted to assist farmers in complying with California’s Short-Lived Climate Pollutant (SLCP) reduction strategy.<sup>13</sup> We recognize that anaerobic digesters are a strategy to meet statewide methane reduction targets; however, locking in crediting incentives despite regulatory capture requirements is a departure from sound life-cycle assessment methodology and misapplies policy incentives designed for transportation fuels to the agricultural sector.

<sup>13</sup> [https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/2nd\\_15day\\_no;ce.pdf](https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/2nd_15day_no;ce.pdf)

On their own, extended timelines for biomethane crediting will not help stabilize the LCFS credit market and address the current oversupply of credits in the market. Historical trends indicate that lenient compliance mechanisms for biomethane will lead to continuous excess crediting and a triggering of the AAM and compliance trajectory step-downs. As stated in previous comments, we recommend that biomethane remain subject to more stringent sourcing requirements consistent with other pathways and to remove avoided methane emissions crediting that does not pass an additionality test.<sup>14</sup> Biomethane and derivative fuels can remain a viable LCFS compliance pathway, without a reliance on out-of-state and out-of-sector emissions offsets and use of inflated carbon intensity factors. We provide evidence to support these arguments below.

<sup>14</sup> <https://www.arb.ca.gov/lists/com-attach/7554-lcfs2024-Bm8BZAZkAyQCWwBj.pdf>.

(15d2-237.6)

**Comment: Biomethane crediting proposal is a departure from sound life-cycle assessment methodology**

Manure-derived biomethane is the most lucrative fuel of all LCFS pathways on a \$ per MJ basis due to the use of avoided methane crediting within Tier 1 and 2 calculators. When biomethane is processed into hydrogen or converted into electricity to power electric vehicles its economic value is even higher, further benefitting from energy economy ratios (EERs) that correct for the higher efficiency of battery and fuel cell powertrains. Organic waste processed at landfills similarly benefits from avoided methane crediting, although to a lesser degree.

We illustrate the expected credit value of common heavy-duty fuel pathways consumed in 2025. We compare the incentive value granted to dairy biomethane-derived renewable natural gas (RNG), electricity and hydrogen relative to renewable diesel (RD) and green hydrogen in Figure 2. Our calculations assume the average CI by pathway of currently certified facilities in the LCFS certified pathways spreadsheet and an LCFS credit price of \$100/mt.<sup>15</sup>

<sup>15</sup> <https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities>

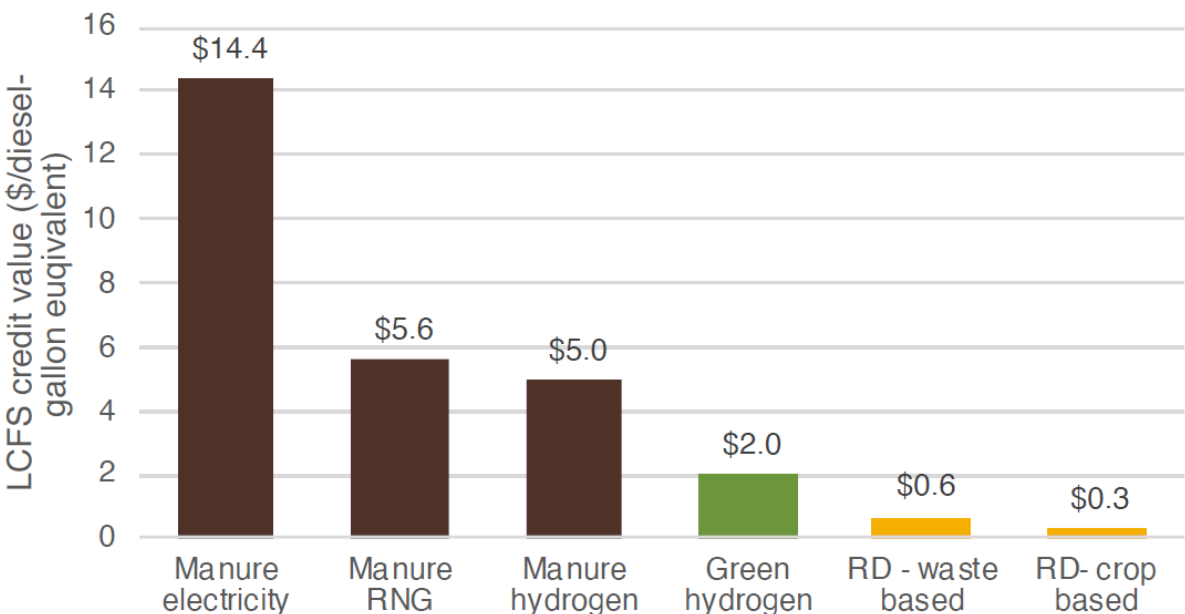


Figure 2. Average LCFS credit value for common heavy-duty fuel pathways in 2025

Manure-derived biomethane pathways receive more than seven times the LCFS credit value as green hydrogen sourced from zero-CI electricity and up to 50 times the credit value of renewable diesel. This is due to highly negative carbon intensity values for certified manure-based fuel pathways; for example, the average CI for manure-derived electricity sold in the California transport sector is -643 gCO<sub>2</sub>e/MJ.

The emissions benefits of manure-derived biomethane are highly subjective and likely overstated due to the assumption that manure is vented to the atmosphere in absence of LCFS policy. Often, baseline operating conditions at livestock farms do not pass an

additionality test nor are they required to under the program. We previously commented on the Yellow Jacket farm pathway application that receives avoided methane credits despite the farm previously operating an electricity generator to convert biogas into electricity sold to the local distribution grid.<sup>16</sup> In absence of a policy adjustment that more accurately reflects whether consuming biomethane as a transport fuel delivers avoided emissions, digester projects will continue to be overcredited for the quantity of emissions reductions they deliver. If avoided methane credits are instead removed from Tier 1 calculations, we estimate that the average CI of dairy-derived RNG raises to 36.4 gCO<sub>2</sub>e/MJ.<sup>17</sup> This corresponds to a credit value of \$0.62 per diesel gallon equivalent (DGE) in 2025 that is comparable to the current credit value for waste-based RD (Figure 2).

<sup>16</sup> <https://www.arb.ca.gov/lists/com-attach/980-tier2lcfspathways-ws-Vj8GY1c1ACcLUlc0.pdf>

<sup>17</sup> <https://theicct.org/wp-content/uploads/2023/05/california-rng-outlook-2030-may23.pdf>

(15d2-237.7)

**Comment:** Environmental justice groups have emphasized the adverse impacts of this accounting practice including a 2021 petition that called on CARB to remove dairy and swine manure eligibility from the LCFS.<sup>18</sup> In the petition, the groups also identified the state's obligation to accurately assess localized pollution impacts associated with alternative fuels and existence of numerous other public funding streams that benefit farmers for installing digester operations such as the Dairy Digester Research & Development Program (DDRDP). Subsequent comments from ICCT and others have underscored the need to update the carbon intensity of biomethane-derived fuel in Tier 1 and 2 emission calculators to "right size" its contribution towards state-wide emission reductions.<sup>19</sup>

<sup>18</sup> Lazenby, Ruthie, Phoebe Seaton, Tarah Heinzen, Tyler Lobdell, Brent Newell, Tom Frantz, Cristina Stella, and Christine Ball-Blakely. "Petition for Rulemaking to Exclude All Fuels Derived from Biomethane from Dairy and Swine Manure from the Low Carbon Fuel Standard Program," October 27, 2021.

<https://food.publicjustice.net/wp-content/uploads/sites/3/2021/10/Factory-Farm-Gas-Petition-FINAL.pdf>.

<sup>19</sup> <https://www.arb.ca.gov/lists/com-a#ach/6955-lcfs2024-Wi8CZ1MhUFwHYgFu.pdf>;

<https://www.arb.ca.gov/lists/com-attach/6886-lcfs2024-AmsCZwFjACcAWQJu.pdf>;

<https://www.arb.ca.gov/lists/com-attach/7077-lcfs2024-Wz4BZgd0BCNVOWJo.pdf>

(15d2-237.8)

**Comment:** CARB has scrupulously worked to avoid any intimation that the dairy and livestock industries will have to change due to the climate impact of cattle methane and nitrous oxide, or because of the climate impact of cattle feed, or because of the environmental consequences of misusing the land (nitrates in the water, NO<sub>x</sub> in the air, and eutrophication). Your position is *directly* contrary to climate science. Below we're including a short list of facts about the role of cows in climate change gleaned from a brief survey of recent writings of climate scientists.

- "More than half of all methane emissions from human activities are agricultural – exceeding the combined emissions from all oil and gas wells, coal mines, and industrial activities in the world."<sup>1</sup>
- "Every four pounds of beef you eat contributes to as much global warming as flying from New York to London."<sup>2</sup>
- "Beef provides less than 1 percent of calories globally but accounts for 5 percent of greenhouse gas emissions from *all* human activities."<sup>3</sup>

- “There are 1.7 billion cows on Earth. If you calculate the total biomass of cows and compare it to the total biomass of every remaining wild terrestrial vertebrate le\_ on Earth, the cows outweigh them by more than a factor of ten. We have literally replaced nature with cows.”<sup>4</sup>
- “If all the grain currently fed to livestock in the United States were consumed directly by people, the number of people who could be fed would be nearly 800 million.”<sup>5</sup>
- “We find irrigation of cable-feed crops to be the greatest consumer of river water in the western United States, implicating beef and dairy consumption as the leading driver of water shortages and fish imperilment in the region.”<sup>6</sup>
- “Of all antibiotics sold in the United States, approximately 80% are sold for use in animal agriculture.”<sup>7</sup>
- “The lowest-carbon meat emits more than the highest-carbon plant protein....The world uses around 4 billion hectares of land to grow food. Simply cutting out beef and lamb (but still keeping dairy cows) would nearly halve our need for global farmland. We’d save 2 billion hectares, which is an area twice the size of the United States. If we were to cut out dairy too, we’d halve this land use again to just over 1 billion hectares.”<sup>8</sup>

<sup>1</sup> Rob Jackson, *Into the Clear Blue Sky*, 2024

<sup>2</sup> Tad Friend, *Can a Burger Help Save Climate Change?*, *New Yorker*, September 23, 2019

<sup>3</sup> Jackson, *op cit.*

<sup>4</sup> Pat Brown in Jackson, *op cit.* page 28

<sup>5</sup> Cornell ecologist David Pimentel in Jackson, p.30

<sup>6</sup> B.D. Richter, et al., *Water Scarcity and Fish Imperilment Driven by Beef Production*, *Nature Sustainability* 3 (20202): 319-28. Cited in Jackson, p. 33

<sup>7</sup> M.J. Martin, et al. *Antibiotics Overuse in Animal Agriculture: A Call to Action for Health Care Providers*, *American Journal of Public Health*, 105 (2015): 2409-10. Cited in Jackson, p.33

<sup>8</sup> *Ibid.*



## Greenhouse gas emissions per 100 grams of protein

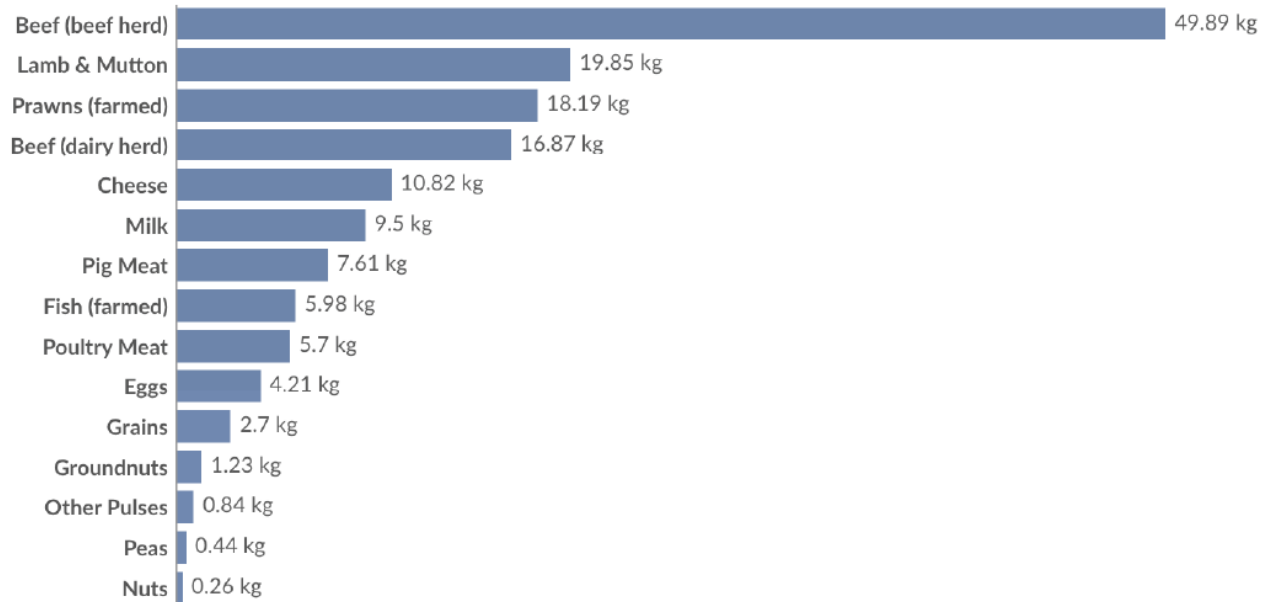
Greenhouse gas emissions are measured in kilograms of carbon dioxide-equivalents.

Our World  
in Data

Table

Chart

Edit foods



Data source: Poore and Nemecek (2018) – [Learn more about this data](#)

OurWorldinData.org/environmental-impacts-of-food | CC BY

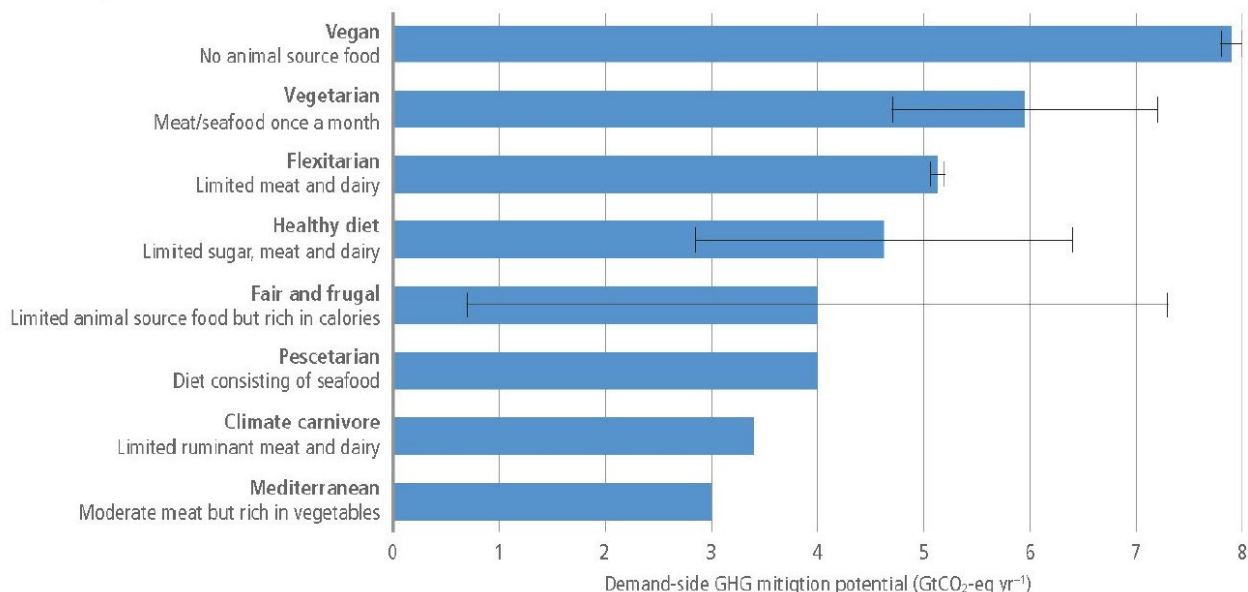


Related: [FAQs: Data on the environmental impacts of food](#)

- According to the IPCC no one needs to become vegan in order to begin to put meat and dairy in its proper place.<sup>9</sup>

<sup>9</sup> <https://www.ipcc.ch/srccl/chapter/chapter-5/5-5-mitigation-options-challenges-and-opportunities/5-5-2-demand-side-mitigation-options/5-5-2-1-mitigation-potential-of-different-diets/figure-5-12/>

# Demand-side mitigation GHG mitigation potential of different diets



We believe that you and CARB’s staff are well aware of these facts. But we are baffled to see the agency taking actions contrary to what is needed: no regulation of dairy manure emissions, extraordinarily high credit values for “avoided emissions” for up to 30 years, no fuel cell requirements for California dairies producing electricity, no pilot programs for enteric emissions (despite the Legislature having provided \$25 million), no public service announcements as with tobacco, and no incentives for alternatives to meat and dairy in Californians’ diets.

It is a profound disappointment for us that some of the striking gains CARB has made in tackling vehicle pollution and emissions have not yet been carried over to agriculture. We understand that CARB would much rather not to be alone in the lead, taking on powerful agricultural interests; but in fact you are arguably the best situated agency in the nation to do so, and it is entirely within your mission.

Hurricanes Helene and Milton and their horrific effects on many thousands of innocent people give us some hope that political calculations may begin to change in regard to climate change and the really very drastic changes we are called on to make. This is an existential opportunity for California to lead once again. (15d2-281.1)

**Comment: The rule does not provide resolution to dairy-adjacent communities seeking an improvement in air and water quality standards.** Staff has shared that some aspects of dairy-related air quality issues must be resolved through local air quality and water quality boards, and we acknowledge that this is a multi-pronged effort. However, we are concerned that the extended lifetime of dairy digesters incentives doesn’t do much to substantially reduce methane at the source. It is also worth noting that this binds California to continued subsidization of major expenses, which will only grow over time as more digesters are built within the optimal window to capitalize upon crediting periods. Testimony from impacted community members during this rulemaking speaks to the profound impact poor air quality has on public health. We can’t lean on an incentives-only, digester-centric approach as chronic

health issues persist. Digesters are not without their flaws. Mitigating methane from the state's biggest contributor should be faced with a comprehensive strategy. We urge the Board to consider a timely rulemaking process for the dairy methane rule in addition to scrutinizing the over-crediting of dairy biogas. (15d2-292.1)

**Comment:** Additionally, the Second 15-day changes demonstrate CARB staff's priority of guaranteeing profits for megadairies and factory farm gas investors over addressing the perverse harms to Californians and CARB's own climate change mitigation efforts. In at least two board meetings on the LCFS, several board members called for reducing the number of years available for avoided methane crediting and replacing the voluntary incentive scheme with a regulatory approach. Yet, proposals released following each of those meetings actually *increased* avoided methane crediting beyond the proposed parameters that board members had critiqued. In clear conflict with board direction, these Second 15-day changes reinforce a harmful preference for subsidies over equitable and effective regulations.

Also concerning to Commenters is that, since the Standardized Regulatory Impact Assessment<sup>2</sup> (SRIA) was released in September of 2023 and disclosed the significant pass-through costs that will be borne by Californians through higher gasoline and diesel prices, CARB staff have aggressively attempted to downplay what most know to be true. The oil and gas industry will benefit from purchasing avoided methane credits from factory farms because that will allow them to offset their high-CI fossil fuels, will continue to produce those fuels, and then will increase prices at the pump to pass cost of the credits onto the public. CARB staff thus demonstrate clear indifference towards the communities that will most significantly bear the pollution costs and fuel costs of the LCFS.

<sup>2</sup> CARB, Low Carbon Fuel Standard 2023 Amendments Standardized Regulatory Impact Assessment (SRIA) (Sept. 8, 2023), [https://ww2.arb.ca.gov/sites/default/files/2023-09/lcfs\\_sria\\_2023\\_0.pdf](https://ww2.arb.ca.gov/sites/default/files/2023-09/lcfs_sria_2023_0.pdf)

1. When CARB Board Members Recommend *Reducing* the Longevity and Perversity of Credit Generation from Livestock Methane, CARB Staff Responds by *Amplifying* the Problem

At CARB's September 2023 board meeting, the Board responded to the policy direction outlined in the Standardized Regulatory Impact Assessment (SRIA) for the LCFS rule change. The SRIA prepared by CARB staff anticipated eligibility for avoided methane crediting for livestock and landfill gas through 2039. Several board members responded to that proposal with concerns that allowing avoided methane crediting through 2039 was too long and set the signal for phase out of these uniquely lucrative subsidies for livestock gas too far into the future. In response to several board members' call to consider reducing the timeframe for avoided methane crediting, CARB staff's proposed LCFS rule,<sup>3</sup> released in December of 2023 and updated in January of 2024, expanded eligibility for avoided methane crediting as compared to the proposal in the SRIA to three ten-year crediting periods, or through 2059 for some LCFS pathway holders. This is twenty years longer than the timeline envisioned in the SRIA.

<sup>3</sup> CARB, Proposed Regulation Order Proposed Amendments to the Low Carbon Fuel Standard Regulation (Jan. 2, 2024), [https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/lcfs\\_appa1.pdf](https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/lcfs_appa1.pdf)

The first set of 15-Day Changes,<sup>4</sup> released in August of 2024, modified the time period for avoided methane crediting to two ten-year crediting periods (or through 2049) - still far too

generous according to several board members who recommended a shorter timeline for avoided methane crediting - such as one ten-year crediting period - during the September 24th joint CARB / EJAC meeting.<sup>5</sup> The Second 15-Day Changes, released after the joint CARB / EJAC meeting, responded by backsliding on the modifications CARB staff had proposed just a month earlier and extended the avoided methane crediting period out again to three 10-year crediting periods for projects that have been certified prior to the effective date of the LCFS rule change.<sup>6</sup> In short, members of the public and several CARB members have called on CARB staff to more aggressively phase out avoided methane crediting in the LCFS, and CARB staff have responded by doing the opposite.

<sup>4</sup> CARB, Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information Proposed Low Carbon Fuel Standard Amendments (Aug. 12, 2024), [https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day\\_notice.pdf](https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/15day_notice.pdf)

<sup>5</sup> See also Aaron Smith, *How Much Should Dairy Farms Get Paid for Trapping Methane?*, Ag Data News (Oct. 14, 2024), <https://agdatanews.substack.com/p/how-much-should-dairy-farms-get-paid> (“[A]fter the initial 10 year crediting period, there is little economic justification to continue these credits.”) (included here as Exhibit 1).

<sup>6</sup> CARB, Proposed Amendments to the Low Carbon Fuel Standard Regulation at § 95488.9(f)(3)(A) [https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/2nd\\_15day\\_atta-1.pdf](https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/2nd_15day_atta-1.pdf)

(15d2-301.1)

**Comment:** These latest amendments claim to be in response to public comment. But whose public comments? Not the comments of those living near dairies who have shared evidence of how the LCFS’s treatment of livestock methane is harming their quality of life, their neighborhoods, and their health. Not the comments of advocates who have demonstrated that lavish subsidies for livestock methane undermine both environmental justice and meaningful climate change policies. Not board members who have said we need livestock methane regulation now, and we need to phase out subsidies for livestock biogas as soon as possible. It is apparent that these changes are responsive to those that benefit financially from the factory farm gas windfall, and no one else.

The LCFS amendments, as currently proposed, will not effectively address livestock methane, will fall short of helping us reach our clean transportation goals, and amount to a complete rejection of environmental justice. And, adding insult to injury, many of the same Californians that will bear the brunt of the environmental injustice embedded in CARB’s broken policies toward livestock methane emissions, will also bear the brunt of the economic costs by paying more at the pump. This proposal doesn’t just fall short of what the Board has called for, but perverts its direction with an LCFS that will go from bad to worse.

The Board must reject this harmful approach and instead demand amendments that are responsive to its direction and the needs of California residents deeply invested in California’s climate policies, not with their investment portfolio, but with their very lives. (15d2-301.6)

**Comment:** To quote the vice president for operations at Dynamic Renewables, a Wisconsin-based company that operates digesters in the Midwest where the LCFS is driving factory farm expansion, “More cows and more manure means more energy.” (Erin Jordan, ‘More Manure Means More Energy’: Iowa Dairies with Biogas Digesters Are Growing Their Herds, which Concerns Water Quality Advocates, Gazette (Nov. 3, 2024),

<https://www.thegazette.com/agriculture/more-manure-means-more-energy-iowa-dairies-with-biogas-digesters-are-growing-their-herds-which-c/>).

The evidence is unavoidable that CARB's decision to allow factory farms to see large profits from the LCFS under the avoided methane crediting policy is counterproductive and the definition of unjust climate policy. As much as staff wish to ignore this, they cannot overcome reality.

And the proposal today attempts to lay waste to CARB's statutory obligations under SB 1383. As staff's presentation reiterated this morning, the LCFS works to "decarbonize our transportation sector." Not the dairy sector. By pushing methane mitigation in agriculture into the LCFS as your means of meeting 1383, you ignore the obvious and staff's own admissions about how capture in one sector used to meet legal obligations in another works.

Finally, the resolution offers a timeline for 1383 regulations that is, on its face, at odds with the statutory text. The resolution calls for staff to implement regulations "starting in 2030." SB 1383 obligates CARB to meet the 40% reduction "by 2030." You cite the statute in the resolution, but direct staff to openly flout the timeline the legislature required. The fix is clear and required by law: CARB must now prioritize 1383 regulations to reduce manure methane emissions and stop using the LCFS and avoided methane crediting to reward factory farms for polluting the climate and communities across the country. (BH-036.1)

**Comment:** We've heard from community members who live in Tulare County of the impacts on their health of incentivizing polluting industries like the dairy industry, and just want you to -- to urge you to consider the health impacts that it will have on community members. We primarily focus on clean drinking water. And in California, about a million folks don't have access to safe and clean drinking water. And one of the main causes of that is the dairy industry. And what you're doing today is continuing to incentivize an industry that does more harm than good to the communities in California. And what you're doing is ensuring that the communities who are farmer communities, low-income communities, continue to live with the impacts.

And so I just wanted to urge you all to consider what that means to the Central Valley region that's often forgotten and often faces the harsh health impacts.

...

So I urge you to include those recommendations that environmental justice groups have suggested today. (BHT-1)

**Comment:** I'm here to tell you to please revise the policy as it can be taken advantage of.

...

You guys need some stricter regulations or provide the necessary tools to properly monitor and report the carbon intensity produced by the fuel types. I understand that there's -- that every fuel type has its own pros and cons, but think about the ones that don't cause 80 percent of the people in the community to health -- to have health problems that range from asthma and heart conditions.

...

Again, we're not doing this out of spite. We just don't want to watch factories being built next to our schools, and kind of fear for our own health and being able to breathe next -- with the people alongside of us. So please continue doing your part to listen to everyone in the community and take a look -- revise, take a look at the policy and thank you. (BHT-4)

**Comment:** And the practice of paying industry dairies for livestock pollution, if we don't take the time to get it right, the State will spend tons of money in something that is not true clean energy. (BHT-15)

**Comment:** I have lived in Pixley for the last 53 years and I'm here to ask you to vote no. I want you to vote no against -- and vote against these regulations, because from what I understand, it doesn't place limits on dairies, for example, that emit methane and other harmful pollutants. On the contrary, I think that they're offering incentives now. I know that they produce milk and they produce gas that is supposedly better, but it's not a clean gas.

And these gases, the methane and everything else that this is generating, is making our people ill. (BHT-26)

**Comment:** We are concerned that this Program incentivizes false climate solutions, such as the use of biogas and allowing methane emissions credits for livestock methane. The science is not with us on this particular issue. Dairy digesters only exacerbate the pollution that communities that are already burdened what they will already be facing. So we please urge you to reevaluate these emissions credits that will only stand to benefit corporations. (BHT-31)

**Comment:** Lastly, the failure to eliminate avoided methane crediting will continue to disproportionately impact environmental justice communities, particularly in places like Tulare County, home to one-third of California's dairy cows, the highest concentration of the state. (BHT-36)

**Comment:** Dairy digesters will increase environmental impacts in already overburdened communities. And the biogas created from digesters emits pollutants like particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide. So I implore the committee to vote no on this -- on this issue. (BHT-38)

**Comment:** The Program is also outright failing on biomethane and fossil-base hydrogen. Allowing these incentives to go on will cause harm for decades, generations. Failing to curb dirty fossil hydrogen will send a bad signal to a developing hydrogen market and will keep hydrogen production polluting the communities that have long borne the brunt of fossil fuel refining. Now, more than ever, we need a program that stands with environmental justice communities. We have been calling on you to correct the LCFS and limit biofuels volumes, stop subsidizing dairy methane, invest in electrification, and cut dirty hydrogen. (BHT-92)

**Comment:** It is time to focus all of our resources on zero-emissions transportation. It is time to phase out distortionary, expensive and harmful avoided methane crediting. (BHT-140)

**Comment:** We ask that you ... stop the flood of credits for livestock-based biomethane. The LCFS should not be used for subsidizing the capture of methane from dairies. (BHT-156)

**Comment:** Another major concern, as you have heard with LCFS, is the continued practice of avoided methane crediting. Staff has proposed shortening the timeline of the Program, which is a small step in the right direction, environmental justice communities have called on this practice to be eliminated entirely.

Avoided methane crediting creates an incentive for dairy farms to acquire larger and larger herds, increasingly polluting San Joaquin Valley communities, especially low-income communities, communities of color and farmworker communities. (BHT-161)

**Comment:** You know, the evidence is increasingly showing that CARB's decision to allow factory farms to profit off the Low Carbon Fuel Standard with avoided methane crediting is counterproductive and unjust climate policy. Because the proposal today doubles down on rewards for the most polluting factory farms and thereby encourages further harm to communities in California and across the country, we urge a no vote. (BHT-219)

**Comment:** Please vote no. The LCFS allows double counting of methane reductions in the transportation sector and the agriculture sector. CARB should end avoided methane crediting and ensure that it achieves the reductions required by Senate Bill 1383.

...

Throughout this entire rulemaking and the SB 1383 proceedings, CARB staff have not provided any explanation that allows such double counting. Cooking the books in the CARB inventory is not an explanation but a cover-up. The Board should end avoided methane crediting immediately, stop allowing double counting, and take all actions under Senate Bill 1383 to achieve the methane reduction target. (BHT-227)

**Comment:** My name is Chris Hunt and I'm here to urge CARB to reject the amendments and to stop incentivizing manure biogas production through the LCFS.

...

In fact, research published earlier this year by my organization and Friends of the Earth suggests that after installing digesters, industrial livestock operations tend to increase their herd sizes, likely in large part due to government incentives for manure biogas production like the LCFS.

As a result the largest most polluting industrial livestock operations grow bigger burying more waste exacerbating the threats posed to the environment, public health, and surrounding communities. This is especially problematic because it's promoting the expansion of industrial livestock operations in other states where environmental regulations and regulatory oversight are much weaker. (BHT-249)

**Agency Response:** No change was made in response to these comments. As significant methane reductions are needed this decade to achieve the statutory 40% methane reduction target from 2013 levels by 2030 under Senate Bill (SB) 1383 (Lara, Chapter 395, Statutes of 2016), it is key to incentivize projects that reduce methane emissions in the near-term. 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 (Pavley, Chapter 249, Statutes of 2016),

SB 1383, and Assembly Bill (AB) 1279 (Muratsuchi, Chapter 337, Statutes of 2022). In order to spur needed methane emission reductions required under SB 1383 and necessary to limit global warming to 1.5°C,<sup>6</sup> the Proposed Amendments make modifications that reduce the possible avoided methane crediting periods, but ultimately retain rather than eliminate the avoided methane from anaerobic digestion of methane emissions from livestock manure in the LCFS lifecycle carbon intensity calculations.

In response to comments related to crediting periods for avoided methane or the timing of the phase out of avoided methane crediting, please see Responses Z-1.4 and Z-1.3, respectively.

In response to objections to potential impacts associated with avoided methane crediting, including the potential for increases in herd sizes within large-scale livestock operations and the associated adverse environmental impacts of the increase in size of these farms, please see Master Response 1 from the *Response to Comments on the Draft and Recirculated Environmental Impact Analyses Prepared for the Amendments to the Low Carbon Fuel Standard*.<sup>7</sup>

In response to objections that local air quality impacts, including ammonia, could result either directly or indirectly from anaerobic digestion, please see the explanation of CARB's analysis of potential air quality impacts that could be associated with the Proposed Amendments contained in Master Response 4 from the *Response to Comments on the Draft and Recirculated Environmental Impact Analyses Prepared for the Amendments to the Low Carbon Fuel Standard*. Regarding activities to reduce air quality impacts from dairies more generally, CARB is beginning the process of updating its ammonia and total organic gases (TOG) emissions inventory for dairies, using the best available livestock population data.<sup>8</sup> An accurate emissions inventory is critical for development of 9 µg/m<sup>3</sup> PM<sub>2.5</sub> State Implementation Plan (SIP) due to U.S. EPA in 2027, and public input will be key to improving the emissions inventory for the SIP. The first SIP emissions inventory workshop was held in September 2024. There will be many opportunities for public input before CARB finalizes the SIP emissions inventory in May 2025.

In response to objections to potential water pollution impacts associated with dairies, please see the explanation of CARB's analysis of potential impacts that could be associated with the Proposed Amendments contained in Master Response 4 from the *Response to Comments on the Draft and Recirculated Environmental Impact Analyses Prepared for the Amendments to the Low Carbon Fuel Standard*.

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<sup>6</sup> <https://www.unep.org/explore-topics/energy/facts-about-methane>

<sup>7</sup> California Air Resources Board. *Response To Comments on the Draft and Recirculated Environmental Impact Analyses Prepared for the Amendments to the Low Carbon Fuel Standard*. November 6, 2024. Available at: [https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/lcfs\\_rtc.pdf](https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/lcfs_rtc.pdf)

<sup>8</sup> California Air Resources Board. *California Dairy Sector Workshop*. PowerPoint Presentation. August 22, 2024. Available at: [https://ww2.arb.ca.gov/sites/default/files/2024-08/CARB\\_Dairy\\_Sector\\_Workshop\\_Staff\\_Presentation\\_08-22-2024.pdf](https://ww2.arb.ca.gov/sites/default/files/2024-08/CARB_Dairy_Sector_Workshop_Staff_Presentation_08-22-2024.pdf)



In response to comments objecting to the idea of using taxpayer dollars to fund livestock facilities: Neither the existing LCFS regulation nor the Proposed Amendments generate tax revenue or otherwise direct flows of public funds to dairies. Instead, the LCFS establishes a regulatory mechanism to spur the supply of lower carbon intensity fuels over time as part of California's strategy for achieving long-term GHG emission reduction goals. More specifically, the LCFS sets annual lifecycle carbon intensity (CI) benchmarks that decline over time for gasoline and its substitutes, diesel and its substitutes, and jet fuel substitutes in order. Based on quarterly reporting of volumes of fuels and fuel blendstocks introduced into the California fuel system that have a CI higher than the benchmark generate deficits, while fuels and fuel blendstocks with a CI below the benchmark generate credits. 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. Annual compliance is achieved when a deficit-generating regulated party uses credits to match its deficits.

Because LCFS credit prices are determined by market participant negotiations based on the supply of and demand for credits, any revenue generated from LCFS crediting for reported volumes of fuel supplied for use in California, are based in part on these credit price negotiations. With this regulatory structure, the LCFS functions to send market signals to support the production and use of low carbon fuels, including fuels with carbon intensities that reflect avoided methane emissions from livestock manure, without any allocation of public funds being directed to those fuels through the program.

In response to comments recommending adjusting the carbon intensity modeling approach for fuel pathways reflecting avoided methane emissions from livestock manure, which some commenters say potentially distorts the LCFS market, see Master Response 5 from the *Response to Comments on the Draft and Recirculated Environmental Impact Analyses Prepared for the Amendments to the Low Carbon Fuel Standard* for explanation how and why the LCFS project boundary is determined for these fuel pathways.

In response to objections that the initial LCFS amendments proposal did not incorporate recommendations from the Environmental Justice Advisory Committee (EJAC), stakeholders, and California Air Resources Board members: that initial proposal incorporates careful consideration of preliminary public feedback<sup>9</sup>, including all recommendations from the EJAC<sup>10</sup> and Board direction.<sup>11</sup> CARB staff were responsive to many of the requests and concerns raised by the Environmental Justice Advisory

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<sup>9</sup> California Air Resources Board. Board Meeting Comment Log Proposed Low Carbon Fuel Standard Amendments. Webpage. Accessible at: [https://www.arb.ca.gov/lispub/comm/iframe\\_bccommlog.php?listname=lcfs2024&\\_ga=2.127766989.1956008532.1734996090-1565224836.1601474474](https://www.arb.ca.gov/lispub/comm/iframe_bccommlog.php?listname=lcfs2024&_ga=2.127766989.1956008532.1734996090-1565224836.1601474474)

<sup>10</sup> Environmental Justice Advisory Committee. 08/28/2023. *DRAFT Recommendations to the California Air Resources Board (CARB) on the Low Carbon Fuel Standard Regulation Updates*. Accessible at: <https://www.arb.ca.gov/lists/com-attach/1-lcfs2024-VjMFaQNjUGABWFA0.pdf>

<sup>11</sup> California Air Resources Board. 09/28/2023. *Meeting State of California Air Resources Board*. Transcript. Accessible at: <https://ww2.arb.ca.gov/sites/default/files/barcu/board/mt/2023/mt092823.pdf>

Committee and the public on dairy biomethane. The final regulatory proposal includes reductions in avoided methane crediting for LCFS pathways and also establishes deliverability requirements for biomethane projects that break-ground after December 31, 2029. In addition, staff presented to the Environmental Justice Advisory Committee and to the Board on the LCFS and addressed questions and concerns raised about the lifecycle analysis and emissions accounting. CARB staff also collected unprecedented levels of data on dairy herd sizes within California and publicly released a first-of-its kind analysis of dairy and livestock trends for dairies with digesters. And finally, as part of Board Resolution 24-14, the Board directed staff to initiate a rulemaking effort on dairies and bring a rulemaking proposal for Board consideration in 2028.

In response to comments objecting that avoided methane crediting for biomethane used to produce hydrogen weakens signals of support for the development of other low-CI hydrogen: Fossil gas is currently the most common feedstock used for hydrogen production globally and steam-methane reformation of fossil gas comprises approximately 95% of hydrogen produced. At the same time, California law requires at least 33% of hydrogen used in transportation to be from be made from eligible renewable energy resources, and the LCFS provides incentives to shift production of hydrogen from fossil resources to hydrogen made from electricity, captured biomethane, and other renewable resources. Providing multiple pathways for hydrogen production in the LCFS, including using biomethane for hydrogen production, helps to ensure the State has adequate and affordable renewable hydrogen supplies to meet both existing hydrogen demand and future demand from increased deployment of hydrogen fuel cell electric vehicles. In addition, in response to comments stating that the LCFS is pulling biomethane into undesired end-uses: until ZEVs have become the dominant equipment type in heavy-duty vehicles, the alternative to biomethane is likely to be fossil compressed natural gas or diesel, which have higher greenhouse gas emissions than biomethane.

Because the LCFS regulations address transportation fuels used in California rather than siting approvals of fuel production facilities, the recommendation to cap the number and location of dairies in relationship to where people live is beyond the scope of the regulation and this rulemaking.

With regard to commenter concerns about methane leaking from digesters: staff does not assume that anaerobic digester projects capture 100 percent of the emitted methane. The LCFS life cycle analysis approach for dairy and swine manure biomethane projects utilizes estimated leakage rates that do not assume a 100 percent capture rate. The program also includes annual verification of fuel pathways, which uses metered and verified data on renewable natural gas (RNG) production to determine the number of credits each fuel pathway receives. Methane plumes coming from digesters register on remote sensing datasets because the gas is pressurized and concentrated at the location of the digester project, and therefore is often above the detection limit of the sensors. Fugitive methane emitted from lagoons is disperse/diffuse across a much larger area, so it is harder to detect by remote sensors. In total, dairies

with open/uncovered lagoons release much more methane than those with covered lagoons and a digester.

In response to comments related to a separate rulemaking to regulate dairy methane emissions, please see Response Z-1.5.

In response to comments about small dairies participating in the program, see Response Z-1.9.

In response to a comment about staff speaking with former CARB staff, there was no categorical direction to stop all contact. The article makes clear the concern was related to an email which included multiple board members during an open rulemaking and there was a need to ensure coordination on official responses and to prevent actions that could violate public meetings laws. It is normal for former colleagues to remain friends.

### **Z-1.3 Multiple Comments: *Oppose Phaseout of Avoided Emission Crediting***

**Comment:** Generate views preventing the emissions from agricultural methane to be no more or less valuable than preventing any other type of greenhouse gas emission, adjusted for global warming potential. The methane emitted is real, and solutions are needed to mitigate those emissions. While it is tempting to exclude certain emissions from our inventory, the climate does not care what laws we pass or what emissions we choose to ignore, only what gases we put into it. As such, we suggest that CARB amend the proposal phasing out avoided methane crediting by 2040 for projects breaking ground in 2030 or later to be conditioned on direct regulation of these methane emissions. This would ensure that emissions do not suddenly increase in 2040 as the existing operating model for projects falls away. (45d-140.6)

**Comment:** Anaergia urges the LCFS to maintain consistency with other California climate programs and with the LCFS itself. Of critical importance maintaining the GREET-based lifecycle approach to emissions accounting for biomethane, which is currently accurately employed for all other eligible LCFS fuels. Eliminating avoided methane crediting for only biomethane would represent a singular and premature change in accounting. Further, this change would contradict the program's design and objectives, the established GREET model, accepted science, and California's progress towards SLCP emissions reductions goals.

There are numerous avenues to achieve SB 1383 compliance, not all of which are equal from an emissions perspective. A particularly important tool is anaerobic digestion (AD) of landfill-diverted organics to generate biomethane, which results in greater methane emissions reductions than composting organic waste, while also generating RNG to reduce fossil fuel use. On balance, with the increased climate benefit of AD, these complex facilities are more expensive to construct and operate, especially in California. Investment and sustainable operation of organic waste digesters relies on adequate revenue generation through the project lifecycle, primarily through biomethane sales. With facility lifespans in excess of 20 years, eliminating avoided methane crediting – even as soon as 2040 – negatively impacts revenue available to finance these capital-intensive facilities. The resulting major reductions in expected revenue will halt investment and therefore the SLCP reduction potential of projects in operation and development today. These complex facilities are not financeable without

long-term (20+ year) avoided methane crediting, especially as no other equivalent program has yet been established to appropriately incentivize biomethane uptake.

The full lifecycle benefits of AD must be accounted for via appropriate methane crediting and biomethane valuation to promote organic waste digesters and achieve SLCP reductions goals. Currently, it is clear that California-generated biomethane from organic waste does **not** have a market value reflective of its real-life climate benefits, nor sufficient to garner the needed investment: CalRecycle estimates over 100 such facilities are needed in California to accommodate the 20 million tons per year of organics that must be diverted from landfill per SB1383; however, RBF is the only such food waste digester currently operating in the State. (This is compounded by the near-term lack of deliverability requirements.) The premature and arbitrary elimination of biomethane crediting will further disincentivize development of this effective methane reduction strategy in two ways: first, by devaluing biomethane and negatively impacting project economics; and second, by creating uncertainty in the market and thereby reducing investor confidence and financeability. In short, changing the approach to avoided methane crediting in the LCFS will jeopardize the State's ability to meet its SLCP reduction goals and to develop additional biomethane supplies necessary to achieve carbon neutrality.

**Maintaining credits for avoided methane emissions beyond 2040 is absolutely essential** to the continued operations of existing facilities generating biomethane from landfill-diverted organics, the development of and investment in additional similar facilities, and ultimately the achievement of SB 1383, SB 32, and AB 1279 (Muratsuchi, Chapter 337, Statutes of 2022). Eliminating avoided methane credits will irreparably damage the industries sorely needed to achieve the State's highest priority climate goals. (45d-043.2)

**Comment:** 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 and the 2021 Global Methane Pledge. (45d-048.5)

**Comment:** It is encouraging, however, that CARB has set a timeline that will avoid near-term stranded investments and allow for the establishment of new policies to encourage biogas use in other sectors. 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. (45d-048.6)

**Comment:** While we understand that CARB's intention here is to begin to transition biomethane away from the transportation sector, the underlying rationale is being construed by some as science-driven rather than a policy decision concerning the phase out of combustion in transportation. ABC does not support the phaseout of avoided emission credits.

Avoided methane emissions are a critical part of science-based, life cycle assessments, and their inclusion in carbon intensity scores is consistent with internationally recognized standards of carbon accounting. The science is robust and recognizes that the baseline includes methane emissions that would otherwise be released into the atmosphere. As stated in our

previous comment letters to CARB, recognizing avoided methane emissions 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. ABC does, however, recognize that avoided emission credits for biogas to electricity projects remain, and applaud CARB for recognizing the value of these projects by proposing to retain this aspect of the program. (45d-096.4)

**Comment Summary:** If CARB's goal is to transition biomethane out of the vehicle sector, the stakeholders strongly encourage CARB to ensure there continues to be a market for low-CI biomethane as it is an important decarbonization tool, especially in sectors that are hard to decarbonize. For example, the CPUC's SB 1440 program creates a biomethane procurement mandate for the state's largest utilities, however, the program excludes dairy biomethane due to the credit it currently receives in the LCFS.<sup>5</sup> With CARB's intention of phasing out all biomethane crediting for transportation fuel by the end of 2040, it makes sense for the CPUC to integrate dairy biomethane into the SB 1440 program which will allow for more market choice and volumes of renewable fuel for utilities to procure. The industrial sector is also another area where biomethane can help significantly reduce emissions, particularly at facilities that are large natural gas users and where electrification is not currently feasible. However, there isn't one, all-encompassing policy that drives biomethane, and other low-CI clean fuels, towards that use case. Thus, the stakeholders recommends that CARB, starting with the 2024 amendments to the LCFS, send a clear policy signal that biomethane is a necessary and effective decarbonization strategy in these other sectors (e.g., residential, commercial, industrial) that are fundamental to the state meeting its ambitious GHG reduction targets.

<sup>5</sup> California Public Utilities Commission, *Decision Implementing Senate Bill 1440 Biomethane Procurement Program: R.13-02-008*, page 4.

<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M453/K954/453954308.PDF>

(45d-096.13, 45d-168.15, 45d-169.9)

**Comment:** Avoided methane crediting and book-and-claim access for biogas projects are central to enabling biogas projects and associated emissions reductions. **We urge CARB to avoid restricting avoided methane crediting or biogas book-and-claim accounting in the program.**

...

We strongly oppose any restrictions to avoided emissions crediting, including avoided methane or N<sub>2</sub>O, or book-and-claim accounting of biomethane pathways. These elements are critical to

supporting biomethane projects from manure and organic waste resources and emissions reductions from the most potent climate forcers, including methane and N<sub>2</sub>O. (45d-121.3)

**Comment:** We urge CARB to maintain existing provisions for book-and-claim accounting of biomethane and avoided emissions, with the minor amendments proposed above, to support a growing organic waste biomethane market with associated carbon, SLCP and N<sub>2</sub>O emissions benefits. (45d-121.5)

**Comment:** Terminating credit generation for CNG vehicles before attractive alternatives are available is likely to halt all dairy digester projects that would otherwise break ground after 12/31/2029. For that reason, it is also likely to thwart the separate goal of supporting methane emissions reductions, also appearing on page 4 of the ISOR. In addition, using the LCFS in this manner to pick winners and losers is likely to make it more difficult for other jurisdictions to adopt LCFS-type programs, a goal that is stated on page 15 of the ISOR. We fervently believe that the capture of methane from dairies should be **supported**, for the overwhelmingly valid reasons stated beginning on page 29 of the ISOR and in SB1382, not **thwarted** as in this proposed change. (45d-141.5)

**Comment:** Phasing out RNG pathways is shortsighted and stymies the LCFS's effectiveness by removing a carbon-negative fuel source from the program. CARB argues for the phaseout because natural gas 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."<sup>4</sup>

<sup>4</sup> *Id.* [See <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>.]

This type of reasoning is antithetical to the spirit of the LCFS program, which is to incentivize the increased use of low-carbon energy sources and spur innovation in the production of even lower carbon transportation fuels. According to the U.S. Department of Energy, since the beginning of the LCFS in 2011, natural gas fuel consumption in California's transportation jumped from approximately 211.5 million gasoline gallon equivalents (GGEs) in 2011 to 403.7 million GGEs in 2021.5 If those gallons were replaced with carbon-negative RNG, it would accelerate the decarbonization of the transportation sector. Further, the availability of RNG pathways under the LCFS led to increased production of RNG. In fact, the potential of securing more LCFS credits was one of the factors that led Suburban Propane to invest in RNG. We created a new subsidiary, Suburban RNG, specifically to acquire assets and increase production of RNG.

Phasing out these pathways removes a key low-carbon and carbon-negative energy source from the LCFS. We ask that CARB remove the RNG pathway phaseout provisions from the Proposed Amendments. (45d-151.2)

**Comment:** - We do not support the phase out of avoided emission credits.

- Avoided methane emissions are a critical part of science-based, life cycle assessments, and their inclusion in carbon intensity scores is consistent with internationally recognized standards of carbon accounting. (45d-152.2)

**Comment:** We feel CARB should remain mindful of the success of the historical framework of the program and continue to apply it to newer pathways and technologies, including the use of avoided emissions and book-and-claim. (45d-152.10)

**Comment:** CARB should encourage the capture and productive repurposing of emissions from organic waste streams processed through anaerobic digestion, regardless of the source of the waste stream. To this end, CARB should avoid making changes in the present amendments that limit opportunities to include avoided emissions in CI calculations. We do not believe that a premature sunset is appropriate in achieving LCFS success. Therefore, we believe that this warrants further study from CARB to avoid any unnecessary consequences as currently proposed. (45d-155.4)

**Comment:** However, we are concerned about ARBs proposed 2030 deadline for biogas to CNG and EV projects which would only be able to account for their avoided emissions benefits until 2040. Provided there are no applicable regulations requiring methane capture on dairy and swine farms, digester projects should be eligible to receive credit for avoided emissions. As a leader in developing programs and policies to lower emissions, California's exclusion of these projects from 2030 and the requirement to physically deliver gas, sends a signal to other jurisdictions, which have launched or are in the process of launching LCFS programs, to exclude these types of projects as well. (45d-160.1)

**Comment:** The proposed amendments 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. While we understand that CARB's intention here is to begin to transition biomethane away from the transportation sector, the underlying rationale is being construed by some as science-driven rather than a policy decision concerning the phase out of combustion in transportation. RAE does not support the phaseout of avoided emission credits.

Avoided methane emissions are a critical part of science-based, life cycle assessments, and their inclusion in carbon intensity scores is consistent with internationally recognized standards of carbon accounting. The science is robust and recognizes that the baseline includes methane emissions that would otherwise be released into the atmosphere. As stated in our previous comment letters to CARB, recognizing avoided methane emissions 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. (45d-168.4)

**Comment Summary:** 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. RAE does, however, recognize that avoided emission credits for biogas to

electricity projects remain, and applaud CARB for recognizing the value of these projects by proposing to retain this aspect of the program. (45d-168.5, 45d-169.4, 45d-360.12)

**Comment:** The proposed amendments 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. Newtrient believes that this is inconsistent with the incentive-based approach outlined in SB 1383 and currently being implemented in California. 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 digester 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.<sup>4</sup>

<sup>4</sup> 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>

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.

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. (45d-169.3)

**Comment:** 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 outside 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 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.”<sup>1</sup> Supporting extremely low carbon intensity (CI) renewable energy to power ZEVs serves both climate and local air quality objectives.

<sup>1</sup> 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.

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. (45d-181.1)

**Comment:** Gevo strongly supports avoided methane crediting recognizing RNG project benefits that reduce global methane emissions regardless of location or end use. In our comments, Gevo recommends changes to the current RNG proposals so the LCFS can continue to deliver emissions benefits and maintain project developer and investor confidence in continuing to advance these important methane abatement projects. (45d-187.6)

**Comment:** Gevo applauds CARB for progressing the LCFS to encourage the mitigation of GHG emissions, increase the production and consumer optionality of clean fuels, and facilitate investments of such clean fuels. To continue to meet those objectives, Gevo urges CARB to continue its progressive stance on biomethane projects, rather than create limitations for methane avoidance projects. (45d-187.26)

**Comment:** As noted, Gevo strongly believes that RNG projects that remove methane, a potent GHG, from the atmosphere should not be limited in their eligibility or approval within the LCFS program, for existing or future projects. To realize the level of emissions benefits needed to meet California's climate targets, all projects that bring demonstrable emissions benefits should continue to be credited on a performance basis. Thus, Gevo urges CARB to decline to adopt the limits on the crediting periods that it has proposed under the LCFS. (45d-187.28)

**Comment: Reconsider Proposed Concepts Related to Phasing Out Avoided Methane Crediting and Aligning Deliverability Requirements of Biomethane as a Transportation Fuel with RPS and CPUC 1440 Program**

DTE Vantage remains highly concerned with CARB's proposed changes to phase out avoided methane crediting and remove book-and-claim accounting for out-of-state biomethane.

We strongly urge CARB to reconsider its proposed changes to eliminate RNG pathways that rely on book-and-claim delivery mechanisms for pathways associated with projects that break ground on or after January 1, 2030. As identified in previous comment letters in response to the CARB LCFS workshops on 2/22/23 and 5/23/2023, DTE's primary areas of concern with this proposal are as follows:

- At present time, there are insufficient outlets available in other markets and end uses to absorb RNG that would otherwise supply the LCFS transportation market.
- Because CARB is proposing to remove the option of a fuel that competes well in the market to continue to enter the fuel mix, credits that otherwise would be generated from out-of-state RNG will presumably be replaced by more expensive alternatives. Thus, the agency's proposal will make compliance more expensive for Californians.

We also urge the agency to continue its avoided methane crediting methodology to preserve and promote meaningful GHG emission reductions for pathways associated with projects that break ground on or after January 1, 2030. Clean fuel providers made significant investments in

dairy RNG projects based on the avoided methane crediting construct, which are mitigating fugitive methane emissions on farms. California's SB 1383 targets a 40% reduction in total methane emissions and a 40% reduction in dairy and livestock emissions. To meet these goals, we recommend that CARB reconsider eliminating avoided methane crediting of the LCFS program. (45d-199.4)

**Comment:** We strongly oppose the phase-out of avoided methane crediting for dairy RNG projects. Given the importance of LCFS crediting in project viability, 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. At current LCFS credit prices, a framework without avoided methane crediting may not even cover operating costs for existing agricultural-based projects. Absent some new market that covers the cost of operations, existing digesters will not continue operating after their avoided methane crediting periods expire, leaving the state with billions of dollars of stranded biomethane capture assets and resulting in methane returning to California's environment or, much worse, the cancellation of projects before they are built. (45d-201.6)

**Comment:** For example, the new proposal backslides on the previously announced avoided methane policy... (45d-210.1)

**Comment:** The proposed amendments 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. Prairie Farms believes that this is inconsistent with the incentive-based approach outlined in SB 1383 and currently being implemented in California. 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.<sup>2</sup>

<sup>2</sup> 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>

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. (45d-219.2)

**Comment:** For the reasons articulated below, CASA urges CARB to carve out the wastewater sector to preserve use of our non-fossil renewable wastewater-derived biomethane (biogas) in the LCFS program indefinitely.

...

The LCFS program should continue to provide a viable incentive for co-digestion of diverted organic waste and the conversion of WRRF renewable biogas to biomethane transportation fuel. In addition to the ACF Regulations, we are concerned CARB's proposal to phase out the use of WRRF biomethane in the LCFS program by 2040 will further inhibit SB 1383 implementation. Implementation of SB 1383 is in its very early stages – however, 75% diversion of organics away from landfills is required by January 1, 2025. With implementation at WRRFs, co-digestion will increase significantly to meet the mandate, in turn, so will diversified uses of WRRF biogas. However, CARB is proposing to phase out the avoided landfill methane credit, which disincentivizes the production and use of non-fossil renewable organic waste-derived biomethane in the LCFS program. At the same time, CalRecycle incentivizes co-digestion in their regulations to implement SB 1383 by requiring jurisdictions that must divert organic waste to procure a corollary product of that diversion, including the use of biogas as a low carbon transportation fuel. While the LCFS program has not been widely utilized at WRRFs to date, we expect that to shift as co-digestion becomes more common. The success of SB 1383 hinges on the public wastewater sector accepting diverted food waste for co-digestion but that will only occur if it is cost-effective and we are assured of the ability to beneficially use all our biogas.

We strongly urge CARB to preserve the use of our biogas as a viable low carbon fuel in perpetuity since it will always be produced and SB 1383 implementation hinges on its beneficial use. Similarly, the proposed ACF Regulations will also inhibit SB 1383 implementation by limiting the use of medium- and heavy-duty trucks using WRRF biogas-derived compressed natural gas to only those in our fleets as of January 1, 2024 – we have proposed that be extended to follow the implementation of SB 1383 and provide WRRFs a pathway for use of the increased biogas. As CASA noted in our comments on the proposed ACF Regulations (and CARB staff acknowledged this in their December 12, 2022 presentation), medium- and heavy-duty electric trucks and vehicles unique to the needs of our sector are not commercially available and we do not expect them to be for many years. Likewise, biogas-to-hydrogen as a transportation fuel for these vehicles is not yet commercially available or demonstrated, both research and demonstrations are necessary to advance that technology and we have offered to work with CARB on those efforts. In the meantime, state regulations and policy should promote biogas deployment using proven technology that most efficiently reduces GHGs to mitigate climate change while also complying with the Omnibus regulations.

...

2. Section 95482(g): we disagree with the proposed phase out of the use of biomethane as a transportation fuel as articulated above.
3. Section 95488.9(f)(3): we disagree with the proposed phase out of avoided methane crediting for both biomethane and hydrogen from biomethane sources. The rationale is provided above. (45d-229.1)

**Comment:** SJI Renewable Energy Ventures has invested in projects that will cost-effectively achieve immediate fugitive methane emission reductions from agricultural operations. The lifecycle GHG emissions accounting that underpins the LCFS program recognizes the benefit of these avoided methane emissions that would have otherwise occurred absent investments like those made by SJI Renewable Energy Ventures. The RNG projects that we are developing will likely be certified at deeply negative carbon intensity values because of this explicit and immediate benefit to methane emission reductions at agricultural operations. The Proposed Rule seeks to utilize a fixed year phase-out of avoided methane crediting. Avoided methane emissions is a vital, fact-based, part of the life cycle assessment and its' inclusion in carbon intensity scores is consistent with internationally recognized carbon accounting. The LCFS program has been extremely successful in reducing overall methane emissions. SJI Renewable Energy Ventures strongly encourages CARB to continue to utilize the current method of acknowledging avoided methane emissions and the use of Argonne National Laboratory's GREET model. (45d-232.1)

**Comment:** A fixed-year phase-out of avoided methane crediting—as included in the Proposed Rule—is simply not smart policy. Agricultural and organic waste diversion projects are heavily dependent on LCFS revenue for profitability, driven by the avoided methane components of their CI scores. During the informal workshop period of this rulemaking, many of our members have, on a confidential basis, individually supplied CARB with detailed economics for the development of dairy RNG facilities that clearly demonstrate that avoided methane crediting is critical to meet capital repayment requirements for new projects.

At current LCFS credit prices, a framework without avoided methane crediting does not even cover operating costs for existing agricultural projects in some instances. 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.

#### 2.1.2 Recognition of Avoided Methane is the Industry Standard in Europe

Opponents of recognizing RNG for avoided methane benefits often portray the CA LCFS's lifecycle analysis framework for methane from organic waste as if it is outside of the norm, or out of step with clean fuel policy in other leading jurisdictions. However, this is not the case. In fact, similar accounting was first pioneered in the European Union's Renewable Energy Directive (RED).

The Renewable Energy Directive is the legal framework for the development of clean energy across all sectors of the EU economy. The EU has found<sup>14</sup> that there is a clear need to scale-up RNG (biomethane) by 2030, as outlined in the REPowerEU Plan published in May of

2022.<sup>15</sup> Under that plan, the EU's biomethane production, either as biogas or its upgraded version as RNG, is targeted to reach 35 billion cubic meters per year by 2030.

<sup>14</sup> [https://energy.ec.europa.eu/topics/renewableenergy/bioenergy/biomethane\\_en#:~:text=EU's%20biomethane%20production%20needs%20to,amounts%20to%20%E2%82%AC37%20billion.&text=This%20is%20a%20modal%20window.&text=Beginning%20of%20dialog%20window.,cancel%20and%20close%20the%20window.](https://energy.ec.europa.eu/topics/renewableenergy/bioenergy/biomethane_en#:~:text=EU's%20biomethane%20production%20needs%20to,amounts%20to%20%E2%82%AC37%20billion.&text=This%20is%20a%20modal%20window.&text=Beginning%20of%20dialog%20window.,cancel%20and%20close%20the%20window.)  
<sup>15</sup> [https://eur-lex.europa.eu/resource.html?uri=cellar:fc930f14-d7ae-11ec-a95f-01aa75ed71a1.0001.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:fc930f14-d7ae-11ec-a95f-01aa75ed71a1.0001.02/DOC_1&format=PDF)

Within the RED framework<sup>16</sup> Annex VI provides Default GHG emission values and calculation rules for gaseous biomass fuels and their fossil fuel comparators.<sup>17</sup> As can be seen in Table 1, reproduced from that RED Annex, RNG from dairy manure for use as a transport fuel has carbon negative performance (e.g., achieves emission reductions greater than 100% relative to the emissions of the fossil fuel displaced).

<sup>16</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02018L2001-20231120>  
<sup>17</sup> [https://joint-research-centre.ec.europa.eu/welcome-jec-website/reference-regulatory-framework/renewableenergy-recast-2030-red-ii\\_en](https://joint-research-centre.ec.europa.eu/welcome-jec-website/reference-regulatory-framework/renewableenergy-recast-2030-red-ii_en)

*Table 1. The EU RED Framework Continues to Recognize the Carbon-Negative Performance of Manure to RNG Transportation Pathways*

BIOMETHANE FOR TRANSPORT (*)			
Biomethane production system	Technological options	Greenhouse gas emissions savings – typical value	Greenhouse gas emissions savings – default value
Wet manure	Open digestate, no off-gas combustion	117 %	72 %
	Open digestate, off-gas combustion	133 %	94 %
	Close digestate, no off-gas combustion	190 %	179 %
	Close digestate, off-gas combustion	206 %	202 %

Despite ongoing analogous scrutiny in Europe of anaerobic digestion of animal wastes—from similar voices as those active in California—the EU has found it is appropriate to continue this framework in the amending Directive EU/2023/2413, entered into force on November of 2023.<sup>18</sup> Embracing the true GHG performance of RNG projects has been a recipe for successful RNG project buildout in both the CA LCFS and EU cases. CARB should continue to coordinate with European leaders on this important topic.

<sup>18</sup> [https://energy.ec.europa.eu/topics/renewable-energy/renewable-energy-directive-targets-andrules/renewable-energy-directive\\_en#the-revised-directive](https://energy.ec.europa.eu/topics/renewable-energy/renewable-energy-directive-targets-andrules/renewable-energy-directive_en#the-revised-directive)

### 2.1.3 Avoided Methane Crediting Should Continue in LCFS Unless and Until a Realistic and Proven Replacement Policy is Implemented

Given the importance of the LCFS crediting in project viability, is unwise and irresponsible to propose an arbitrary (tied to a fixed year) phase-out of avoided methane crediting without a detailed plan for developing a supporting replacement policy. Because of this fact, although

better than prior proposals discussed during the workshop period, the Proposed Rule's treatment of avoided methane would still lead to significant project uncertainty and increases the potential for stranded assets—an issue correctly cited by CARB during the workshops as a key signal to be avoided.<sup>19</sup>

<sup>19</sup> 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](https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/lcfs_meetings/LCFSpresentation_02222023.pdf)

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.<sup>20</sup>

<sup>20</sup> Office of Environmental Farming and Innovation, California Department of Food and Agriculture, March 29<sup>th</sup> 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>

Although demand for liquid beverage milk is declining, and milk substitutes have emerged, US supply and demand for total milk products (both per capita and in aggregate) continues to grow.<sup>21,22</sup> These facts make it challenging for individual states, even a large dairy state such as California, to require control of manure methane unilaterally. However, it is possible that a federal requirement, or a mandate developed by a coalition of like-minded dairy states could be effective. We advise proponents of such a shift from “carrots” to “sticks” that, for such a transition to be effective it will require the cooperation of both the California dairy and RNG industries.

<sup>21</sup> USDA, *Dairy Products: Per Capita Consumption, United States (Annual)*, last updated 9/30/22.

[https://www.ers.usda.gov/webdocs/DataFiles/48685/pconsp\\_1\\_.xlsx?v=4825](https://www.ers.usda.gov/webdocs/DataFiles/48685/pconsp_1_.xlsx?v=4825)

<sup>22</sup> USDA, *US Milk Production and Related Data*, last updated 8/15/22.

[https://www.ers.usda.gov/webdocs/DataFiles/48685/quarterlymilkfactors\\_1\\_.xlsx?v=4825](https://www.ers.usda.gov/webdocs/DataFiles/48685/quarterlymilkfactors_1_.xlsx?v=4825)

The current LCFS rule already contemplates an appropriate phase-out of avoided methane crediting once mandatory control requirements are in place. Section § 95488.9(f)(3)(B) of the Current Rule states 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. The project may not request any subsequent crediting periods.”

It is possible that a federal mandate to control manure methane could be developed, promulgated, and in effect in the 2040 timeframe. RNG Coalition would consider supporting such federal action if it treated anaerobic digestion with productive energy use as best available control technology. However, we currently see no signs that such a federal effort is on the horizon.<sup>23</sup> 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 required phase-out of avoided methane crediting without a suitable replacement policy.

<sup>23</sup> 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.

If CARB staff continues to treat RNG 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.

#### 2.1.4 The Underlying Facts that Justify Avoided Methane Crediting to Ag RNG Projects Have Not Changed, CARB Should Rely on Extensive Prior Public Process and Leave the Current Framework in Place

While we always support additional stakeholder dialog around AD and RNG issues, we note that the facts on these issues have not changed and CARB has held extensive stakeholder outreach on these topics over the last decade, as required by Senate Bills (SB) 605 (Lara, 2014)<sup>24</sup> and SB 1383 (Lara, 2016).<sup>25</sup>

<sup>24</sup> [https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill\\_id=201320140SB605](https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB605)

<sup>25</sup> [https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill\\_id=201520160SB1383](https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB1383)

Senate Bill 605 required that CARB complete a comprehensive strategy to reduce emissions of short-lived climate pollutants (SLCP) in the state and hold at least one public workshop during the development of the strategy. CARB did so, developing the **Short Lived Climate Pollutant Reduction Strategy**<sup>26</sup> (SLCP Strategy) in March of 2017 with input from, “state and local agencies, academic experts, a working group of agricultural experts and farmers convened by the California Department of Food and Agriculture (CDFA), businesses, and other interested stakeholders in an open and public process”.<sup>27</sup> Throughout this process, CARB “sought advice from academic, industry, and environmental justice representatives”.<sup>28</sup> The SLCP Strategy contained extensive economic analysis of agricultural RNG projects<sup>29</sup> and found that:

<sup>26</sup> [https://ww2.arb.ca.gov/sites/default/files/2020-07/final\\_SLCP\\_strategy.pdf](https://ww2.arb.ca.gov/sites/default/files/2020-07/final_SLCP_strategy.pdf)

<sup>27</sup> CARB SLCP Strategy, p. 25.

<sup>28</sup> Ibid.

<sup>29</sup> CARB SLCP Strategy, *Appendix F: Supporting Documentation for the Economic Assessment of Measures in the SLCP Strategy*. <https://ww2.arb.ca.gov/sites/default/files/2021-01/appendixF-SLCP-Final-2017.pdf>

“The LCFS and the federal Renewable Fuel Standard (RFS) incentivize the use of renewable natural gas as a transportation fuel, creating large revenue potential within the dairy manure and organic diversion measures. These programs in particular can help support cost-effective projects to reduce methane from the dairy and waste sectors. Without the LCFS or RFS programs, additional sources for financial incentives and funding may be needed.”<sup>30</sup>

<sup>30</sup> CARB SLCP Strategy, p. 107.

SB 1383 further required that CARB provide a forum for public engagement on these issues by holding at least three public meetings in geographically diverse locations throughout the state where dairy operations and livestock operations are present. CARB went above and beyond



this requirement and conducted almost two years of stakeholder engagement on these topics through a Dairy and Livestock Greenhouse Gas Reduction Working Group (Working Group).<sup>31</sup>

<sup>31</sup> *Recommendations to the State of California's Dairy and Livestock Greenhouse Gas Reduction Working Group* <https://ww2.arb.ca.gov/sites/default/files/2020-11/dairy-subgroup-recs-112618.pdf>

The three subgroups of the Working Group held 28 meetings that were open to the public for in-person and remote attendance and participation. The subgroup meetings typically included “information presented by subject matter experts and representatives from academia, industry, and nongovernmental organizations, including environmental justice advocates” and environmental justice experts served on the subgroups.<sup>32</sup> The full Working Group—composed of the principals at CARB, the California Department of Food and Agriculture (CDFA), the California Energy Commission (CEC), and the California Public Utilities Commission (CPUC)—held three public meetings. This led to a set of recommendations that helped inform the Current Rule.<sup>33</sup>

<sup>32</sup> *Ibid.*, p. 3.

<sup>33</sup> Including a recommendation to stabilize LCFS price support to ag RNG projects through a pilot financial mechanism that was never acted upon. Had such a provision been added projects would not be facing the current negative impacts of low prices.

In March of 2022 CARB held another extensive public discussion of these topics, conducting an all-day workshop on ***Methane, Dairies and Livestock, and Renewable Natural Gas in California***.<sup>34</sup> This workshop contained an in-depth presentation from CARB on LCFS mechanics.<sup>35</sup> In the same month CARB released an ***Analysis of Progress toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions Target***<sup>36</sup> after taking extensive public input<sup>37</sup> on a draft of that analysis. In the *Analysis of Progress* document CARB provided further analysis of LCFS and RFS environmental credit prices on ag AD project economics and continued to support AD as a primary means to reduce dairy manure methane emissions.

<sup>34</sup> <https://ww2.arb.ca.gov/our-work/programs/slcp/meetings>

<sup>35</sup> <https://ww2.arb.ca.gov/sites/default/files/2022-04/dairy-ws-session-9-CARB.pdf>

<sup>36</sup> California Air Resources Board, *Analysis of Progress Toward Achieving the 230 Dairy and Livestock Sector Methane Emissions Target*, p. 22, March 2022, <https://ww2.arb.ca.gov/sites/default/files/2022-03/final-dairylivestock-SB1383-analysis.pdf>.

<sup>37</sup> <https://www.arb.ca.gov/lispub/comm2/bccommlog.php?listname=draft-dl-analysis-ws>

### 2.1.5 External Academic Analysis Shows that CARB's Strategy is Working

Realistically, if California wants to continue to lead globally on critical reductions in this SLCP from dairy and swine operations they cannot consider significantly upending their approach every few years, especially if the existing framework continues to demonstrate success. Recent UC Davis analysis shows continued implementation of California's incentive-based dairy methane reduction efforts will, by 2030, achieve the full SB 1383 40% reduction goal.<sup>38</sup>

<sup>38</sup> Kebreab, Mitloehner and Sumner, *Meeting the Call: How California is Pioneering a Pathway to Significant Dairy Sector Methane Reduction*, December 2022, <https://clear.ucdavis.edu/news/new-report-california-pioneeringpathway-significant-dairy-methane-reduction>

This is a powerful and important finding. California's dairy industry, with support from the LCFS and other key programs (e.g., CDFA grants and the federal Renewable Fuel Standard), is on a course to meet the methane reduction challenge required by California law. In terms of both

emission reduction and cost effectiveness, these are some of the state's most successful climate protection activities.<sup>39</sup>

<sup>39</sup> CARB, *Analysis of Progress Toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions Target*, p.17, Table 3.

Any further changes to the treatment of avoided methane crediting for agricultural AD in the LCFS would likely directly contradict the state's prior existing emissions reduction strategy for dairy manure methane, ignore the extensive stakeholder engagement work conducted by state agencies on these topics detailed above, discourage a new RNG industry that has been coalesced primarily to reduce greenhouse gas emissions, and most importantly disincentivize investment in one of the most effective methods of methane abatement that the state fundamentally needs to use to reach its statutory goals.

#### 2.1.6 There is No Evidence of a Perverse Incentive to Increase Farm Size from LCFS

LCFS credits from biomethane production does *not* incentivize manure production by increasing herd size. Even skeptical academic experts studying this issue<sup>40</sup> have found no empirical evidence to support the "perverse incentive" claims that underly some of the comments that continue to be made by uninformed anti-dairy voices.

<sup>40</sup> Smith, Aaron, "Are Manure subsidies Causing Farmers to Milk More Cows?" April 8, 2023.

[https://agdatanews.substack.com/p/are-manure-subsidies-causingfarmers?r=i2qe&utm\\_campaign=post&utm\\_medium=web](https://agdatanews.substack.com/p/are-manure-subsidies-causingfarmers?r=i2qe&utm_campaign=post&utm_medium=web)

Dairy RNG, at current transportation GHG market prices, generates only a small fraction of the gross revenue that is created by milk-sales. What is more, only a small share of that revenue goes to the farmer—the majority will be distributed to cover the costs of the digester developers, the gas marketer, the credit broker, end users (e.g., fleets adopting clean vehicles), the investors, and the banks. Meaning that the farmer does not make enough additional revenue from RNG to justify increasing herd size. However, the additional LCFS revenue from RNG production *is* critical to help defray the cost of an anaerobic digester and encourage the transition toward a model of sustainable agriculture.

Even at higher prices, the LCFS incentive is unlikely to shift farm behavior. Dairy farmers are in the business of milk production and not RNG production. Agricultural voices that run dairy farms provided oral comment to this effect at the informal workshops and public meetings in direct response to questions from CARB Staff. RNG production at farms is usually handled by third-party project developers who constitute a large share of RNG Coalition's membership. These firms take substantial financial risk on these projects, historically because of explicit direction to do so from CARB and other California leaders.

Agricultural RNG projects are also a clear example that tests the thesis that investments based primarily on LCFS revenue—and GHG emission reduction benefits in general—is a feasible business model. Agricultural RNG development is one of the first major low carbon fuel industry built primarily around the LCFS program and it has only been successful because it was stood up by CARB based on the extensive public process described above. Major changes to this framework—without substantive new information—would undermine prior efforts to convince investors to make long-term capital deployment decisions based on LCFS credit value specifically, and California's climate strategies more generally.<sup>41</sup> Therefore, CARB should leave the current avoided methane crediting framework in place.

<sup>41</sup> For the initial years of the LCFS, prospective low carbon fuel producers included anticipated credit revenue in financial models and the investors would ignore or heavily discount the LCFS line item, due to perceived change in law risk (colloquially called “stroke of the pen” risk).

(45d-240.5)

**Comment:** CARB should ensure that the program amendments preserve a *technology-neutral* approach in order to maximize cost-effectiveness. CARB’s proposal to phase out avoided methane crediting and project-based crediting treats different low-CI technologies inconsistently, disincentivizing certain investments and foregoing important emissions benefits. For example, in Book-and-Claim accounting, low-CI process energy would need a direct connection, while low-CI electricity and hydrogen used in transportation would not require this additional step. Removing existing crediting mechanisms risks stranding assets while discouraging investments in other zero-emission and low-emission technologies, which will lead to increased program costs and will decrease emissions benefits associated with methane reductions. This approach also runs counter to existing programs incentivizing the development of projects to address Short-Lived Climate Pollutants. We encourage CARB to instead study the potential impacts of imposing deliverability requirements before adding untested regulatory restrictions. (45d-241.3)

**Comment:** The Amendments impose an overly-broad phase-out timeline for biomethane crediting. CARB should revise these requirements and retain discretion to align implementation of crediting pathways under the LCFS with its statutory obligations under SB 1383.

...

### **CARB Should Not Create A Blanket 2040 Phaseout for In-state Dairy Fuel Pathways.**

The Initial Statement of Reason (“ISOR”) discusses the role of pipeline biomethane and that in the longer term, the State plans to shift away from biomethane as a transportation fuel source.<sup>8</sup> According to the ISOR, “this resource should be transitioned 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.”<sup>9</sup> The Amendments would phase out CNG pathways after December 31, 2040 and biomethane - hydrogen-based pathways would be phased out after December 31, 2045.

<sup>8</sup> *Id.*, p. 30. [<sup>7</sup> Tulare County Annual Report of Dairy and Feedlot GHG Emissions in 2021 (March 2023) p. 8, available at: <https://tularecounty.ca.gov/rma/permits/dairy/bos-agenda-item-2022-annual-report-of-totalghg-emissions-from-dairies-feedlots-for-2021/>.]

<sup>9</sup> *Id.*

The ISOR does not identify what exactly the long-term tool will be once these phase-out dates take effect. Similarly, the ISOR does not address how, if at all, the Amendments would continue to support SLCP reductions after the phase out. We are concerned that in the absence of an ongoing financial signal, there could be project failure, which would risk increasing SLCP emissions. Smaller projects that naturally have longer pay-back 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 2025-30, 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 pay-back periods. There is important hydrogen-related fuel development occurring in the dairy sector that we are hopeful will qualify these concerns, but based on what we know now, more must be done to support SLCP reductions at smaller in-state dairies.

For this rulemaking, CARB should supplement the record and address how it will ensure that in-state dairies have access to financial capital needed to make long-term investments. CARB should qualify the uniform application of the proposed phase-out dates for biomethane pathways. The Tier 2 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 emissions sources covered by SB 1383 to request an extension to the phaseout timelines through the tier 2 pathway application process. (45d-245.2)

**Comment:** Arguments that the LCFS will directly lead to larger dairy herd populations should be rejected. Allegations of incentives to increase herds solely due to the LCFS are unsupported. In fact, reductions in total herd size continue to occur. This is especially apparent in Tulare County, which is the largest dairy producing county in the nation and location of many of the dairy digester projects that have already contributed to considerable methane reductions in California. A March 2023 report produced by Tulare County shows that milk cow populations in Tulare County decreased by nearly 15% during the same period that 39 digester projects began operations and another 13 were in planning and development.<sup>7</sup> Tulare County reported significant emission reductions during this same timeframe, making clear that, in Tulare County, the presence of LCFS incentives clearly did not increase total herd populations or otherwise alter the ongoing trend of herd reductions and consolidation in California's dairy industry.

<sup>7</sup> Tulare County Annual Report of Dairy and Feedlot GHG Emissions in 2021 (March 2023) p. 8, available at: <https://tularecounty.ca.gov/rma/permits/dairy/bos-agenda-item-2022-annual-report-of-totalghg-emissions-from-dairies-feedlots-for-2021/>.

(45d-245.3)

**Comment:** Unfortunately, anti-dairy activists continue their misguided efforts to call for a complete change of course on the State's SLCP Reduction goals. Some have called for forced conversion to pasture-based operations, direct regulation of dairy farms, and immediate phase outs of dairy digester incentives. These proposals will not only fail to achieve the desired greenhouse gas emission reductions but will also exacerbate the problem by causing significant emissions "leakage." Command and control measures for SLCP reductions in the dairy industry will accelerate dairies leaving California for states with less costly regulations and less commitment to climate protection. This outcome would be in direct conflict with CARB's mandates to minimize emission leakage in the design of its GHG programs. CARB has wisely rejected calls for immediate phase out of dairy biomethane pathways. We applaud CARB for developing a robust record on the importance of the LCFS to the achievement of SLCP emission reductions. (45d-245.4)

**Comment:** BAC strongly supports the increased stringency of the proposed regulation, but is very concerned about the continued use of Book and Claim for undelivered biomethane and the phase-out of avoided methane credits. Failing to require delivery of biomethane means that

California will continue to use fossil gas on the road and it will hurt instate projects that are converting organic waste to energy to meet the state's Short-Lived Climate Pollutant reduction, landfill diversion, wildfire reduction, and other important state policies. Phasing out credit for avoided methane emissions, even when they are not required by law, will also undermine efforts to meet the SLCP reduction requirements of SB 1383. BAC urges the Air Board, therefore, to revise the amendments to require biomethane delivery consistent with RPS and SB 1440, and to only phase out avoided methane emissions to the extent that they are required by law. (45d-246.1)

**Comment:** CARB SHOULD NOT PHASE OUT CREDIT FOR AVOIDED METHANE EMISSIONS UNLESS THEY ARE REQUIRED BY LAW AND HIGHER EMITTING ALTERNATIVES ARE NOT ALLOWED.

BAC also urges the Air Board to continue to give 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. BAC appreciates that lifecycle analyses should not include emissions reductions that are required by law, but in both of these cases, the specific reductions are not required by law and should be credited in a lifecycle analysis.

## **1. Dairy and Other Livestock Waste**

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 emissions<sup>3</sup> and those findings are difficult to impossible to achieve, so the State cannot currently regulate dairy methane emissions unless it changes the law. 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.

<sup>3</sup> Health and Safety Code section 39730.7(b)(4).

## **2. Diverted Organic Waste**

Diverted organic waste is a more complex category since SB 1383 does require 75 percent of organic landfill waste to be diverted from landfill by 2025. At the same time, 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). The State of Oregon's Department of Environmental Quality has also conducted a literature of 148 separate studies and found that bioenergy plus composting the remainder (digestate) provide 3.5 times greater carbon reductions than compost alone.<sup>4</sup> More recent methane monitoring by NASA's Jet Propulsion Lab also found that compost production facilities emit substantial amounts of methane and yet this is an allowed alternative under CalRecycle's regulations.<sup>5</sup> None of this is

to dismiss the value of compost, but where low carbon fuel can be generated instead, the difference in emissions should still be valued under the LCFS.

<sup>4</sup> Morris, et al, *Evaluation of Climate, Energy, and Soils Benefits of Selected Food Discards Management*, Prepared for the State of Oregon Department of Environmental Quality, October 2014, Table ES-2 at page iii.

<sup>5</sup> See, <http://methane.jpl.nasa.gov/>

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. (45d-246.2)

**Comment:** WUD urges the Air Board to continue to provide credits for avoided methane emissions from livestock manure, which are the most cost effective GHG emissions reductions funded by the State. When asked by the State, dairy farmers stood up and achieved what was asked of them, it is important that the State now uphold its support of these projects through the LCFS program as promised. Therefore, dairy biogas producers should receive full credit for avoided methane emissions from livestock manure that is used to produce biofuels participating in the LCFS program.

The success of the LCFS program cannot be overstated in bringing down the carbon intensity of transportation fuels, which is one of the more difficult sectors to decarbonize. By linking the carbon intensity of fuels to voluntary projects like digesters on dairy farms, the program has also spurred a significant reduction in methane emissions. This has driven change and innovation on farms to be part of the solution. It is important that ARB maintain the course that has gotten us here and not abandon those that have stepped up to be part of the solution. To accomplish this the value of the avoided methane emissions must continue to be included in the carbon intensity score of fuels produced from dairy biomethane. The projects developed by our members to help ARB achieve its goals are not inexpensive to operate and maintain. The LCFS is the most important revenue source for these projects and keeps these projects viable. It also continues to reward innovation and maintains the pace of emissions reductions, which has been unprecedented.

California dairy farms are very sensitive to leakage with the California dairy herd continuing to migrate to other states as shown in recent ARB reports on dairy and livestock populations, including the ARB GHG inventory. Removing the avoided methane emissions value from the LCFS will add pressure on California dairies to leave California to other states without GHG reductions targets for dairies. This will increase global GHG emissions counter to ARB goals. The most effective way to achieve ARB's GHG goals is to support California's dairy farmers in their reduction of methane emissions thereby providing an example to other states and countries on how to achieve emissions reductions and maintain a healthy farm sector that provides jobs in much needed areas of the state and supports fresh local food production. This is how California can achieve meaningful global GHG emissions reductions by being a successful laboratory of innovation while at the same time supporting our economy.

Consolidation is not unique to California dairies. Many businesses in California have experienced consolidation to survive increasing costs and regulatory pressures, including environmental pressures. Consolidation has been happening in dairies across the United States for over 50 years, and California is no exception. The LCFS program is not driving this,

but other business pressures to become more efficient and productive. Scale allows dairies to implement practices that reduce GHG emissions and improve air quality. California dairies also provide important year-round jobs, many to disadvantaged communities, that would disappear without our dairy farms.

Ending credits for avoided methane emissions would be counter to SB 1383. It also sends a message that investments in these projects are risky as the state is not willing to support these projects long term. These projects provide some of the most cost-effective investments the state is making in carbon reductions and should be strengthened, not abandoned. For all these reasons, WUD urges ARB to maintain a lifecycle analysis approach to carbon emissions, including avoided methane emissions. (45d-259.1)

**Comment:** CARB appropriately recognizes the crucial role of reducing methane emissions in the Proposed Amendments in combating global climate change and the positive impact of RNG in facilitating methane reductions, regardless of the project's location or ultimate end-use. To address climate change, we must aggressively and rapidly reverse fugitive methane emissions from all sectors, including organic waste streams. Thus, we encourage CARB to advocate for keeping and even increasing RNG-related opportunities to boost investor confidence, accelerate methane emission reductions, and highlight the urgency of addressing methane as a potent climate pollutant on a global scale.

Leading authorities have echoed the need to reduce methane emissions. In 2023, the International Energy Agency's (IEA) report featured a dedicated section on Biogas and Biomethane<sup>2</sup>, underscoring global acknowledgment of biogas in decarbonization. The report forecasts the deployment of renewable energy technologies in electricity, transport, and heat until 2028, addressing fundamental challenges and identifying barriers to industry growth. The IEA highlights the role of biogas and biomethane in fostering a circular economy through residue and waste valorization, contributing to rural economic development, and generating rural employment. Additionally, the US EPA has endeavored to promote anaerobic digester installation for productive energy use for the last 30 years since the inception of the AgStar program in 1994. Both reports support CARB continuing to utilize a fact-based analysis for LCFS updates.

<sup>2</sup> <https://www.iea.org/reports/renewables-2023/special-section-biogas-and-biomethane>

Until there is a more effective replacement for avoiding methane emissions, CARB should continue to allow avoided methane credits as a pivotal tool to reduce methane emissions. A fixed-year phase-out of avoided methane crediting may jeopardize the viability of future agricultural RNG projects. These projects rely heavily on LCFS revenue for profitability, with avoided methane components essential for meeting capital repayment requirements. Without methane crediting, existing agricultural projects may struggle to cover operating costs, leading to potential closures and the risk of losing the opportunity to abate significant methane release. CARB should not arbitrarily embrace an avoided methane reduction phase-out without a detailed replacement policy for those emissions. This policy is essential to reduce significant LCFS project risks, avoid potentially stranding assets, and ensure continued investment and buildout of projects that can reduce organic methane release wherever possible. (45d-275.2)

**Comment:** While the comments following are designed to provide a complete overview of California’s comprehensive and highly successful efforts to reduce dairy methane in the state, two foundational conclusions remain indisputable:

1. California cannot achieve the 40% target in livestock methane reduction by 2030 without the continued implementation of dairy digesters which capture enormous quantities of methane on dairy farms in the state.
2. The continued implementation of dairy digesters in California hinges on the incentives provided by continued avoided methane crediting in the LCFS program.

Put simply, without appropriate avoided methane crediting and continued participation in the LCFS, California cannot successfully achieve 40% reductions in dairy and other livestock emissions by 2030 and will fail to achieve the state’s overall short-lived climate pollutant (SLCP) targets as sought under SB 1383 and will fail to achieve the state’s overall 48% targeted reduction in carbon by 2030.

These conclusions are consistent with any credible analysis of the state’s climate strategies and policies, including the CARB 2022 Scoping Plan Update, as well as other CARB analysis<sup>2</sup>, and those by UC Davis researchers.<sup>3, 4</sup>

<sup>2</sup> CARB Analysis of Progress toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions Target

<sup>3</sup>Analysis by UC Davis researchers: Meeting the Call: How California is Pioneering a Pathway to Significant Dairy Sector Methane Reduction

<sup>4</sup> Analysis by UC Davis researchers published in CABI Reviews: The path to climate neutrality for California dairies

Moreover, continued avoided methane crediting by digesters under the LCFS is fully consistent with CARB’s stated goals as outlined in the Initial Statement of Reasons (ISoR) as follows:

4. “Supporting methane emission reductions and deploying biomethane for best uses across transportation.”

## **Discussion**

### **Livestock’s essential role**

California nation-leading dairy sector plays a vital role in providing essential nutrition and supporting the livelihoods and resilience of countless families and communities in rural California. California dairy farms are the most productive and important agricultural commodity in the state and directly and indirectly account for over 180,000 well-paying, year-round, and benefited jobs, most of which are in the eight county San Joaquin Valley.

California dairy farms also play an integral role in California sustainable food systems. Dairy cattle upcycle agricultural and food waste from other agricultural commodities, food and wine processing, and urban food waste. Approximately 40% of California’s dairy feed is from agricultural and food waste, representing 5.5 million tons of feed that has zero additional carbon footprint, and would otherwise need to be landfilled or disposed, leading to significant additional methane and carbon avoidance. Upcycling agricultural and food waste also dramatically reduces land use, water use, use of fossil fuels, pesticides and synthetic fertilizer, as well as resulting in less energy needed to produce traditional feed crops. From 1964 to



2014 the increased use of agricultural byproducts and food waste, as well as improved animal nutrition and animal welfare, contributed to California's rapidly rising milk product production efficiency, resulting in 89% less land, 88% less water, 45% less greenhouse gases, including reduced methane emissions and fewer fossil fuels used.

California's dairy farms also provide a critical source of organic fertilizer that dramatically reduces the need for synthetic fertilizer production and use. Manure from California's dairy farms is a tremendous source of crop nutrients for the state's growing organic and regenerative farm practices and the advancement of healthy soils, a leading state priority. When managed properly, dairy farms can reduce their footprint on the planet. California's dairy farms play a vital role in developing sustainable food systems, a healthier environment, enhanced nutrition, and a better quality of life for all.

### **California's comprehensive dairy methane reduction approach**

The emission intensity, as well as emission sources of dairy production varies significantly across dairy livestock management practices, and even across regions in California. "Organic pasture-based" operations on California's North Coast produce more enteric emissions than conventional "free-stall" farming operations in the San Joaquin Valley, while conventional operations in the San Joaquin Valley generally produce more manure methane emissions. "Dry-lot" farming operations generally found in the Chino basin and on older dairies in the San Joaquin Valley also tend to likely produce more enteric than manure methane. Each of these production systems possess unique characteristics, cost/benefits, interactions, and trade-offs. The size of dairy farm operations, while all owned by families, also varies greatly from a few hundred cows to several thousand cows. Recognizing these unique characteristics, CARB and CDFA have correctly recognized that there is no universal one-size-fits-all solution to lowering methane emissions from California's dairy sector. CARB and CDFA also have correctly recognized that California is not building new dairies. California's comprehensive approach has appropriately been tailored and designed to work with California's unique and existing mix of pasture-based, dry-lot and conventional free-stall-barn dairy operations. California's comprehensive approach also recognizes that the effectiveness of intervention options depends on factors such as location, access to services, farmers' willingness to implement interventions, economic considerations, and uncertainty surrounding the efficacy of certain measures.

CARB and CDFA have designed a comprehensive five-part strategy to reduce dairy and other livestock sector methane. CARB and CDFA did not arrive at this comprehensive strategy alone. The strategy was developed with significant input from stakeholders representing broad and diverse interests, including the dairy and other livestock sectors, environmental and environmental justice NGOs, air and water quality regulators, leading scientists and academics, and other state agencies. Multiple stakeholder group meetings were conducted and followed by several public hearings held throughout California, as required by Senate Bill 1383.



The comprehensive approach that has emerged correctly recognizes the broad adoption of sustainable best management practices across California’s diverse dairy and livestock farming systems and is crucial to delivering lower emissions and mitigating the environmental impact of dairy and other livestock systems. The approach also correctly recognizes that dairy methane comes from both manure (back end) and enteric (front end) sources and solutions for both are distinct, but necessary since both contribute significantly to the state’s methane inventory. In fact, enteric methane counts for slightly more overall methane from the combined California livestock sectors (12 million metric tons) versus methane from livestock manure management (10 million metric tons).

### **California’s Dairy Cow Population Continues to Decline**

**Fact: no new dairies in California of any significance have been built in the past 7 to 8 years and the state’s cow population continues to steadily decline.**

California’s milk cow population peaked at 1.880 million cows in 2008 and since that time has declined by over 10% to 1.688 milk cows in 2022, according to the USDA’s recently published Census of Agriculture (2017-2022). This significant decline is expected to continue and accelerate in the future due in large part to the lack of available water supplies<sup>5</sup> resulting from surface water curtailments and implementation of the Sustainable Groundwater Management Act (SGMA). Increased regulation, high feed costs, skyrocketing energy costs and rapidly rising cost of labor, coupled with historically low milk prices will further accelerate the decline.

<sup>5</sup> Economic Impacts of SGMA on San Joaquin Valley Dairies and Beef Cattle – analysis by ERA Economics

The decline in California’s milk cow population has already resulted in an estimated 2 million metric tons (MMT) reduction as each fewer milk cow represents an average reduction of about 10 metric tons of CO<sub>2</sub>e reduction in the state’s annual inventory<sup>6</sup>. Continued reductions in the milk cow herd in California, similar to the 2017, 2022 reductions, which averaged approximately 13,000 cows per year, will lead to an estimated additional 100,000 cow attrition over the next eight years. (2023-2030). This continued reduction in cow herd will add another 1 MMT of CO<sub>2</sub>e reduction in California’s inventory or more than 3 MMT of CO<sub>2</sub>e since 2008. These reductions will be higher if accelerated attrition occurs as no new dairies are expected to be built in the state and the number of operating dairies in the state continues to steadily decline. This latter trend is evidenced by the latest USDA Census of Agriculture, which showed the number of operating dairies in California declined by over 500 dairies from 2017 to 2022.

<sup>6</sup> Analysis by UC Davis researchers: Meeting the Call: How California is Pioneering a Pathway to Significant Dairy Sector Methane Reduction

### **CDFA’s Grant programs**

These comments focus primarily on manure methane emissions, due to the important role played by the LCFS in incentivizing sustainable manure methane practices. As part of the comprehensive strategy, CARB and CDFA have designed two primary programs to address manure methane. These programs can broadly be characterized as methane avoidance and methane capture and beneficial use mitigation programs.

CDFA's Alternative Manure Management Program or AMMP has historically provided grants up to 100% of project cost to incentivize farmer adoption. AMMP projects are designed to work on dairies of all sizes and encourage adoption of alternative practices that avoid methane production on dairy farms. Practices include solid-liquid separation systems, conversion from flush to scrape or vacuum systems, conversion to pasture-based systems, or the adoption of compost pack barns. All of these practices avoid manure methane creation by limiting manure in anaerobic conditions where methane production increases. CDFA, with significant financial support from USDA (\$85 million), has also recently deployed the Dairy-Plus Program which is designed to maximize methane avoidance on dairy farms. To date, CDFA has funded more than 185 AMMP (170), or Dairy-Plus (15) projects on California dairies. It should be noted, the incentives and funding for these alternative methane avoidance projects has grown substantially, and the number of grants awarded each year now exceeds both the number and dollars awarded under the Dairy Digester Research and Development Program. While AMMP methane avoidance projects are highly cost-effective compared to other programs funded by the state's climate investments, they currently only account for about 10% of the state's manure methane reductions. CDFA's implementation of the Dairy-Plus Program and funding more alternative projects each year will increase the contribution of AMMP projects in overall methane reduction efforts.

### **DDRD – Methane Capture and Utilization**

CDFA's Dairy Digester Research and Development Program (DDRD) provides grants to dairy digester projects in California that are designed to buy down the capital cost of the technology. The program only funds a small portion (generally 25% or less) of the overall cost of a typical project. Total project costs can easily exceed \$8 - \$10 million per dairy farm or more. Additional revenue streams associated with the beneficial use of the captured methane, such as the LCFS, federal Renewable Fuel Standard, as well as the CPUC Biomat and RNG procurement programs, are also needed to incentivize investment.

The LCFS has become the primary program to fully incentivize the development of dairy digesters in the state. This investment has paid significant dividends in California, leading to an estimated 2.4 MMT of CO<sub>2</sub>e annually in dairy methane reductions from the 140 projects funded to date. These reductions represent about 90% of the total dairy methane reduction from projects funded by the state. These significant reductions are critical to the state's dairy methane reduction efforts, and without these reductions, the state's overall 40% SLCP and 48% GHG targets cannot be met by 2030. The state's DDRD is also highly cost-effective, returning 1 MT of CO<sub>2</sub>e reduction for each \$9 invested by the state. The return on investment is greatly magnified by the fact that the reductions are methane emissions and more valuable in short-term efforts to limit additional global warming. As a result, the state's DDRD is widely regarded as the most cost-effective program. Equally important, the DDRD is by far the most effective in achieving overall emissions reductions. According to the most recent California

Climate Investments 2023 Annual Report produced by the state, the DDRDP accounts for 23% of GHG reductions from all climate programs invested in by the state with just 1.6% of total funds awarded. Moreover, the report highlights that 68% of funds expended on dairy digesters are benefiting priority populations, including disadvantaged communities.

Without participation in the LCFS, these projects are simply not economically feasible and will not be financed in California. Preclusion from participation in the LCFS, or the loss of avoided methane crediting would not only jeopardize existing dairy digester projects but would foreclose the ability to finance the additional 100 or so projects that will be necessary to achieve the state's methane reduction and climate targets.

### **Direct Regulation Will Prevent Achievement of Targets**

While direct regulation of dairy methane reductions is outside the scope of this proceeding, we offer the following comments in response to repeated efforts by environmental justice organizations to directly regulate the dairy industry.

SB 1383 only authorizes CARB to implement regulation of the dairy and livestock sectors after January 1, 2024, and only after key conditions and considerations are met. These conditions and considerations include the determination by CARB and CDFA that any proposed regulations are technologically and economically feasible, cost-effective, and mitigate and minimize (prevent) leakage. SB 1383 also mandates an evaluation of progress made by incentive-based programs.

While none of these mandated considerations have been undertaken and the conditions cannot be met at this time, any effort to impose direct regulation will simply delay further progress toward the goals and ensure they will not be met. Efforts to develop regulations will take years, face significant legal challenges, and only ensure the state's methane reduction targets are not met. Efforts to directly regulate the dairy and beef cattle sectors only in California will also lead to massive methane leakage to other states, which is contrary to SB 1383 and California's leadership role in climate policy. Moreover, the existing comprehensive incentive-based program is clearly achieving the targeted reductions. Throwing out a successful program in search of a new, unproven direct regulatory scheme would be foolish and would ensure the state's climate policies are not followed by jurisdictions.

### **Conclusion**

California's comprehensive approach to reducing methane from dairy operations is widely recognized as an effective model and fully consistent with national efforts being implemented by USDA and other federal agencies. The state's dairy methane reduction strategies are designed to provide cost-effective options and incentives for the state's diverse array of dairy farms. Continuation of these programs and efforts are critical to achieving the state's methane reduction and overall climate goals by 2030. In December 2022, a UC Davis report, *Meeting the Call: How California is pioneering a pathway to significant dairy sector methane reduction*<sup>7</sup>, summed it up as follows:

<sup>7</sup> Analysis by UC Davis researchers: Meeting the Call: How California is Pioneering a Pathway to Significant Dairy Sector Methane Reduction

“Our 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% reduction in dairy methane sought by the state’s regulators without the need for direct regulation.” (45d-301.1)

**Comment:** CARB should recognize the high costs for installing and operating manure Biogas Control Systems (BCS) and not eliminate methane avoidance credits abruptly and develop an incentive (utilizing avoided methane) for dairy farms to install a BCS system to regulate their uncontrolled methane emissions in-line with the capital and operational expenditures for such BCS system(s). (45d-314.2)

**Comment:** 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. Avoided methane crediting should continue in LCFS 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. (45d-320.5, Apr-082.21)

**Comment:** 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, followed by up to two years to receive provisional pathway scores. Avoided methane crediting provides the source of revenue for these projects that pays for their beneficial impact and allows 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. Until then, avoided methane crediting is the only way to support digester development, ongoing operations, and associated emissions reductions. **We strongly encourage CARB to maintain avoided methane crediting for all RNG pathways, and to not phase out CNG or hydrogen pathways unless and until direct regulation renders avoided methane non-additional.**

As noted above, 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 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. If existing projects shut down, we will backslide to pre-LCFS methane emissions at dairies. Our existing

projects and projects currently under construction prevent about 700,000 MT per year of carbon reduction that would revert to venting.

Backsliding has happened before. Some of Amp's largest 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. (45d-323.8)

**Comment:** Do not phase out avoided methane crediting and book-and-claim eligibility for all RNG pathways, including RNG-to-hydrogen. (45d-323.17)

**Comment: Avoided Methane Crediting Should Continue in LCFS and Remain Available to Those Addressing The goals set forth in SB 1383 or Until a Realistic and Proven Replacement Policy is Implemented** SB 1383 requires the state to achieve a reduction in SLCP emissions, including a 40 percent reduction in methane, by 2030.<sup>1</sup> In its 2022 Scoping plan, CARB outlines its SLCP related emissions achievements, while noting that these reductions have not kept pace with the broader progress towards California's decarbonization goals.<sup>2</sup> The document states that "more aggressive action is needed" to meet the state's legislative goals.<sup>3</sup>

<sup>1</sup> California State Legislature, "SB 1383 - Short-lived climate pollutants: methane emissions: dairy and livestock: organic waste: landfills" 2015

<sup>2</sup> California Air Resources Board, "Final 2022 Scoping Plan Update", Page 224

<sup>3</sup> ID

As CARB has acknowledged, the emission impacts of SLCP's are especially strong over the short term, and timely action on reducing these pollutants can have an immediate beneficial impact on climate change and public health.<sup>4</sup> Achieving reductions in SLCP's would help reduce ambient levels of ozone and particulate matter and the cardiovascular and respiratory effects associated with air pollution, and many of these benefits would accrue in disadvantaged communities, which are often located near sources of SLCP emissions.<sup>5</sup>

<sup>4</sup> California Air Resources Board, "Short-Lived Climate Pollutant Reduction Strategy", Page 1

<sup>5</sup> California Air Resources Board, "Short-Lived Climate Pollutant Reduction Strategy", Page 13

SB 1383 requires a 40 percent methane reduction target by 2030, but by 2025 the state is expected to remain roughly 8 million tons short of anaerobic digestion or composting capacity.<sup>6</sup> Scaling up California's organic waste recycling infrastructure is crucial to achieving the adopted goals and such infrastructure can be incredibly costly to local jurisdictions. Private businesses can help the state achieve these goals with project investments both inside and outside of California.

<sup>6</sup> Governing Magazine (March 10, 2022), "It's Time America stopped Throwing Out Food Waste"

Despite the state's need to reduce short lived climate pollutants and to scale organics processing infrastructure, the Proposed Rule has outlined a plan to phase out the avoided methane crediting in the LCFS program. This phase out is premature and leaves an incredible amount of uncertainty for investors that are looking to scale organics processing solutions that promote decarbonization within the state. These types of projects are often reliant on LCFS crediting and it would be counterproductive to propose an arbitrary phase out of avoided

methane crediting without a detailed plan for developing a replacement policy or continuing to provide a similar credit to projects that are working to help the State achieve the goals set for in SB 1383. To continue with a phase out will lead to significant project uncertainty, an increased potential for stranded assets, and could discourage future investment within the state of California.

We continue to support CARB analyzing phase-out of avoided methane crediting once replacement policies are in place. However, we do not support the Proposed Amendment's *required* phase-out of avoided methane crediting *without* a suitable replacement policy. Divert would recommend that CARB work with industry stakeholders to determine what alternative incentives are needed to advance projects that directly achieve the state's SLCP emissions reduction goals. (45d-330.1)

**Comment:** The US dairy RNG industry has been largely built upon capturing fugitive methane emissions and receiving credits for turning those emissions into transportation fuel. Without a way of monetizing those reductions, future investments in digesters are at risk. While we appreciate that the draft rule gives dairy RNG projects a long time before phasing out avoided methane crediting, CARB is still signaling that its goal is to end avoided methane crediting—even if those methane reductions remain additional, verifiable, and voluntary. We would prefer CARB communicate that avoided methane crediting will remain valid under the LCFS for as long as the reductions are additional—just like any other fuel. We note that the European Union's Renewable Energy Directive, Argonne-GREET, and many other leading protocols assign avoided methane benefits to RNG, and we ask CARB not to be the leader in tearing down an industry that CARB has done so much to build up. (45d-351.3)

**Comment: Renewable Natural Gas (RNG) – Importance of the Transportation Market Segment to Avoid Phase Out for Biomethane and Hydrogen**

The CARB proposed amendments 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. While we understand that CARB's intention here is to begin to transition biomethane away from the transportation sector – this will have impact on both short term and long term investments, and the underlying rationale is being construed by some as science-driven rather than a policy decision concerning the phase out of combustion in transportation. AFCC and its member companies do not support the phaseout of avoided emission credits. (45d-360.12)

**Comment:** 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.<sup>2</sup> 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.

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-causingfarmers?r=i2qe&utm\\_campaign=post&utm\\_medium=web](https://agdatanews.substack.com/p/are-manure-subsidies-causingfarmers?r=i2qe&utm_campaign=post&utm_medium=web)

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. (45d-363.4)

**Comment:** We therefore strongly urge CARB to refrain from imposing an arbitrary end-date for avoided methane crediting. Any such measure would not only hinder continued investment into methane abatement at farms that LCFS has been instrumental in catalyzing, but also jeopardize existing RNG production assets, which are subject to significant operational expense.

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 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.”<sup>3</sup> 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.”<sup>4</sup>

<sup>3</sup> ISOR, p. 124

<sup>4</sup> Id.

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 commend CARB for taking a measured position in support of avoided methane crediting generally and opposing any near-term phase out. 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. (45d-363.5)

**Comment:** Since agriculture is the largest source of global methane emissions, farmers present the largest opportunity to deliver this climate cooling effect.



It is not a solution to simply produce less food. For example global dairy production will increase 50% by 2030 to meet demand which grows unabated despite the marketing of supposed “non-dairy” alternatives.

CARB recognized this and pioneered and incentivized simple but effective technology, called digesters, to capture dairy methane and convert it into renewable fuel while also supporting affordable dairy production. As a result, CA dairy is well on its way to reducing its methane emissions by a whopping 40% by 2030 as documented in a recent UC Davis study and report.

Dairy methane capture contributes toward global cooling, it recycles a waste into an energy, it allows dairy farms to sustainably maintain their dairy cows which themselves are an important and major recycler,s transforming significant quantities of inedible agricultural waste into nutrient-rich, dairy.

Over 100 digesters are currently operational in the CA on approximately 400,000 milk cows. These digesters also reduce odors by removing over 350 tons per year of hydrogen sulfide emissions and in doing so reduces 670 tons of small damaging PM2.5 particles. Overall these 100 digesters are the equivalent to removing 8 million cars from the Central Valley roads. Another 100 need to be build. Hence the need for CARB to step down and steepen the compliance curves to match credit supply with deficits and critically to support dairy RNG pathways to electricity and hydrogen fuels via book and claim.

Dairy methane recycling into fuel,

- displaces fossil fuel consumption and reducing exhaust pipe emissions,
- improves local air and water pollution in surrounding communities,
- supports local clean economies through emission reductions,
- generates high-quality, organic fertilizer for sustainable agriculture,
- creates jobs,
- increases investment in disadvantaged communities,
- is one if not the most affordable way for the state to reduce ghg emissions.

The time for debate and half-measures has passed; the time for even more action is upon us. California’s family farms remain committed and “all in” on their important role of producing the majority of the nation’s dairy (and the much of world’s) economically and sustainably, creating a cleaner, more reliable and affordable food future for generations to come. (Apr-005.1)

**Comment:** Avoided methane crediting and book-and-claim access for biogas projects are central to enabling biogas projects and associated emissions reductions. **We urge CARB to avoid restricting avoided methane crediting or biogas book-and-claim accounting in the program.** (Apr-026.8)

**Comment:** While not discussed in detail at the workshop, the ABC would like to reiterate the important role that biomethane plays in the program. 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. As a result, 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, the

ABC would like to emphasize the need for CARB to send a clear policy signal that biomethane is a necessary and effective decarbonization strategy in sectors outside of transportation (e.g. industrial, residential, commercial) if it is CARB's goal to transition biomethane out of the vehicle sector. (Apr-056.4)

**Comment:** We would like to reiterate that 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.

As such, we recommend that CARB refrain from imposing an end-date for avoided methane crediting. 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 long-term economic viability of existing RNG production assets, which are subject to significant operational expense. We strongly urge CARB to continue following climate science on a technology-neutral basis and to maintain the framework that has catalyzed investment into methane abatement of swine and dairy operations. (Apr-069.4)

**Comment: The LCFS Should Continue to Support and Credit Avoided Methane Projects, Including from Dairy RNG**

Gevo appreciated CARB staff's comments during the April 10 Workshop in support of RNG crediting and responding to opposing comments on dairy and other forms of RNG. Gevo strongly supports avoided methane crediting recognizing RNG project benefits that reduce global methane emissions regardless of location or end use. This should include avoided methane from dairy-manure RNG projects. 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."<sup>6</sup>

<sup>6</sup> California Air Resources Board, "Proposed Amendments to the Low Carbon Fuel Standard Initial Statement of Reasons," Dec. 19, 2023, at page 124.

And use of dairy digesters creates synergistic environmental benefits, as farmers can generate soil amendments that provide nutrients and decrease the amount of fertilizer needed.<sup>7</sup>

<sup>7</sup> 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>.

(Apr-078.5)

**Comment:** Renewable Natural Gas (RNG) consumption continues to grow significantly as well, especially for negative CI dairy RNG, further creating a need for a more robust step change. In the latest workshop CARB signaled that it will not accelerate the phase out of Avoided Methane Crediting and will instead continue granting negative CI dairy pathways until 2030. Like renewable diesel, the latest data release showed Dairy RNG becoming the largest

feedstock for CNG in 2023 with growth on pace to completely take over the pool; a simple 2-year linear extrapolations show dairy RNG becoming 100% of the feedstock pool for CNG by 2028. (Apr-091.7)

**Comment:** WSPA believes that avoided methane crediting is needed to support current and future investments and project development. These credits for methane – which was previously emitted or flared – are key components of dairy renewable natural gas investments and should be preserved to ensure the maximum production of lower-CI fuels and emission reductions. (Apr-094.25)

**Comment:** Finally, to be consistent with CARB’s 2022 Scoping Plan Update, the agency must first identify where emissions reductions will come from to replace those that are currently being realized through avoided methane crediting. More work must be done before eliminating existing incentives that currently achieve real reductions in emissions. (Apr-094-26)

**Comment:** A fixed-year phase-out of avoided methane crediting—as included in the Proposed Rule—is simply not smart policy. **Removing a “carrot” to reduce methane from sources such as dairies is unwise unless and until a “stick” has been developed.** Any mandatory rule must be able to meet the requirements of state law. If CARB wishes to continue to promote private investment in dairy RNG projects, any switch from incentives to direct requirements to install methane control systems must be more carefully managed. The current uncertainty over which regulatory tool will be used is preventing methane reduction projects from occurring. (Apr-098.12)

**Comment:** Even where existing appropriate regulatory requirements are in place, additional incentives are often needed to ensure greater amounts of methane capture. As such, **CARB should properly reflect the methane benefits of avoiding landfilling in the LCFS**, which would enhance the economic incentives and better motivate buildout of needed food/green waste digesters. (Apr-098.13),

**Comment:** 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. 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. (Apr-101.2)

**Comment:** We urge CARB to follow the deep and sound science and maintain avoided methane crediting for all RNG pathways. (Apr-101.3)

**Comment:** We also urge CARB to maintain and add elements that will support continued innovation and development of additional low carbon fuels, even as the state’s vehicle fleet evolves. Among other items, these include:

- Maintaining avoided methane crediting and book-and-claim accounting for biogas-based pathways, ... (Apr-101.16)

**Comment:** We support the additional time provided to hydrogen for the beneficial use of biomethane and suggest that there not be a sunset for avoided methane to the extent biomethane is used to produce fuels that are used by zero emission vehicles (e.g., renewable hydrogen used in fuel cell vehicles). (Apr-103.7)

**Comment:** 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 (biogas) 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, removal of the avoided methane credit will render co-digestion projects at WRRFs within California financially infeasible and inadvertently drive co-digestion projects out-of-state. We made similar arguments during the Scoping Plan Update and the more recent development of 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 collaborative process to begin as soon as possible.

...

As we have noted in previous discussions and comment letters for both the ACF and LCFS regulations, the wastewater sector represents an important in-state partner for meeting SB 1383 organic waste diversion requirements and for development of low-carbon fuels. As documented in the State Water Board's Co-digestion Capacity Analysis assessing co-digestion capacity at WRRFs, the estimated total available wastewater digester capacity is capable of receiving all food waste required to be diverted from landfills in California for co-digestion. This will exponentially increase the biogas produced and captured at WRRFs.

The wastewater sector is aligned with LCFS program goals, notably to diversify transportation fuels away from fossil fuel-based sources and achieve carbon neutrality. The biogas generated 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. CASA continues to disagree with the proposed phase-out of avoided methane crediting for both biomethane and hydrogen pathways, as well as the eventual phase-out of credit for biomethane as a transportation fuel which currently supports and will continue to support wastewater sector fleets in maintaining essential public services of wastewater collection and treatment to protect public health and the environment in the absence of ZEV options and to meet the need for immediate reductions to meet SIP requirements in non-attainment zones for ozone (a priority in the South Coast). Without considering the full life cycle of biogas to renewable biomethane and hydrogen fuels and the support from the LCFS Program, these projects become financially infeasible, members will be forced to flare a renewable resource, we will not meet near-term SIP requirements in critical air basins, and members will no longer be able to accept diverted food waste in support of achieving SB 1383 mandates for methane reductions.

**We strongly urge CARB to preserve the use of our biogas as a viable low carbon fuel in perpetuity since it will always be produced and successful SB 1383 implementation hinges on its beneficial use.** Similarly, the proposed ACF Regulations will also inhibit SB 1383 implementation by limiting the use of medium- and heavy-duty trucks using WRRF biogas-derived compressed natural gas to only those in our fleets as of January 1, 2024 – we have proposed that be extended to follow the implementation of SB 1383 and provide WRRFs a pathway for use of the increased biogas. As CASA noted in our comments on the proposed ACF Regulations (and CARB staff acknowledged this in their December 12, 2022, presentation), medium- and heavy-duty electric trucks and vehicles unique to the needs of our sector are not commercially available and we do not expect them to be for many years. Likewise, biogas-to-hydrogen as a transportation fuel for these vehicles is not yet commercially available or demonstrated, both research and demonstrations are necessary to advance that technology and we have offered to work with CARB on those efforts. In the meantime, state regulations and policy should promote biogas deployment using proven technology that most efficiently reduces GHGs to mitigate climate change while also complying with the Omnibus regulations. RNG vehicles also greatly improve air quality in environmental justice communities. Not being able to use them will result in prolonged and increased use of diesel trucks which create 90% worse air quality. (Apr-107.1)

**Comment:** The current LCFS crediting regime for biomethane derived from animal manure is delivering the significant benefits it was designed to achieve. Specifically, the current LCFS crediting incentive for methane capture for transportation fuel use appears to be spurring the development of new digester projects. Since the 2018, LCFS amendments came into effect, the number of digesters has grown from around 20 to more than 100 operating today.

CAFB agrees that reducing methane is the quickest and best way to meet our emissions goals. Avoided methane capture is on track to meet our goals, and LCFS is one critical reason as to our success.

California's digesters have tremendous potential for GHG reductions—targeting methane, a short-lived climate pollutant— and also can reduce other air emissions and improve air quality.<sup>i</sup> Building and operating a manure digester is expensive and the financing of new projects, and continue operation of existing ones, may depend on the continued availability of CI credits in the LCFS program. It is crucial that we continue to send signals to the market regarding the stability and certainty of LCFS.

Manure digesters have the greatest potential to address two overlapping barriers to meeting California's ambitious climate goals: How to reduce methane emissions and how to produce large amounts of RNG needed for zero-carbon transportation and achieving a zero-carbon electric grid. We understand that LCFS is a bridge fuel, and until better options are available, it is premature to reduce support for new and existing methane digesters. (Apr-120.1)

**Comment:** 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 in the present amendments that limit opportunities to include avoided emissions in CI calculations. We do not believe that a premature sunset is appropriate in achieving LCFS success as these

sources of methane emissions are directly tied to population growth and expanded food production. 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.

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. (Apr-131.8)

**Comment:** While not discussed in detail during the staff presentation, the ABC would like to reiterate the important role that biomethane plays in the program. 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. As a result, 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, the ABC would like to emphasize the need for CARB to send a clear policy signal that biomethane is a necessary and effective decarbonization strategy in sectors outside of transportation (e.g. industrial, residential, commercial) if it is CARB's goal to transition biomethane out of the vehicle sector. There are still emission reduction opportunities within the transportation sector that have yet to be fully realized within the program, such as aviation and marine fuels. As referenced in staff's Initial Statement of Reasons (ISOR) there is an expanded role that biofuels can play in off-road, hard to decarbonize sectors as demand for cleaner fuels and zero-emission technologies continues to grow. The ABC urges CARB to go forward with integrating these sectors into the program to ensure emission reduction opportunities are not overlooked and that there are clear market signals that support investments and innovation directed at producing clean fuels for these sectors. (Apr-137.5)

**Comment:** As currently drafted, the proposed credit phaseout for avoided methane emissions will put in-state producers of low carbon fuels derived from diverted organic waste at a severe disadvantage, as California is the only state with a 75% diversion goal for organic waste. Importantly, this is a statewide goal, not a local requirement. In other words, California communities are not obligated to reduce their organic waste by 75%, rather they are obligated to provide organic waste collection service to all customers. Moreover, local jurisdictions have optionality in how they manage organic waste outside the landfill and are not required to produce low carbon fuels from organic waste. For this reason, we support the continuation of avoided methane emissions credits for California projects that convert diverted organic waste to produce low carbon fuels.

Should California projects not receive avoided methane emission credits, they will be severely disadvantaged by the proposed approach. Out-of-state projects without the same organic waste diversion goals will continue to receive credit for avoided methane emissions, while in-state projects will not. This is in direct conflict with the goals of SB 1383, and could seriously

impair our ability to build out the necessary infrastructure to manage diverted organic waste. Currently, we are far behind the 75% organic waste diversion goal, and the proposed language will only serve to exacerbate this issue and slow down a critical opportunity to reduce methane emissions in California. Instead, we need to adopt policies and incentives to increase the in-state production of biogas and biomethane. We strongly urge CARB to not discontinue credit for avoided methane emissions based on “targets” for landfill diversion that are not binding legal requirements.

Importantly, CARB should also be working to identify and develop new markets for biomethane, as committed to in the Advanced Clean Fleets resolution. These efforts are critical to California’s short-lived climate pollutant reduction goals. (Apr-144.1)

**Comment:** BAC is extremely concerned that the proposed changes will hurt or even stop production of in-state biomethane at precisely the time when production needs to increase to meet the requirements of SB 1383 and other important state policies. In particular:

- The changes to avoided methane crediting, especially for diverted organic waste projects, could result in far higher value for out of state projects where landfill diversion is not required than for in-state projects that are helping to meet the requirements of SB 1383. (Apr-150.1)

**Comment: The Proposed Phaseout of Credit for Avoided Methane Should be Consistent with SB 1383 and Should Not Put In-state Producers at a Severe Disadvantage.**

The proposed regulations will severely impact in-state projects that are converting diverted organic waste into low carbon fuels. The 45-day language released in January would end credit for avoided methane emissions that are required by law, but California is the only state with a 75 percent landfill diversion target beginning next year. That means that diverted organic waste projects in California may no longer receive credit for avoided methane emissions, but out of state projects using diverted organic waste will continue to receive credit for avoided landfill emissions.

As a consequence, out of state fuels produced from diverted organic waste could still have carbon intensities of negative 100 to negative 200 while in-state fuels produced from diverted organic waste would have positive carbon intensities and be worth a small fraction as much under the LCFS. The LCFS would then provide far greater incentives for out of state projects than in-state projects doing the same thing. This will slow or potentially even reverse progress in reducing California’s organic landfill waste, impair progress in meeting the requirements of SB 1383, and put in-state projects at a huge disadvantage.

Combining this change with the failure to meaningfully phase out credit for undelivered biomethane essentially means that the LCFS will no longer work for diverted organic waste projects in-state that can no longer compete with out of state projects. This is exactly the opposite of SB 1383’s requirement that state agencies adopt policies and incentives to increase the in-state production of biogas and biomethane.<sup>1</sup>

<sup>1</sup> Health and Safety Code section 39730.8.

Ending the avoided methane credit for diverted organic waste projects is also not supported by the science. SB 1383 requires landfill diversion of organic waste, but it does not require that

diverted organic waste be converted to energy or fuels. CalRecycle's SB 1383 regulations authorize far higher emission alternatives to bioenergy, including compost production and mulch. Even if fuels from diverted organic waste should no longer receive credit for avoided landfill emissions, they should still receive credit for avoided emissions from other allowable alternatives such as compost production. Numerous studies have found that bioenergy provides several times greater carbon reductions than compost. The State of Oregon's Department of Environmental Quality conducted a literature review of 148 separate studies and found that bioenergy plus composting the remainder (digestate) provides 3.5 times greater carbon reductions than compost alone.<sup>2</sup> 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). None of this is to dismiss the value of compost, but where low carbon fuel can be generated instead, the difference in emissions should still be valued under the LCFS.

<sup>2</sup> Morris, et al, *Evaluation of Climate, Energy, and Soils Benefits of Selected Food Discards Management*, Prepared for the State of Oregon Department of Environmental Quality, October 2014, Table ES-2 at page iii.

(Apr-150.6)

**Comment:** Do not discontinue credit for avoided methane emissions based on "targets" for landfill diversion that are not binding legal requirements. The 45-day language recognizes that credit should not be given for emissions reductions that are required by law, but SB 1383 only sets statewide targets, not binding legal requirements. Health and Safety Code section 39730.6(a) states that "methane emissions reduction goals shall include the following targets to reduce the landfill disposal of organics." (emphasis added) Since organics diversion is a target, not a binding legal requirement, the LCFS should continue to provide full credit for avoided methane emissions from diverted organic waste projects. (Apr-150.8)

**Comment:** If CARB decides nonetheless that it should phase out credit for avoided methane emissions from diverted organic waste, then it should do so only to the extent that organic waste is actually being diverted. This should be based on statewide diversion rates and updated every three years. For example, if California achieves statewide diversion of 25 percent of its organic landfill waste by 2030, the fuels generated from diverted organic waste would only receive 75 percent credit for avoided landfill emissions. (Apr-150.9)

**Comment:** Crediting for avoided landfill emissions should be the same for instate and out of state biofuels. Out of state fuels produced from diverted organic waste should be based on the same diversion rates as achieved in California so that projects in states without diversion targets do not have a competitive advantage over California projects that provide the same reductions and greater benefits overall. (Apr-150.10)

**Comment:** Biofuels (biomethane, electricity, or hydrogen) from diverted organic waste should continue to receive credit for the difference between their avoided methane emissions and the avoided methane emissions achieved by the highest emitting procurement product allowed under CalRecycle's SB 1383 regulations. As noted above, projects that produce both bioenergy and compost provide several times greater carbon reductions than compost only projects, so the LCFS should continue to provide credit for the additional methane reductions



that fuels from diverted organic waste provide compared to other alternatives under CalRecycle's regulations.

These corrections to the 45-day language are essential to maintain progress on organic waste diversion and Short-Lived Climate Pollutant reductions. (Apr-150.11)

**Comment:** Promus supports CARB's commitment to continue dairy biogas avoided emissions crediting. This approach ensures that there are long-term crediting opportunities available to finance projects that capture and eliminate methane emissions at dairies. 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. (Apr-152.5)

**Comment: Align to be consistent with the latest methane science and SB 1383 definitions**

We also support recognizing the latest science finding higher methane emissions are otherwise generated from landfilling organic waste prior to processing in anaerobic digestors. Do not discontinue credit for avoided methane emissions based on "targets" for landfill diversion in 1383 that are not binding legal requirements without alternative mechanisms. (Apr-158.8)

**Comment: Remove Fixed-year Phase-out of Avoided Methane Crediting:** removing this from the proposed rule would prevent any dramatic reduction in LCFS market value that enables methane capture and beneficial use projects. Without that revenue stream and market certainty, projects such as dairy digesters will not be able to be financed or implemented post-2030. The development of dairy digesters is widely recognized by the California Air Resources Board<sup>5</sup> and the Legislative Analyst Office<sup>6</sup> as the most productive and cost-effective climate investment currently being implemented. Without avoided methane crediting under the LCFS, new projects will not be developed, and existing projects will not remain economical and will cease operating.

<sup>5</sup> California Air Resources Board, *California Climate Investments 2022 Mid-Year Data Update*, [https://ww2.arb.ca.gov/sites/default/files/auction-proceeds/cci\\_2022\\_mydu\\_cumulativeoutcomes.pdf](https://ww2.arb.ca.gov/sites/default/files/auction-proceeds/cci_2022_mydu_cumulativeoutcomes.pdf) (page 4).

<sup>6</sup> Legislative Analyst Office, *Cap-and-Trade Spending Overview*, March 30, 2023. <https://sbud.senate.ca.gov/sites/sbud.senate.ca.gov/files/230238LAO%20Cap%20and%20Trade.pdf>

(Apr-160.6)

**Comment: Methane Avoidance:** CARB should not arbitrarily eliminate methane avoidance for food waste by 2030. CARB should follow actual science of methane released from landfills and update capture rate to actual practice.

Consequence: eliminating methane avoidance immediately removes negative CI score even though landfills continue to emit methane, and kills food waste RNG projects with gas value so low projects fail economically. (Apr-167.03)

**Comment:** Specifically, this comment recommends that the California Air Resources Board ("CARB") establish a safe harbor crediting period for early adopters of enhanced landfill methane collection systems including automated monitoring and control technologies for

landfills (“Advanced LFG Control Systems”). The establishment of this crediting period would be consistent with the language and intent of SB 1383, the short-lived climate pollutant (“SLCP”) statute that underpins the SLCP Strategy that CARB developed. Under the LCFS program at section 95488.9(f)(4), similar safe harbor crediting periods already exist for dairy and swine digester pathways and for voluntary organics diversion pathways. The establishment of this safe harbor for enhanced landfill methane collection systems would incentivize landfill owners and operators to install these systems prior to the effective date of any future more stringent landfill methane regulation.

If implemented, this proposal would expedite and expand the capture of methane, the largest component of landfill gas by volume, and reduce methane emissions. The accelerated and expanded capture of methane would be highly beneficial to California’s greenhouse gas (“GHG”) and carbon neutrality goals given that methane is a potent short-lived climate pollutant. As stated in the 2022 Final Scoping Plan,

*Human sources of methane emissions are estimated to be responsible for up to 25 percent of current warming. Fortunately, methane’s short atmospheric lifetime of ~12 years means that emissions reductions will rapidly reduce concentrations in the atmosphere, slowing the pace of temperature rise in this decade. Further, a substantial portion of the targeted reductions can be achieved at low cost and will provide significant human health benefits. For example, the UN’s Global Methane Assessment (2021) found that over half of the available targeted measures have mitigation costs below \$21/MTCO<sub>2</sub>e, and that each million metric tons of methane reduced would prevent 1,430 premature deaths annually due to ozone pollution caused by methane.<sup>1</sup>*

<sup>1</sup> CARB, Final 2022 Scoping Plan (December 2022), at p. 225 (footnotes omitted), at <https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>

...

### Opportunities to Decrease Landfill Gas Methane Emissions

As stated in the Final 2022 Scoping Plan:

*“Due to the multidecadal time frame required to break down landfilled organic material, the emissions reductions from diverting organic material in one year are realized over the course of several decades. For example, one year of waste diversion in 2030 is expected to avoid 8 MMTCO<sub>2</sub>e of landfill emissions, cumulatively, over the lifetime of that waste’s decomposition. Near-term diversion efforts are critical to avoid locking in future landfill methane emissions. (...)*

*While reducing organic waste disposal is the most effective means of achieving reductions in waste sector methane, strategies to reduce emissions from waste already in place in landfills also will play a role in achieving near-term reductions. As Figure 4-16 shows, the total degradable carbon (a measure of the amount of waste with potential to generate methane) that is accumulated from waste deposited in previous years is over 20 times greater than the amount added each year. This illustrates that even if we were able to entirely phase out landfilling of organic waste today, the existing waste in place at landfills would continue to generate methane for decades into the future.*

*Through a combination of improvements in operational practices, use of lower permeability covers, advanced landfill gas collection systems, and increased monitoring to detect and repair leaks, it is estimated that a direct emission reduction of 10 percent is achievable across the state's landfills by 2030. Technologies to utilize landfill gas efficiently can contribute further emission reductions in the energy sector.<sup>3</sup>*

<sup>3</sup> California Air Resources Board, "2022 Scoping Plan for Achieving Carbon Neutrality," (November 16, 2022), from Landfill Methane section at p. 233-234 (emphasis supplied, footnotes omitted), available at <https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp.pdf>

### Landfill Gas Reduction Potential in California

The largest landfills in California have been reporting gas collection operating performance annually for twenty years or more pursuant to measurement requirements and methodologies established by EPA Greenhouse Gas Reporting Program. This public data base provides a reliable benchmark for gas collection operations using industry standard manual wellfield tuning. An independent peer review of four landfills which utilized Loci's Advanced LFG Control System found an increase in methane capture of 13-24% compared to the landfill's previously documented LFG capture performance. Utilizing a representative estimate of average performance improvement of 15% for implementation of Loci's Advanced LFG System would result in the following decreases in methane emissions from California landfills.

Year	% of California Landfill AGCCS Adoption (methane inventory basis)	Emissions Reduction Annually from Landfills with AGCCS - in metric tons/year CO <sub>2</sub> e	% reduction of Estimated CA Landfill Emissions relative to 2019 estimated baseline
2024	3%	163,400	2%
2025	6%	245,100	3%
<b>2026</b>	9%	408,500	5%
2027	12%	571,900	7%
2028	15%	653,600	8%
2029	18%	817,000	10%
<b>2030</b>	<b>21%</b>	<b>898,700</b>	<b>11%</b>
2031	25%	1,143,800	14%
2032	30%	1,307,200	16%
2033	35%	1,552,300	19%
2034	40%	1,797,400	22%
<b>2035</b>	<b>45%</b>	<b>2,042,500</b>	<b>25%</b>

### Status of Future California Landfill Methane Regulations

Approximately one year ago, on May 18, 2023, CARB held an informal workshop entitled Public Workshop on Potential Improvements to the Landfill Methane Regulation with stakeholders to inform the development of future landfill methane regulations.<sup>4</sup> Since that time, there has not been another LMR workshop held or scheduled. It is anticipated that at some point in the future CARB may hold additional workshops and will subsequently proceed to develop the proposed regulations, and to prepare the necessary analyses that are necessary to support the review and approval of any future landfill methane regulations. At this time, it is

uncertain when the public workshop process will complete, when the formal rulemaking process will begin, and when the future LMR will come into effect. As established by SB 1383, Health and Safety Code section 39730.6(b) provides that except as otherwise provided by this section and Public Resources Code section 42652.5, CARB “shall not adopt, prior to January 1, 2025, requirements to control methane emissions associated with the disposal of organic waste in landfills other than through landfill methane emissions control regulations.” SB 1383 does not establish a date by which CARB must adopt more stringent LFG regulations. During this period of regulatory uncertainty, most landfill operators can reasonably be expected to defer investments in enhanced landfill methane collection systems until the program specifics are conclusively determined by CARB and approved by the Governing Board.

<sup>4</sup> CARB, “Landfill Methane Regulation Meetings & Workshops,” at <https://ww2.arb.ca.gov/ourwork/programs/landfill-methane-regulation/meetings>

### A Simple LCFS Program Amendment Will Speed Deployment of Enhanced Landfill Methane Collection Systems

In the interim period before more stringent regulations are established, the LCFS program does provide a market signal to incentivize the deployment of enhanced landfill methane collection systems even before the landfill methane regulations are proposed to the Governing Board, and likely years before future regulatory mandates will require large-scale deployment of Advanced LFG Control Systems. Unfortunately, due to the nature of LCFS program crediting, the possibility of future mandated installation of Advanced LFG Control Systems is likely to undercut that LCFS market signal. Specifically, the LCFS program structure provides incentives for reductions to the carbon intensity (“CI”) of transportation fuels based on a California regulatory baseline. In other words, while the use of RNG or electricity derived from nonmandatory methane capture would provide a recognizable CI reduction under the LCFS, the capture and use of the same RNG or electricity from mandated methane capture would not. Thus a landfill owner or operator that installs an enhanced landfill methane collection system in the near-term faces uncertainty regarding two critical investment decisions: 1) whether the Advanced LFG Control System or other system will meet the future LMR requirements that CARB has not yet established and 2) uncertainty regarding for how many years an early adopter facility will generate LCFS credits.

This hurdle could be overcome by the establishment of a safe-harbor LCFS crediting provisions for Enhanced Landfill Methane Collection Systems. This approach is consistent with the existing language of SB 1383 for the dairy and swine manure pathways and for qualified organics diversion. For these types of pathways, LCFS crediting is protected for a 10-year period by §95488.9(f)(3) even if CARB approves mandated methane control in the dairy sector or diversion of organic material from landfill disposal.<sup>5</sup> To the extent that CARB seeks to extend comparable treatment for landfill gas, §95488.9(f) of the LCFS could be amended to establish a 10-year crediting period for projects that capture biomethane that would otherwise be released to the atmosphere from the landfill and that commence prior to the establishment of any law, regulation, or legally binding mandate. Proposed regulatory changes to implement this proposal are included in attached Exhibit A.

<sup>5</sup> See LCFS Regulation entitled “Special Circumstances for Fuel Pathway Applications at §95488.9(f)(3) that provides for 10-year crediting periods for avoided methane emissions for dairy and swine manure pathways and for landfill-diversion pathways.

...

## **Exhibit A**

Section 95488.9(f) as proposed in rulemaking, proposed new language in black underline, proposed new Loci language in red underline/strike-out:

(f) *Carbon Intensities that Reflect Avoided Methane Emissions from Dairy and Swine Manure, or Organic Waste Diverted from Landfill Disposal, or Enhanced Landfill Methane Collection Systems.*

- (1) A fuel pathway that utilizes biomethane from dairy cattle or swine manure digestion may be certified with a CI that reflects the reduction of greenhouse gas emissions achieved by the voluntary capture of methane, provided that:
  - (A) A biogas control system, or digester, is used to capture biomethane from manure management on dairy cattle and swine farms that would otherwise be vented to the atmosphere as a result of livestock operations from those farms.
  - (B) The baseline quantity of avoided methane reflected in the CI calculation is additional to any legal requirement for the capture and destruction of biomethane.
- (2) A fuel pathway that utilizes an organic material may be certified with a CI that reflects the reduction of greenhouse gas emissions achieved by the voluntary diversion from decomposition in a landfill and the associated fugitive methane emissions, provided that:
  - (A) The organic material that is used as a feedstock would otherwise have been disposed of by landfilling, and the diversion is additional to any legal requirement for the diversion of organics from landfill disposal.
  - (B) Any degradable carbon that is not converted to fuel is subsequently treated in an aerobic system or otherwise is prevented from release as fugitive methane. Upon request, the applicant must demonstrate that emissions are not significant beyond the system boundary of the fuel pathway.
  - (C) The baseline quantity of avoided methane reflected in the CI calculation is additional to any legal requirement for the avoidance or capture and destruction of biomethane.
- (3) A fuel pathway that utilizes enhanced landfill methane collection systems may be certified with a CI that reflects the reduction of greenhouse gas emissions achieved by the voluntary capture of methane provided that:
  - (A) The enhanced landfill methane collection system is additional to any legal requirement for the capture of methane from landfills.
  - (B) Any degradable carbon that is not converted to fuel is prevented from release as fugitive methane. Upon request, the applicant must demonstrate that emissions are not significant beyond the system boundary of the fuel pathway.
  - (C) The baseline quantity of avoided methane reflected in the CI calculation is additional to any legal requirement for the avoidance or capture and destruction of biomethane.
- (4) Carbon intensities that reflect avoided methane emissions from dairy and swine manure or organic waste projects are subject to the following requirements for credit generation:
  - (A) *Crediting Periods.* Avoided methane crediting for dairy and swine manure pathways as described in (f)(1) above, for landfill- diversion pathways as described in (f)(2) above, and for enhanced landfill methane collection as described in (f)(3) above is

limited to three 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 LRT.CBTS. The Executive Officer may renew crediting periods for fuel pathways certified before January 1, 2030, for up to three consecutive 10-year crediting periods. 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 that break ground after December 31, 2029, the Executive Officer may only approve avoided methane crediting through December 31, 2045.

- (B) Notwithstanding (A) above, 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, or enhanced landfill methane collection 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. The project may not request any subsequent crediting periods.
- (C) Notwithstanding (A) above, projects that have generated CARB Compliance Offset Credits under the market-based compliance mechanism set forth in title 17, California Code of Regulations Chapter 1, Subchapter 10, article 5 (commencing with section 95800) may apply to receive credits under the LCFS. However, the LCFS crediting period for such projects is aligned with the crediting period for Compliance Offset Credits, and does not reset when the project is certified under the LCFS. (Apr-174.1)

**Comment:** A fixed-year phase-out of avoided methane crediting—as included in the Proposed Rule—is bad public policy. **Removing a “carrot” to reduce methane from dairies is unwise unless and until a “stick” has been developed.** Any mandatory rule must be able to meet the requirements of state law. If CARB wishes to continue to promote private investment in dairy RNG projects, any switch from incentives to direct requirements to install methane control systems must be more carefully managed. The current uncertainty over which regulatory tool will be used is preventing methane reduction projects from being built. (Apr-180.8)

**Comment:** 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. (15d1-017.1)

**Comment:** 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 digester 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.<sup>4</sup>

<sup>4</sup> 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>

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.

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. (15d1-052.4)

**Comment:** 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. (15d1-062.2)

**Comment:** 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. (15d1-178.1)

**Comment:** 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. (15d1-186.4)  
**Comment:** 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. (15d1-212.6)

**Comment:** 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. (15d1-212.9)

**Comment: CARB SHOULD AVOID ARBITRARY SUNSETS TO AVOIDED METHANE CREDITING, INCLUDING RETROACTIVE REDUCTIONS TO AVOIDED METHANE CREDITING PERIODS**

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 proven way to support the development, ongoing operations, and associated emissions reductions that digesters provide.<sup>4</sup>)

<sup>4</sup> <https://onlinelibrary.wiley.com/doi/10.1111/gcbb.13101>

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. (15d1-212.14)

**Comment:** 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. (15d1-212.16)

**Comment:** 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. (15d1-220.6)

**Comment:** Anew climate appreciates CARB’s continued recognition that LCFS crediting does not incentivize increased farm sizes. 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.<sup>2</sup>

<sup>2</sup> 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](https://agdatanews.substack.com/p/are-manure-subsidies-causing-farmers?r=i2qe&utm_campaign=post&utm_medium=web)

(15d1-220.7)

**Comment:** 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. (15d1-220.8)

**Comment:** 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.

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 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.”<sup>3</sup> Without anaerobic digesters, California would not be able to meet its SB 1383 methane reduction goals.

<sup>3</sup> ISOR, p. 124

(15d1-220.10)

**Comment:** 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.”<sup>4</sup>

<sup>4</sup> Ibid.

(15d1-220.11)

**Comment:** 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. (15d1-220.12)

**Comment:** 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. (15d1-231.3)

**Comment:** 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. (15d1-234.2)

### **Comment: AVOIDED METHANE CREDITING IS CRITICAL TO ACHIEVING CALIFORNIA'S CLIMATE GOALS**

As detailed in our comments responding to the November 9, 2022, workshop,<sup>1</sup> dairy biogas projects are low cost in terms of greenhouse gas reductions, but high cost in terms of energy production. Based on cost curve estimates from UC Davis,<sup>2</sup> and updating for inflation, market progress to date, and additional cost drivers not included in their analysis, we estimated at the time that the cost required to increase dairy RNG production in California from the current location on the supply curve would have been \$121 per MM Btu. Today, after two years for high inflation and some continued progress up the supply curve, those costs have only increased. It is impractical to expect that energy markets alone will support continued investment in these dairy RNG projects at these prices.

<sup>1</sup> <https://www.arb.ca.gov/1ists/com-attach/125-lcfs-wksh-p-nov22-ws-VzZcN1EgAgSQOgh.r.pdf>

<sup>2</sup> <https://jste.ps.ucdavis.edu/wp-content/uploads/2017/05/2016-UCD-ITS-R-R-16-20.pdf>

Therefore, in order to sustain investment in these projects and progress toward California's statutory methane reduction goals, the greenhouse gas reductions (that is, avoided methane) from these projects need to be accounted for and valued. That's why the LCFS has succeeded in scaling dairy digester and RNG development, when other approaches have not-lifecycle accounting under the LCFS explicitly values avoided methane emissions, supporting low-cost climate mitigation where energy-only markets cannot.

**Continuing avoided methane crediting under the LCFS is absolutely critical to maintaining the viability of existing projects, and development of new ones.** 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 allows 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 proven way to support the development, ongoing operations, and associated emissions reductions that dairy digesters provide.<sup>3</sup>

<sup>3</sup> <https://onlinelibrary.wiley.com/doi/10.1111/gcbb.13101>

(15d2-172.1)

**Comment:** Remove the biomethane credit phaseouts. (15d2-190.2)

**Comment:** Phasing out RNG pathways is shortsighted and stymies the LCFS's effectiveness by removing a carbon-negative fuel source from the program. CARB argues for the phaseout because natural gas 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."<sup>5</sup> This type of reasoning is antithetical to the spirit of the LCFS program, which is to incentivize the increased use of low-carbon energy sources and spur innovation in the production of even lower carbon transportation fuels. According to the U.S. Department of Energy, since the beginning of the LCFS in 2011, natural gas fuel consumption in California's transportation jumped from approximately 211.5 million gasoline gallon equivalents (GGEs) in 2011 to 403.7 million GGEs in 2021.<sup>6</sup> If those gallons were replaced with carbon-negative RNG, it would accelerate the decarbonization of the transportation sector. Further, the availability of RNG pathways under the LCFS led to increased production of RNG. In fact, the potential of securing more LCFS credits was one of the factors that led Suburban Propane to invest in RNG. We created a new subsidiary, Suburban RNG, specifically to acquire assets and increase production of RNG.

<sup>5</sup> *Id.*

<sup>6</sup> See <https://afdc.energy.gov/states/ca>.

Phasing out these pathways removes a key low-carbon and carbon-negative energy source from the LCFS. We ask that CARB remove the RNG pathway phaseout provisions from the Modified Proposed Amendments and restore the three 10-year crediting periods for all RNG projects. (15d2-190.4)

**Comment:** Reversing crediting for avoided methane runs counter to the goals of the LCFS and could cause backsliding. (15d2-207.4)

**Comment:** Chevron objects to the changes to avoided methane crediting and imposed delivery requirements. According to the EPA, anaerobic digestion provides a demonstrated, significant reduction in greenhouse gas emissions that would otherwise be released to the atmosphere and is the best manure management practice available to mitigate methane<sup>10</sup>. Limiting incentives for biogas and renewable natural gas producers is inconsistent with the Subnational Methane Action Coalition's statement of purpose, the 2021 Global Methane Pledge, and threatens the additional 2.4 MMTCO<sub>2</sub>e reductions needed per SB 1383 and California's Greenhouse Gas and Short-Lived Climate Pollutant Policy framework<sup>11</sup>.

<sup>10</sup> Practices to Reduce Methane Emissions from Livestock Manure Management | US EPA

<sup>11</sup> Dairy Sector Workshop Presentation (ca.gov)

(15d2-207.21)

**Comment:** We also appreciate CARB's continued recognition that LCFS crediting does not incentivize increased farm sizes, and we urge the Board to stay the course towards realizing the full climate benefit of the substantial investments made to avoid methane emissions to date, providing investors with the clarity and confidence necessary for continued development. (15d2-212.6)

**Comment:** The technology-neutral and 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. These are foundational pillars of the program that cannot afford to be lost in future rulemakings. (15d2-256.1)

**Comment:** Newtrient did not support the phaseout of avoided methane emission crediting in the 45-day package, nor the modified language regarding the requirements for crediting periods in the first 15-day changes. The second 15-Day changes package adjusts these requirements to state that a project certified before the effective date of the regulation is allowed three consecutive 10-year crediting periods, and projects certified after the effective date of regulation or after January 1, 2030, will be limited to two consecutive 10-year crediting periods. As stated previously, Newtrient opposes any changes to the current system.

All the recommended proposals place dairy biomethane projects at a significant disadvantage, could potentially lead to shutdowns, and will certainly stifle investments in new projects going forward. 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.

Newtrient strongly believes that the proposed phaseout is inconsistent with the incentive-based approach outlined in SB 1383. 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 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.<sup>3</sup>

<sup>3</sup> 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>

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. 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 systems.

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. (15d2-260.3)

**Comment: RNG Utilization and Sustainability:** The proposed refinements to feedstock sustainability provisions and the continued support for RNG projects are commendable. By maintaining incentives for RNG, the amendments ensure that RNG remains a viable and attractive option for reducing carbon intensity in the transportation sector. As SDG&E previously noted, providing regulatory certainty for projects utilizing avoided methane crediting pathways is critical for maintaining the financial viability of existing projects.<sup>5</sup>

<sup>5</sup> See SoCalGas' and SDG&E's August 27, 2024, Comments on CARB's Proposed Amendments to the LCFS at: <https://www.arb.ca.gov/lists/com-attach/7573-lcfs2024-UyAHbgdlUGIGbFUy.pdf>.

(15d2-273.5)

**Comment:** One area where California Farm Bureau remains adamant is regarding the continuation of the crediting for avoided methane. Dairy families and dairy families have been doing their piece, thanks in part to state investment into proven technologies like digesters, and AMMP to reduce emissions of critically important methane. Not only are dairy families meeting emissions goals, but exceeding them. The data shows, and is backed up by CARB's CADD data, that dairies are already heavily regulated, and remain regulated in terms of air quality and water quality. A pending Water Board general order regarding dairies will continue this and ensure that dairies remain stewards of the land, their neighbors, and community members.

Time and time again, dairy families are on the receiving end of mistruths from activists. Backed up by independent data, academic research, and CARB's own data, dairies do not worsen air quality and digesters do not increase the growth of dairies.

We ask that CARB continue its incentive-based approach, for the sole fact that it is working. At this time, there is no need to regulate dairies and doing so will 1) hurt hardworking community members and dairy families who already struggle to make a living in California, and 2) cause leakage to other less regulated states of emissions by moving dairy herds out of state. We

appreciate the realization that regulating digester projects started prior to 2030 would be harmful to the market and reduce investment in future projects. (15d2-291.1)

**Comment:** BAC continues to have serious concerns about the phaseout of avoided methane credits... but we addressed those issues in our August 27 comments. (15d2-294.3)

**Comment:** We would like to reiterate our opposition to the phaseout of avoided methane emission crediting and reduction in crediting periods for biomethane projects. Changes to this system places these projects at a significant disadvantage, could potentially lead to shutdowns, and will certainly stifle investments in these -- as these new pro -- in these new projects going forward, undermining the key role that the agricultural community has been playing to meet California's GHG reduction targets.

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. It is scientifically proven that methane is 30 times more potent than CO2. California needs to ensure that their climate policies are adequately addressing short-lived climate pollutants and building on the beneficial results that the agricultural community is delivering. Scaling back successful programs will prevent us from meeting our GHG reduction targets. (BHT-58)

**Comment:** With respect to treatment of renewable natural gas and avoided methane crediting, we urge CARB to continue to remain true to the principles of fuel neutrality and to base LCFS crediting on science and carbon intensity scoring. In the future, we urge CARB to reconsider arbitrary end dates for avoided methane crediting, flow direction requirements for RNG delivery,... (BHT-164)

**Comment:** I think we were hoping that RNG avoided methane crediting can have another look, as we look to the next rulemaking. (BHT-174)

**Comment:** But I would just mind everyone that the dairy industry is on track to meet our goals, and they are lofty, and they should be, which -- and is something that we should be incredibly proud of. And we ought to be doubling down on our investment for avoided methane pathways, not limiting our options in this critical time. (BHT-216)

**Agency Response:** The Proposed Amendments to subsection 95488.9(f)(3) were modified in response to public comments to adjust the phase-out of LCFS crediting for fuel pathway carbon intensities that reflect avoided methane emissions from dairy and swine manure or organic waste projects as described in the response to the comments in section F-1.4 below. No other changes were made in response to the comments opposing this adjusted phase-out concept, which would end LCFS avoided methane crediting for biomethane used in CNG vehicles after December 31, 2040, and those for renewable hydrogen or electricity production after December 31, 2045, if the project broke ground after December 31, 2029. If the project broke ground before December 31, 2029, then there is no phase out of pathways reflect avoided methane emissions from dairy and swine manure or organic waste projects. This adjusted phase out structure encourages the replacement of fossil gas earlier, in order to spur needed near-term methane emissions reductions, as projects that break ground before 2030 may receive credits for longer.



While there is a role for biomethane in decarbonizing California's transportation sector (as a vehicle fuel in the near-term and particularly as a feedstock for renewable hydrogen production in the longer-term), biomethane use for vehicle fueling will decline as ZEVs penetrate the market, and should shift to other difficult to decarbonize sectors. Biomethane can play a key role in being a feedstock for renewable hydrogen and 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. The phase-out of LCFS avoided methane crediting for biomethane specified in the Proposed Amendments would continue to incentivize the methane reductions needed in the next decade, while aligning with the 2022 Scoping Plan Update in the medium and longer term to signal the decarbonization need to shift biomethane to the production of renewable hydrogen or for use in other sectors by 2045. In order to continue to reward early investments for voluntary emissions reductions and prevent backsliding, the Proposed Amendments also would not reduce the crediting periods for any projects certified before the effective date of the Regulation.

In response to the comment related to the crediting periods, please see Response Z-1.4 below.

#### **Z-1.4 Multiple Comments: *Crediting Periods***

**Comment:** Will the three ten-year crediting periods for avoided emissions crediting also extend to biomethane to electricity for EV charging pathways, or will they only apply to biomethane to CNG, LNG, and Hydrogen pathways? Certainty for these crediting periods is essential for the financeability of biomethane to electricity projects and the reduction of electricity CI for EV charging. (45d-049.4)

**Comment:** The following statement in the Proposed Regulation Order that describes the three ten-year crediting period suggests that a project needs to be certified by 2030 for it to be eligible: "The Executive Officer may renew crediting periods for fuel pathways certified before January 1, 2030, for up to three consecutive 10-year crediting periods."<sup>2</sup> However, this conflicts with statements later in that section and in other documents that suggest that the project must only have broken ground by 2030 to be eligible for the three ten-year crediting period. Could you please clarify the eligibility requirements?

<sup>2</sup> [https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/lcfs\\_appa1.pdf](https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/lcfs_appa1.pdf), Page 166

(45d-049.5)

**Comment Summary:** Remove the 10-year "grace period" for factory farm gas producers. (45d-027.4, 45d-30.3, 45d-184.4, 45d-208.6, 45d-230.3, 45d-339.3, 45d-381.3, 45d-398.3, 8608-8727.4, 8756-8763.4, Apr-077.6, 15d1-043.3)

**Comment:** CARB should ensure that the final rulemaking documents explicitly provide for the possibility of adjusting crediting periods for avoided methane if future research or data indicates that the LCFS is leading to negative climate consequences such as additional

methane emissions (e.g., from enteric or digestate management due to changes in farm management practices) or negative health consequences. (45d-206.4)

**Comment:** We strongly support the proposed amendment allowing projects that break ground by December 31, 2029 to preserve the current approach of book and claim and the full three, 10 year avoided methane crediting periods to continue to incentivize the growth of the biogas to RNG industry as an integral component of achieving CARB's goals. (45d-252.1)

**Comment:** 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. (15d1-041.5)

**Comment:** 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 MMTCO<sub>2</sub>e reductions needed per SB 1383 and California's Greenhouse Gas and Short-Lived Climate Pollutant Policy framework.<sup>7</sup>

<sup>7</sup> Dairy Sector Workshop Presentation (ca.gov)...

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. (15d1-042.7a)

**Comment: 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.** (15d1-045.5)

**Comment:** 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. (15d1-052.3)

**Comment: 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.”<sup>6</sup> 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.<sup>7</sup>

<sup>6</sup> California Air Resources Board, “Proposed Amendments to the Low Carbon Fuel Standard Initial Statement of Reasons,” Dec. 19, 2023, at page 124.

<sup>7</sup> 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.”<sup>8</sup> 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.”<sup>9</sup> 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.

<sup>8</sup> CARB, Notice of Public Availability of Modified Text and Availability of Additional Documents and/or Information Proposed Low Carbon Fuel Standard Amendments, at 12.

<sup>9</sup> *Id.*

(15d1-064.5)

**Comment: 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.** (15d1-066.7)

**Comment:** 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. (15d1-105.3)

**Comment:** 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. (15d1-106.2)

**Comment:** 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. (15d1-120.2)

**Comment:** 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.<sup>4</sup> 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 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.<sup>5</sup> However, even with this modification, factory farms would still be greatly incentivized to expand their herds and install digesters before December 31, 2029.

<sup>4</sup> ISOR, at 31.

<sup>5</sup> Notice of Additional Modifications, at 12.

(15d1-123.2)

**Comment:** At the same time, however, we strongly oppose proposed changes that: ... Eliminate credit for avoided methane emissions after 2040 even when those avoided emissions are not required by law.

...

**The Proposed Regulation Should Not Eliminate Credit for Avoided Emissions that are Not Required by Law.**

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 emissions<sup>3</sup> 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.

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. (15d1-136.5)

**Comment:** 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.

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. (15d1-144.6)

**Comment:** 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.

...

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. (15d1-147.1)

**Comment: Ongoing Crediting for Anaerobic Digester Projects Is Necessary to Meet the Statutory Requirements of SB 1383.**

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. (15d1-157.1)

**Comment: Two Crediting Periods Are Not Necessarily Sufficient to Justify Investments in Smaller Dairy Digester Projects.**

The notice explaining the changes to 17 CCR § 95488.9(f)(3)(A) concludes that two crediting periods would provide “sufficient return on investment.”<sup>2</sup> 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. (15d1-157.2)



**Comment:** Changes to RNG crediting should be reverted to the original 45-day proposal. (15d1-171.9)

**Comment: Proposed 15-Day Changes to RNG Crediting Should Be Reverted**

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. (15d1-171.30)

**Comment:** 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.

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. (15d1-183.3)

**Comment:** 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 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.<sup>4</sup> 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. (15d1-185.1b)

**Comment:** 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. (15d1-186.1)

**Comment:** 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.

...

### **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. (15d1-199.1)

**Comment:** As the Agency implements final changes to the rulemaking, we strongly encourage CARB to implement the following modifications:

...

- Reverse the elimination of the third avoided methane crediting period, (15d1-199.7)

**Comment: CARB Should Restore the Third 10-Year Crediting Period for the Avoided Emissions Credit.**

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 22<sup>nd</sup> 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. (15d1-206.3)

**Comment: 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. (15d1-209.6)

**Comment:** 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.<sup>5</sup> 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.

<sup>5</sup> 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).

(15d1-211.6)

**Comment:** 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:

*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. (15d1-212.15)

***Comment: We Oppose Any Arbitrary End Date for Avoided Methane Crediting and Oppose Reduction of Eligible Crediting Periods from Three to Two***

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. (15d1-220.9)

**Comment:** 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. (15d1-231.6b)

**Comment:** 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. (15d1-234.4)

**Comment:** 2) The proposed reduction in maximum avoided methane emissions crediting periods is premature and may harm the viability of existing projects; (15d1-237.2)

**Comment: The proposed reduction in maximum avoided methane emissions crediting periods is premature and may harm the viability of existing projects.**

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.<sup>5</sup>

<sup>5</sup> 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](https://ww2.arb.ca.gov/system/files/webform/public_comments/4026/230614%20Dairy%20Cares%20Comments%20on%20LCFS%20Virtual%20Community%20Meetings%20%2800607595xBA8E1%29.pdf)

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.<sup>6</sup> 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.

<sup>6</sup> <https://ww2.arb.ca.gov/sites/default/files/2020-11/dsg2-final-recs-112618.pdf>

(15d1-237.9)

**Comment: 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 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. (15d1-241.4)

**Comment: 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. (15d1-249.3)

**Comment:** 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*

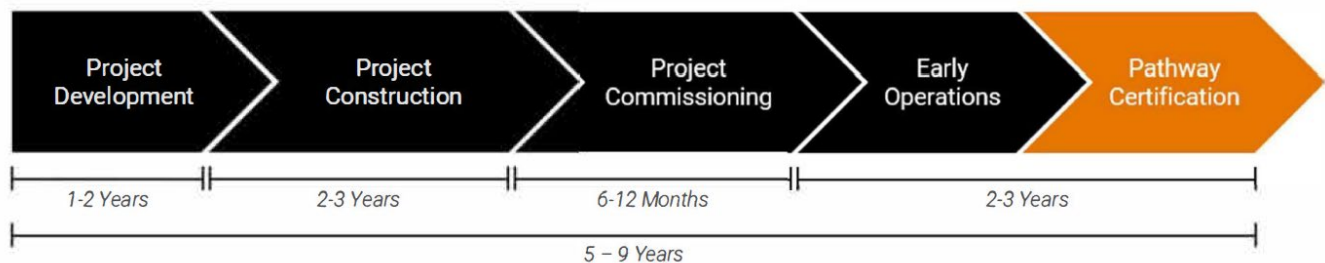
*emissions crediting periods to two, rather than three. This proposed change aligns more closely with the end-dates for avoided methane pathways that break ground after December 31, 2029, which was proposed in the Staff Report 3, while still providing an incentive to develop methane capture projects.”*

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. (15d1-252.4)

**Comment:** Include a Safe Harbor for Avoided Methane Crediting Periods

We commend CARB for considering market feedback and iterating on the proposal which would reduce the LCFS's recognition of the benefits of avoiding methane emissions. The new amendment to the proposal, retaining the existing rules on crediting periods for existing projects, demonstrates CARB's role as a steady partner for market participants. For infrastructure assets with useful lives of several decades, it is vital for investors and project developers to be able to rely on regulatory stability for existing projects if they are going to be able to invest in new projects across any technology. This response to market feedback helps to provide that level of trust.

The currently proposed rule rightly excludes retroactive changes to existing projects, but there remains a potential gap for projects already under development or in early operations which have not yet received pathway approvals. The timeline from project conception to achieving a certified pathway is often lengthy due to the time-consuming process of infrastructure development and construction, and due to the current backlog of pathway reviews at CARB. For many technologies, it is often 5 years or more from final investment decision to obtain a certified pathway; for large scale developments such as those for sustainable aviation fuel (“SAF”), the timeline can approach 10 years.



**We propose that CARB work with market participants to issue further guidance on the regulation to clarify that the rule allows for a safe harbor,** similar to what the Federal government has for years used for investment tax credits ("ITC") eligibility. This would provide much-needed stability and confidence for investors, who should not be forced to guess whether there will be policy changes during the 5-10 years between allocating capital to a project and the pathway being certified. To motivate capital towards the decarbonization of California's transportation sector, CARB can help remove financial friction through this clarification. (15d2-166.3)

**Comment:** Specifically, on biomethane we recommend removing the proposed changes to subsection 95488.9(f)(3) (A) and (B) that extend crediting periods for avoided methane and introduce a last-minute grandfathering provision for manure digester projects that break ground before 2030. (15d2-168.1)

**Comment:** We strongly oppose the proposed changes to subsection 95488.9(f)(3) (A) and (B) that extend crediting periods for avoided methane and introduce a last-minute grandfathering provision for manure digester projects that break ground before 2030. The new language in both subsections should be rejected. The changes to 95488.9(f)(3) (A) would extend crediting periods far longer than is economically justified, and constitutes an excessive subsidy for dairies paid for by drivers. The changes to 95488.9(f)(3) (B) preempt a forthcoming rulemaking and allow credits for avoided methane pollution to continue for decades after the underlying regulatory structure that justifies crediting avoided methane emissions has changed. The existing rules provide for one 10-year period, which is sufficient to provide regulatory certainty and cover the costs of the digester. It is time to phase it out and hold dairies responsible to mitigate their own pollution with the same support available to other LCFS pathways.

The recent analysis of Professor Aaron Smith makes it clear that “after the initial 10-year crediting period, there is little economic justification to continue these credits [for avoided methane emissions]”<sup>1</sup>.

<sup>1</sup> <https://ljenergyathaas.wordpress.com/2024/10/14/how-much-should-dairy-farms-get-paid-for-trappingmethane/>

*After the first 10 years, once capital costs have been paid, there is little economic justification for digesters to receive prevented methane LCFS credits. At current prices, credits from the RFS, plus the component of the LCFS credit stemming from fuel combustion, are more than sufficient to cover costs. This statement is particularly pertinent for the two thirds of digester credits generated outside the state. The federal program is providing enough to keep these digesters running; California drivers are effectively donating additional dollars.*

One result of extending these subsidies will be that economic distortions caused by LCFS subsidies for digesters in milk and meat markets across the United States will persist until almost 2050, and in some cases longer. CARB has responded to this concern with the claim that there is not clear evidence that LCFS subsidies have already led to measurable changes in herd size at dairies with digesters. While we agree that LCFS subsidies are not the only factor responsible for dairy consolidation, extending these excessive subsidies after the capital costs of the digesters have been recouped would provide windfall profits that tilt the playing field in favor of the largest dairies. This is not necessary or justified to meet California's dairy methane reduction targets.

CARB initially justified these subsidies because California dairies were not otherwise required to mitigate their own methane pollution. As we have discussed in previous comments, it is essential that CARB initiates a rulemaking process outside of the LCFS to directly regulate dairy methane emissions as soon as possible. The last-minute addition of this consequential grandfathering provision in the LCFS amendment inappropriately preempts the discussion of how best to structure regulations on dairies by shielding a large number of potentially regulated parties from the impact of the regulation before that important regulatory process has even



started. The grandfathering provision also locks in this lavish subsidy for many years after the technical justification has ended. This means that a substantial share of the credits issued by the LCFS will not reflect real emissions reductions based on up-to-date lifecycle analysis.

Using the LCFS to support digesters means that California drivers end up covering the costs of the subsidies for digesters, and not just in California but across the United States. Providing a single 10-year crediting period in which digester projects are credited with avoided methane emissions is already a generous approach, which covers the costs of investments required to comply with forthcoming regulations of dairies. After dairy regulations go into effect and the initial 10-year crediting period expires, dairies should be held accountable to mitigate their own pollution.

Winding down the counterproductive treatment of avoided methane pollution in an orderly way will help ensure that emissions benefits claimed by the LCFS are real and based on up-to-date lifecycle assessments. (15d2-168.3)

**Comment: CARB SHOULD CLARIFY THAT DAIRY AND SWINE MANURE AND ORGANIC WASTE DIVERTED FROM LANDFILL DISPOSAL PROJECTS UNDER DEVELOPMENT ARE ELIGIBLE FOR THREE CREDITING PERIODS FOR AVOIDED METHANE**

While we oppose any arbitrary sunseting of avoided methane crediting, especially before alternative mechanisms are in place to achieve similar climate benefits, we appreciate staff's ongoing efforts to strike a balance among stakeholder perspectives in the proposed amendments. In particular, we appreciate clarification in the Second 15-Day Changes that the change from three to two avoided methane crediting periods does not apply to existing projects, which aligns with clarifications we requested in response to the First 15-Day Changes and the principle that new rule changes shouldn't apply retroactively, especially in cases where those changes would upend the economics of projects already under development. Retroactive regulation will set a dangerous precedent that will chill appetite for investment broadly under the LCFS and other regulatory programs in support of state goals.

But there remains an important caveat worth clarifying - Amp had requested clarification that the proposed change in avoided methane crediting would not apply to existing projects *or those under development*.<sup>4</sup> Existing projects and those under development both were financed and developed based on the expectation of receiving three crediting periods, and CARB should avoid amendments that retroactively affect projects and investments previously made.

<sup>4</sup> [https://www.arb.ca.gov/lists/com-attach/7547-lcfs2024-UDFcN1\\_YnWFQLNcl.pdf](https://www.arb.ca.gov/lists/com-attach/7547-lcfs2024-UDFcN1_YnWFQLNcl.pdf)

The impact could be significant. Amp alone has hundreds of millions of dollars of projects under development that have yet to receive a pathway certification, but which were financed under the expectation of receiving three crediting periods for avoided methane. These projects alone are expected to deliver annual emissions reductions of about 250,000 MTCO<sub>2</sub>e. Across the industry, we expect the impact could be about ten times greater, likely reaching projects and investments totaling billions of dollars and millions of MTCO<sub>2</sub>e of annual emissions reductions. Many of these projects have submitted pathway applications to CARB that have been pending for well over a year, with unknown dates for when they'll be formally approved.

**Both existing projects, as well as those under development, should receive a safe harbor from regulatory changes that will affect the market moving forward. We hope**

**that CARB can clarify this through the Resolution, guidance or other means.**  
(15d2-172.2)

**Comment:** Board Members expressed a desire to see a more rigorous cap on lipid biofuels than staff proposed in the 1st 15-day Notice and a reevaluation of the duration of avoided methane crediting and deliverability requirements for RNG projects. CARB staff not only ignored this direction, but also reversed course by:... shielding digester projects from a potential future regulation by guaranteeing 30years of avoided methane credit for currently certified projects and 20 years for future projects that break ground prior to 2030. (15d2-183.2)

**Comment: The cutoff for avoided methane pathways to receive three crediting periods should be based on applications *submitted* prior to the effective date of the regulation, rather than those certified by that date.**

We propose a revision to the language in 95488.9(f)(3)(A):

*Avoided methane crediting for dairy and swine manure pathways as described in (f)(1) above, and for landfill-diversion pathways as described in (f)(2) above, **certified submitted** before the effective date of the regulation, is limited to three consecutive 10-year crediting periods, counting from the quarter following Executive Officer approval of the application. [...]*

CARB has a lengthy backlog of Tier 2 pathway applications, including some that have been sitting for 18 months or longer. The proposed change would not only ease the pressure on CARB staff to complete outstanding certification processes from its backlog while also finalizing this rulemaking, but would also be more fair for participants who have submitted or are working to prepare pathways to be able to take advantage of the full three crediting periods. (15d2-185.5)

**Comment:** To avoid stranding capital invested already in such projects and potentially cause shut downs of brand new under construction methane reducing projects due to insufficient methane crediting periods, which is clearly antithetical to the purposes of the LCFS, the revised language is not clear enough to address this issue. We would recommend changing the three-period crediting period eligibility to include projects like ours being built on the basis of 30 years of operating life by substituting “**under construction before the effective date**” rather than the 15 day amendment’s current “*certified before the effective date*” (15d2-188.4)

**Comment: CARB Should Not Adopt Changes to RNG Crediting Periods.**

CARB’s proposed updates to crediting periods for avoided methane crediting for dairy and swine manure pathways could unnecessarily delay crediting. As revised, § 95488.9(f)(3)(A) states that “Avoided methane crediting for dairy and swine manure pathways as described in (f)(1) above, and for landfill-diversion pathways as described in (f)(2) above, certified on or after the effective date of the regulation and before January 1, 2030, is limited to two consecutive 10-year crediting periods, counting from the quarter following Executive Officer approval of the application.” This language is unclear as to what “certified” refers to. Requiring a certified pathway could unreasonably delay crediting due to the historically lengthy process for CARB to certify pathways, which will harm project developers who made the early investment decisions several years prior on these important projects to address methane

emissions. Project developers may still be waiting on CARB to approve relevant pathways even if projects have begun construction. We urge CARB to use the date of the first pipeline injection to determine whether pathways are granted two or three consecutive 10-year crediting periods. (15d2-195.27)

**Comment:** The timeline for avoided methane crediting is troublesome, as reviews by CARB staff for Tier 2 pathways have been extensively delayed beyond the 6 months estimated in the regulation. By restricting the avoided methane crediting period to the arbitrary timeline of the “effective date of the regulation,” developers operating between the gap years of 2025 and 2030 will incur losses, discouraging investment. (15d2-207.22)

**Comment:** These comments express support for the changes to provide dairy biomethane projects with longer term certainty for investments in methane reduction measures. (15d2-210.1)

**Comment:** Revisions to Section 95488.9(f) of Title 17 of the California Code of Regulations would clarify that biomethane projects breaking ground prior to 2030 would be eligible to seek approval of an additional crediting period. Dairy Cares and the Ag Council appreciate and support this important clarification. As CARB recognized in its May 30, 2024 response to the March 1, 2024 *Petition for Rulemaking to Regulate Methane and Other Air Pollutants from California Livestock*, methane emissions must be further reduced, but CARB “must also follow the appropriate process before initiating a rulemaking pursuant to SB 1383, which requires more actions before regulations can be designed, adopted, and implemented.”<sup>3</sup> As explained in our prior comments in this rulemaking record, dairies are making substantial progress towards the Senate Bill 1383 targets, but will require long-term financial support to justify ongoing investments and continued operation of existing digesters to achieve these targets. The proposed revisions will help provide greater certainty for these important short-lived climate pollutant (“SLCP”) reduction efforts.

<sup>3</sup> See CARB Response to Petition for Rulemaking (May 2024), available at:

<https://ww2.arb.ca.gov/sites/default/files/2024-05/2024-05-30-CARB-CDFA-Response-to-Dairy-Rulemaking-Petition.pdf>.

(15d2-210.2)

**Comment:** We strongly urge CARB to refrain from imposing any arbitrary end-date for avoided methane crediting. We opposed the staff proposal in the first 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. In the second 15-Day Package, staff clarified that projects that are certified before the effective date of the proposed revisions would be eligible for three consecutive crediting periods. We oppose limiting eligibility to “certified” projects because it is not clear in this context what “certified” means, and this change could significantly impact existing projects. This is true especially for projects that have already been in operation for several years and which could unexpectedly have less than a full crediting period of eligibility remaining. This limitation would punish early-mover projects that originally operated in the voluntary market, making the continued operation of such projects highly uncertain and potentially leaving important methane abatement opportunities unrealized.

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 clarify how existing projects may benefit from three consecutive crediting periods during the implementation phase of the proposed LCFS revisions. (15d2-212.7)

**Comment:** Additionally, CalBio recognizes the modifications made to the regulatory text around avoided methane crediting periods which are important in helping sustain projects and allow them to continue providing benefits to the state. However, the modification to reduce the total number of crediting periods from three to two 10-year periods for projects which are not certified before the effective date of the regulation remains problematic. This clause potentially undermines many promising dairy digester projects that have already begun construction but may not have an opportunity to be certified in time. Investment was made in these projects under the prior rules of the program and deserve equal support and incentives, as they are critical to advancing California's clean energy transition and contribute significantly to the state's long-term climate. The regulation should have been written to more broadly include projects that have commenced construction, ensuring that they are not unfairly excluded from the program. (15d2-215.3)

**Comment: Avoided Methane Crediting Remains a Key Policy for Enabling RNG Projects and Maximizing GHG Capture**

The first 15-Day package proposed instituting limits on the crediting period for avoided methane emissions projects to two consecutive 10-year crediting periods instead of three for projects breaking ground before January 1, 2030. The second 15-Day package adjusted these requirements to state that a project certified before the regulation's effective date is allowed three consecutive 10-year crediting periods, and projects certified after the regulation's effective date or after January 1, 2030, will be limited to two consecutive 10-year crediting periods. DTE maintains its strong disapproval of the proposed reduction in crediting periods and does not believe that CARB has demonstrated a rationale for changing this fundamental policy for driving methane capture.

Avoided methane crediting is essential for covering the operating expenses in many existing agricultural and organic waste diversion projects, where commercial viability relies on CI scores from avoided methane. Reducing the crediting periods shortens the available timeframe for recovering capital costs and justifying investments. 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 credit period. (15d2-224.3)

**Comment: Gevo Supports CARB's Proposal to Retain Three Ten-Year Crediting Periods for Early Adopters and Urges CARB to Eschew Crediting Time Limits for All Avoided Methane Projects (Section 95488.9(f)(3)(A))**

In the Second 15-Day Notice, CARB has withdrawn its proposal from the first 15-Day Notice that would have reduced 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, proposing instead in Section 95488.9(f)(3)(A) to retain the three 10-year periods in the original LCFS proposal. Gevo supports CARB's proposal to revert back

to three 10-year crediting periods for these projects, though, as we have previously commented, we believe that the inclusion of any crediting limit (whether for pre-2030 projects or those that commence in 2030 or later) unnecessarily stifles investment in these important projects and limits the climate benefit avoided methane projects can bring.

As we noted in our previous comments, 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.”<sup>4</sup> 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.<sup>5</sup>

<sup>4</sup> California Air Resources Board, “Proposed Amendments to the Low Carbon Fuel Standard Initial Statement of Reasons,” Dec. 19, 2023, at page 124.

<sup>5</sup> 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 previous comments, 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 would not only inhibit initial investment but also would threaten the viability of continuing methane avoidance operations over time. By restoring the crediting period for pre-2030 biomethane projects to three 10-year periods, these avoided methane projects will be able to bring needed climate benefits for longer.

While supporting the provision in the Second 15-Day Notice for pre-2030 avoided methane projects, Gevo continues to question why CARB would limit these pre-2030 projects to only three crediting periods and we urge CARB to decline to place crediting time limits on any avoided methane projects. (15d2-226.3)

**Comment:** CARB’s proposal to lock-in avoided methane crediting for 20 years beyond the end of the crediting period in which binding methane regulations take effect does not appear to support the implementation of alternative manure management strategies as an SLCP reduction strategy. It instead exacerbates existing problems with LCA accounting at livestock digesters with contested localized environmental benefits. (15d2-237.11)

**Comment:** The ABC, however, does not support the phaseout of avoided methane emission crediting in the 45-day package, nor the modified language regarding the requirements for crediting periods in the second 15-day changes. The second 15-Day changes package adjusts these requirements to state that a project certified before the effective date of the regulation is allowed three consecutive 10-year crediting periods, and projects certified after the effective date of regulation or after January 1, 2030, will be limited to two consecutive 10-year crediting periods. The ABC believes that CARB should honor the dairy biomethane projects developed

under the previous rules, specifically those that have received a temporary CI score before the new amendments go into effect, and allow these projects to be eligible for three consecutive 10-year crediting periods. There are two years of operating projects set to come online that were developed with the assumption that they were eligible for three consecutive 10-year crediting periods but will now be forced to have two consecutive 10-year crediting periods due to CARB's long wait times for project certifications. As stated in our August 27, 2024, comment letter, any changes to this system places these projects at a significant disadvantage, could potentially lead to shutdowns, and will certainly stifle investments in new projects going forward.<sup>3</sup> 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.

<sup>3</sup> American Biogas Council Comments on the first 15-Day Changes Amendments to the Low Carbon Fuel Standard. August 27, 2024. <https://www.arb.ca.gov/lists/com-attach/7513-lcfs2024-ADIGNFdmVzwGMgl1.pdf>

(15d2-256.5)

**Comment:** We appreciate CARB proposing to provide three (3) AMC crediting periods to legacy projects ("grandfathered") certified prior to the adoption of the new regulation. This protects project investments made previously under the program that have seen project returns rapidly deteriorate under the current LCFS market environment, but we must also recognize that new projects need extended AMC length if they are going to be successful.

**PROPOSED AMENDMENT:** The AMC should not be limited to two consecutive 10-year crediting periods for new projects built between 2025-2029. This action may inadvertently stunt new dairy project investments that California needs to meet its SB 1383 goals. Most dairy projects require long-term agreements with farmers and front-end manure management programs/infrastructure projects to be built at the dairy. AMC crediting is essential to all of this, so reducing the crediting opportunity by one (1) period (10 years) changes the investment criteria, especially at smaller dairies. Unmitigated dairy emissions are one of the largest sources of methane emissions in the state, so removing the AMC tool used to combat these emissions may materially impact the market, especially amongst the smaller dairy facilities. Reducing AMC crediting periods is counterproductive to our climate goals, and therefore, we urge CARB to retain the three (3) crediting periods for projects pre- and post-certification of the regulation. (15d2-266.3)

**Comment:** Second, we remain disappointed by the proposal to reduce the avoided methane crediting periods from three to two for RNG projects built after January 1, 2030. This policy will pose significant challenges for agricultural waste diversion projects that rely on LCFS revenue to justify investments. The methane avoidance components of carbon intensity (CI) scores are crucial and removing recognition of these benefits, without a replacement policy, will undermine the viability of associated projects. Reducing incentives during the critical 2025–2030 period also contradicts CARB's goals and statutory guidance, as it forces RNG projects to rely on much higher LCFS prices to recover capital costs over 20 instead of 30 years. At lower prices, LCFS revenue may not cover operating costs, and even if prices rebound, fewer projects will remain viable under this new scheme. (15d2-267.3)

**Comment:** Further, complex triggers on RNG deliverability rules and timing for reduced recognition for avoided methane crediting remain unclear. These arbitrary decisions have

ensured there will be fewer RNG projects motivated by the LCFS and have limited how the RNG industry can contribute to California's methane reduction goals. (15d2-269.4)

**Comment:** *Shift in Crediting Periods Allowed for Avoided Methane Needs More Clarification*

We remain disappointed that CARB plans to reduce the total number of crediting periods for avoided methane emissions for RNG projects 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, and recognition for this GHG benefit should not simply be ignored (as we've stated in prior comments, such credit should be given unless and until a replacement policy is put in place).

Providing *less* incentive to develop methane capture projects during the critical period between 2025 and 2030 seems counter to statutory direction and CARB's own goals. Attempting to recover capital costs over 20 years will mean that RNG projects built between 2025 and 2030 will need much higher LCFS prices, all else equal, than they would if they receive a full 30 years of avoided methane crediting. At low prices, LCFS revenue (with avoided methane recognition) cannot even cover operating costs in some cases. Even if LCFS prices recover more quickly, as suggested by the scenarios in Attachment C to the First 15-Day Package, fewer RNG projects will be viable because of this proposed change.

Further, while the Second 15-Day Package attempts to clarify when this transition from three to two periods occurs, it fails to fully alleviate concerns that existing projects will unintentionally be impacted. We request additional guidance from CARB on this topic. Taking away crediting periods from projects that are already built is classic change-in-law risk (colloquially called "stroke-of-the-pen" risk when government acts in an arbitrary fashion) a concept we warned against in detail in our informal workshop comments back on December 21, 2022.<sup>7</sup>

<sup>7</sup> <https://www.arb.ca.gov/lists/com-attach/74-lcfs-wkshp-nov22-ws-U2FSZINjWThWYgMy.pdf>

For the initial years of the LCFS, prospective low carbon fuel producers included anticipated credit revenue in financial models and the investors would ignore or heavily discount the LCFS line item, due to perceived change-in-law risk. CARB should be motivated to do all it can to avoid this prior paradigm of market distrust. Unfortunately, this rulemaking has instead reignited these fears and soured many clean tech investors on the program. (15d2-269.9)

**Comment:** 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 calculations is consistent with internationally recognized standards of carbon accounting. The Second 15-Day package proposes that a project certified before the effective date of the regulation are limited to three consecutive 10-year crediting periods, and projects certified after the effective date of regulation but before January 1, 2030, will be limited to two consecutive 10-year crediting periods.

As stated in our August 27, 2024, comment letter, 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. 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. Maintaining the original structure of three crediting periods would provide the necessary support to ensure the long term viability of these projects while more accurately representing their life-of-project contributions to reducing greenhouse gas emissions. (15d2-278.5)

**Comment:** Avoided methane crediting is crucial to finance the initial capital costs of methane capture projects and keep those efforts economically viable.<sup>1</sup> Limiting avoided methane credits would financially undermine existing methane capture projects and discourage new ones. Methane capture projects provide some of the most cost-effective investments the state is making in carbon reductions.<sup>2</sup> The improved timelines on the avoided methane pathway help make sure that renewable natural gas remains a viable and attractive option for reducing carbon intensity in the transportation sector.

<sup>1</sup> 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](https://ww2.arb.ca.gov/system/files/webform/public_comments/4026/230614%20Dairy%20Cares%20Comments%20on%20LCFS%20Virtual%20Community%20Meetings%20%2800607595xBA8E1%29.pdf)

<sup>2</sup> CARB, California Climate Investments 2022 Mid-Year Data Update, September 2022, indicates that investments in dairy digesters and diverted organic waste cut carbon emissions by approximately \$9 and \$10 per ton, respectively. CARB's 2021 Annual Report on Climate Investments also showed that investments in organic waste to energy were the most cost-effective of the State's climate investments: at 119

(15d2-279.1)

**Comment:** The 2nd 15 day package proposed changes to § 95488.9 (f) (3) that would limit the number of recertifications specified RNG projects that use dairy or swine manure as feedstock can be credited for, and also that project that break ground in 2030 or later shall only receive avoided methane credits for the duration of their current pathway certification at the time. We note that the language in § 95488.9 (f) (3) (A) is articulated as a maximum limit on the number of recertifications, not a requirement that each pathway be offered recertifications up to that limit.

The life cycle analysis underpinning LCFS credit quantification requires certain analytical assumptions or parameter determinations to be made, either explicitly or implicitly. Additionality is one of the most important and complex of these. Best practices throughout scientific literature on LCA, especially when it is utilized as part of regulatory or incentive programs such as the LCFS, emphasize the need to ensure that actions or production being credited are additional to what otherwise would have happened in the absence of the regulatory or incentive. In the LCFS context, this means that only actions that would not otherwise have occurred without the LCFS should be considered for CI determination and subsequent crediting. The LCFS has established a clear and transparent standard that actions required by law or regulation should not be credited or used to reduce the CI of certified fuel pathways because they are non-additional. This is to say, one cannot receive LCFS credit for actions taken to comply with applicable laws. Allowing previously certified pathways to remain valid through their expiration, even if they include credits or consideration of actions rendered



non-additional by new law or code adopted after their certification deviates from both sound science and precedents repeatedly established under the LCFS. In some cases, this deviation is justified if necessary to maintain market confidence in the validity of LCFS incentives as a guide for investment.

The proposed changes to § 95488.9 (f) (3) (B) however, create a categorical exemption for projects that break ground in 2029 or before, allowing them to be recertified with avoided methane credits, even if such credits would be clearly non-additional at the time of recertification. This exemption breaks with well-accepted principles of life cycle analysis as well as past precedent under the LCFS. There can be a valid rationale to extend avoided methane crediting beyond what a typical interpretation of additionality would suggest, e.g. if the capital cost of a digester has not been fully repaid by the end of a crediting period. This exemption may be more common in early digester projects - which may be more expensive than later ones due to their reliance on less mature technology and supply chains. The proposed provision, however, essentially assumes that this is the case without requiring project operators to provide evidence. The proposed language in the 2nd 15 day period does not attempt to ascertain whether such exemptions are necessary, cost-effective, nor how long the crediting of non-additional emissions benefits must continue to repay the project's capital, and instead allows recertification of additional 10-year crediting periods for all pre-2030 digester projects.

Accurate assessment of GHG impacts, underpinned by a clear and accurate assessment of additionality is essential for the success of the LCFS. Crediting non-additional emissions benefits increases costs borne by gasoline and diesel consumers without providing commensurate emissions benefits. If and when the LCFS breaks from common and well-supported practices around additionality assessment, these exceptions should be as narrow as possible, to preserve the LCFS' basis in sound science. Limiting the duration of recertification with avoided methane credits to better match the actual needs of specified projects would better align the LCFS with the consensus in the life cycle assessment literature. (15d2-287.8)

**Comment:** The regulations should clarify that projects previously generating California Carbon Offsets should be automatically eligible for three crediting periods. (15d2-290.6)

**Comment:** *Crediting Periods Allowed for Avoided Methane Needs More Clarification*

SkyNRG is disappointed that CARB plans to reduce the total number of crediting periods for avoided methane emissions for RNG projects built after January 1, 2030, from three to two. This is a very problematic change as both agricultural and organic waste diversion projects are heavily dependent on the LCFS for viability.

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. Recognition for this GHG benefit should not simply be ignored particularly when no replacement policy is in place. As noted in

previous comments, is unwise and risky to impose an arbitrary phase-out of avoided methane crediting without a detailed plan for developing a supporting replacement policy.

If there are to be limits on credits from the use of avoided methane, the longest possible phase-out period is preferred. 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.<sup>2</sup>

<sup>2</sup> 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](https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/lcfs_meetings/LCFSpresentation_02222023.pdf)

(15d2-302.2)

**Comment:** The recent analysis of Professor Aaron Smith makes it clear that “after the initial 10-year crediting period, there is little economic justification to continue these credits [for avoided methane emissions]”<sup>1</sup>.

<sup>1</sup> <https://energyathaas.wordpress.com/2024/10/14/how-much-should-dairy-farms-get-paid-for-trapping-methane/>

After the first 10 years, once capital costs have been paid, there is little economic justification for digesters to receive prevented methane LCFS credits. At current prices, credits from the RFS, plus the component of the LCFS credit stemming from fuel combustion, are more than sufficient to cover costs. This statement is particularly pertinent for the two thirds of digester credits generated outside the state. The federal program is providing enough to keep these digesters running; California drivers are effectively donating additional dollars.

One result of extending these subsidies will be that economic distortions caused by LCFS subsidies for digesters in milk and meat markets across the United States will persist until almost 2050, and in some cases longer. CARB has responded to this concern with the claim that there is not clear evidence that LCFS subsidies have already led to measurable changes in herd size at dairies with digesters. While we agree that LCFS subsidies are not the only factor responsible for dairy consolidation, extending these excessive subsidies after the capital costs of the digesters have been recouped would provide windfall profits that tilt the playing field in favor of the largest dairies. This is not necessary or justified to meet California's dairy methane reduction targets.

CARB initially justified these subsidies because California dairies were not otherwise required to mitigate their own methane pollution. As we have discussed in previous comments, it is essential that CARB initiates a rulemaking process outside of the LCFS to directly regulate dairy methane emissions as soon as possible. The last-minute addition of this consequential grandfathering provision in the LCFS amendment inappropriately preempts the discussion of how best to structure regulations on dairies by shielding a large number of potentially regulated parties from the impact of the regulation before that important regulatory process has even started. The grandfathering provision also locks in this lavish subsidy for many years after the technical justification has ended. This means that a substantial share of the credits issued by the LCFS will not reflect real emissions reductions based on up-to-date lifecycle analysis.

Using the LCFS to support digesters means that California drivers end up covering the costs of the subsidies for digesters, and not just in California but across the United States. Providing a single 10-year crediting period in which digester projects are credited with avoided methane

emissions is already a generous approach, which covers the costs of investments required to comply with forthcoming regulations of dairies. After dairy regulations go into effect and the initial 10-year crediting period expires, dairies should be held accountable to mitigate their own pollution.

Winding down the counterproductive treatment of avoided methane pollution in an orderly way will help ensure that emissions benefits claimed by the LCFS are real and based on up-to-date lifecycle assessments. (BH-025.7)

**Agency Response:** Staff proposed refinements to the initial proposal's approach to avoided methane crediting periods to support the stated goals of the rulemaking and in response to public comments. Those refinements, described below, are designed to strengthen the proposal's support for the stated policy objectives of the amendments to incentivize near-term methane reductions, and a transition of biomethane primarily to non-transportation uses by 2045. For more detail on the policy supporting the phase-out of LCFS crediting for the use of fuels derived from biomethane in transportation, please see Response Z-1.3 above.

In the first 15-day package, staff proposed to reduce the total number of potential crediting periods for avoided methane emissions for projects breaking ground between the effective date of the proposed amendments and before January 1, 2030, from three to two. The proposed amendments to subsection 95488.9(f)(3)(A) specify that "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." This proposal to reduce crediting periods from three to two aligns more closely with the proposed end-dates for avoided methane crediting for projects that break ground after December 31, 2029, while still providing an incentive to develop methane capture projects.

The first 15-day proposal also proposed to reduce eligibility for all avoided methane crediting from three to two crediting periods. In the second 15-day proposal, in response to public comments, staff proposed to revert to the general approach in the current regulation, and initial amendment proposal for projects with pathways certified before the effective date of the regulation of allowing up to three consecutive 10-year crediting periods. Certification of a temporary fuel pathway before the effective date would qualify that applicant for the three crediting periods. Thus, the final proposal retains the approach to crediting periods described under the current regulation for existing projects, while providing long-term policy clarity to spur near term development of methane reduction projects developed between the effective date of the amendments and January 1, 2030.

#### **Z-1.5 Multiple Comments: *Regulate Dairy Methane Emissions Directly with a Separate Regulation***

**Comment:** Be it further resolved that the EJAC recommends that CARB immediately initiate formal rulemaking for the regulation of livestock methane pursuant to Health and Safety Code section 39730.7(b). (45d-001.11)

**Comment:** CARB should regulate methane emissions from large dairies.

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. (45d-101.9, Apr-039.9, 15d1-177.6)

**Comment:** Third, direct staff to immediately begin a rulemaking for dairy methane. Avoided methane crediting for dairies is unique under the LCFS. No other industry is treated as if their methane pollution is naturally part of the baseline and then lavished with large financial incentives for simply reducing their own pollution.<sup>3</sup> Oil companies are not awarded large LCFS incentives for avoiding methane emissions at oil fields and refineries. Instead, they are regulated and penalized for their emissions. Likewise, landfill operators are not awarded large, avoided methane incentive for capturing methane escaping from landfills, rather they are regulated and required to do so. Excessively rewarding an industry for poor historic environmental performance is troubling in the least and furthermore, doing so only through a transportation fuels program distorts the market against the consideration of less costly and more sustainable methane mitigation options. Every effort should be made to regulate methane emissions from the dairy industry and limit any subsidies to the bare minimum necessary to resolve the problem. As it is, avoided methane crediting for dairies acts as an LCFS offset program, allowing oil companies to generate or purchase large amounts of credits while displacing very little or no fossil fuel.<sup>4</sup> It is no wonder that oil companies are investing heavily in dairy digesters, as it allows them to comply with the LCFS, make a profit doing so, and retain their market share for fossil fuels.

<sup>3</sup> At an LCFS credit price of \$200, dairy digester gas generates approximately \$80 per MMBtu in value from the LCFS and currently receives about \$40 per MMBtu in value from the federal Renewable Fuel Standard. The commodity price for natural gas is approximately \$5 per MMBtu.

<sup>4</sup> Much of the current dairy gas is not displacing fossil fuel, but rather displacing landfill gas.

(45d-154.3)

**Comment:** CARB and other state agencies must regulate livestock methane starting in 2024 instead of relying solely on incentives to yield dairy methane reductions, and do so in a manner that advances co-equal benefits to local air and water quality, odor, and community well-being. (45d-200.2)

**Comment:** Regulate dairies to limit methane instead of producing factory farm gas that benefits oil and gas companies and artificially delays progress to zero emission transportation. (45d-200.6)

**Comment:** The SB 1383 moratorium on regulation expires in 2024, and as the Scoping Plan is a five-year plan, it must include a plan to begin regulating emissions from dairies in 2024. In the alternative, direct the upcoming LCFS rulemaking to address these issues, and pause certification of LCFS pathway applications that include these polluting fuels until the completion of the 2024/2025 rulemaking. (45d-200.7)

**Comment:** The California Legislature gave CARB the authority to start regulating dairy pollution in 2024, and CARB should start developing these regulations. However, instead of winding down the subsidies, the ISOR is doubling down, suggesting credit for avoided methane pollution could remain in place for decades after the legislature granted CARB the

authority to regulate and extending the problems into the power and hydrogen sectors. Using negative carbon intensity (CI) biomethane to generate negative CI electricity or hydrogen is greenwashing, which will subsidize digesters in other states in place of supporting investment to reduce emissions in California. (45d-276.8)

**Comment:** ...and utilize CARB's SB 1383 authority to open a proceeding by 2025 to regulate, track and report emissions from the agricultural sector. (45d-279.1)

**Comment:** First, the proposed amendments ignore and attempt to displace CARB's mandatory duties to directly regulate manure methane emissions pursuant to SB 1383 and prioritize direct emission reductions as mandated by AB 197. Instead, CARB continues to use the false baseline of perpetually unregulated manure methane emissions to continue its perverse policy of avoided methane crediting that enriches the largest and most polluting operations and investors in factory farm gas. (45d-368.2)

**Comment:** Direct CARB staff to initiate a rulemaking to directly regulate methane emissions from manure management to achieve the methane reductions required by Senate Bill 1383. It is inappropriate for California drivers to continue footing the bill for methane mitigation when CARB has a legal duty to mandate methane reductions from livestock operations. (45d-379.22)

**Comment:** It seems possible that a Livestock Methane Regulation could come into force in the next couple of years and before the next LCFS rulemaking. Can you please provide guidance on how the program would respond to a Livestock Methane Regulation as per SB 1383?

1) Would a regulation requiring reduced methane emissions on dairies affect Avoided Methane crediting because some avoided methane would no longer be additional?

2) Would crediting change for existing credit pathways? Or would it only affect new and renewed credit pathways?

3) In judging the additionality of avoided methane emissions from non-California dairies, would California regulations be used as a baseline, or would a dairy's respective local and state level methane regulations be used as a baseline? (Apr-006.1)

**Comment:** We have submitted a petition to CARB asking that the regulations for livestock methane required in SB 1383 be implemented.<sup>1</sup> If this were to occur, it would automatically eliminate the avoided emissions credits for California operations – except those with existing contracts. Regulation could be innovative, as in the Union of Concerned Scientists proposal for a Low Carbon Milk Standard.<sup>2</sup> With regulation in place, LCFS could, and should require biogas from other states to be regulated as well in order to participate in the LCFS.

<sup>1</sup> [https://actionnetwork.org/user\\_files/user\\_files/000/106/944/original/2024-03-01\\_Petition\\_to\\_regulate.pdf](https://actionnetwork.org/user_files/user_files/000/106/944/original/2024-03-01_Petition_to_regulate.pdf) a slide presentation is at: <https://my.visme.co/v/319j003r-zz6wqv#s1>

<sup>2</sup> <https://blog.ucsusa.org/jeremy-martin/something-stinks-california-must-end-manure-biomethane-accounting-gimmicks-in-its-low-carbon-fuel-standard/#:~:text=The%20carbon%20intensity%20of%20dairy,on%20characteristics%20of%20the%20di%20gester.Feb.15,2024.>

...

### ***Regulation and the counterfactual of avoided emissions***

There is probably no one who cares about global warming who does not recognize the need to abate methane as quickly as possible. Yet in California the majority of methane emissions are unregulated, coming from livestock and to a smaller extent rice. Overall, out of 115 MMT of CO<sub>2</sub>e methane, 63MMT belong to livestock and is unregulated (*2020 Emissions Inventory*).

SB 1383 governs methane and other short-term pollutants in California. It calls for CARB to adopt regulations for livestock methane by 2024. We have submitted a petition to CARB asking that the law be followed. If CARB were following the law, the emissions attributed to voluntary action by dairy and other farmers would already be required, so high negative emissions credits would not be permissible.

### ***Incentives and the counterfactual of avoided emissions***

However, there is another way to view the issue. Matthew Botill posed this question, “If we can achieve the SB 1383 40% reduction by incentives why would we regulate?” So, CARB appears to be viewing incentives as an alternative to regulation but designed to accomplish the same mitigation goal. To that end, many incentives for capturing methane are available. Dr. Kevin Fingerman has looked at all of the sources of funding for digesters.<sup>10</sup> These include cap-and-trade, DDRDP, federal RIN credits, the CPUC, Aliso Canyon Settlement funding, the California Energy Commission, and the federal REAP fund as well as roughly 2.5 billion over ten years through LCFS. (This is not government money, but it would not exist without a government structured program.) The total cost to abate a ton of CO<sub>2</sub>e via a digester is \$159 (far above the \$9 cited in the 2022 CARB SB 1383 status report).<sup>11</sup> Economist Aaron Smith has calculated that for LCFS, specifically, the cost for abating a ton of CO<sub>2</sub>e through the avoided emission credits is \$167.<sup>12</sup> Seemingly CARB thinks that the incentives are sufficient to reduce livestock emissions by the required 40% in 2030. So, in this case very generous incentives (enough to establish a whole new biomethane industry in California) are *substituting* for regulation. If this is the case, though, in what sense should the dairy emissions be considered as voluntary actions to reduce emissions? If there were no government incentives (which amount to about \$28 per metric ton of methane) you could argue that individual farmers who install digesters are in fact avoiding emissions. But with incentives set so high that CARB top administrators believe they nullify the need for regulations, the concept of avoided emissions does not make sense. In fact, forty-two California dairies are among the 58 earning LCFS credits *and* among those with funding from the DDRDP incentives.<sup>13</sup> The total reductions in ten years claimed for these 42 dairies by the DDRDP is 9,113,976 MTCO<sub>2</sub>e. The point here is not that there is double counting (LCFS does not require additionality) but that for those 42 dairies the farmers had already been paid to reduce the emissions the LCFS claims *it* is avoiding.

<sup>10</sup> Wakeman, D. and Fingerman, K. (2023). *Waste stream to revenue stream: calculating the costs and climate impact of California’s investments in dairy digester infrastructure*. Arcata, CA. The work was performed for the Center for Food Safety.

<sup>11</sup> California Air Resources Board. *Analysis of Progress toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions Target (March 2022)*.

<sup>12</sup> Smith, Aaron. “Cow Poop is Now a Big Part of California Fuel Policy” Energy Institute Blog, UC Berkeley, January 22, 2024, <https://energyathaas.wordpress.com/2024/01/22/cow-poop-is-now-a-big-part-of-california-fuel-policy/>

<sup>13</sup> We also checked the Pathway 2 applications that are pending LCFS approval at <https://ww2.arb.ca.gov/resources/documents/lcfs-pathways-requiring-public-comments> Two of five California dairies also had DDRDP grants.

LCFS is governed by the following provision in the Compliance Offset for Livestock: “Eligible offsets must be generated by projects that yield surplus GHG reductions that exceed any GHG reductions otherwise required by law or regulation *or any GHG reduction that would otherwise occur in a conservative business-as-usual scenario.*”<sup>14</sup> The extensive subsidies available and used by dairies already account for the digester reductions since they “occur in a conservative business-as-usual scenario” of multiple private and government funds independent of LCFS. Investors have turned manure methane from a waste product to a commodity. Dairies with digesters now sell both milk and methane. *The concept of avoided emissions requires a counterfactual that, because of extensive subsidies does not, in fact, exist.*

<sup>14</sup> CARB Compliance Offset Protocol: Livestock Projects – Capturing and Destroying Methane from Manure Management Systems. Adopted: November 14, 2014. Our italics.

In summary, since everyone knows methane must be abated, and CARB is specifically required by state law to regulate livestock methane by 2024, no magic dust in the form of “avoided emission” counterfactuals should be permitted. Eliminating “avoided emission” carbon intensity scores would mean the carbon intensity assigned livestock methane would be more in line with that of landfill gas (roughly 53 rather than the -321 average of dairy gas). If, on the other hand, government is providing or arranging for handsome profits for a new industry which makes farmers very interested in making manure methane a commodity, then again the high credits due to avoided emissions should not apply, as the counterfactual is erroneous.

...

Inadvertently, perhaps, LCFS has at least three tigers by the tail – mega-dairies, biomethane/RNG plants, and dirty hydrogen. The problem for CARB is how to let go before letting go becomes impossible in the face of billion-dollar industry lobbies. We have already seen two legislative attempts to limit avoided methane credits killed, one this year (AB 2870) by a power play which did not even permit the bill a committee hearing. And SB 1420, a very bad dirty hydrogen bill that appears to depend on avoided emissions credits, is already in Senate Appropriations. The best way out, and one that is already legislatively mandated, is simply to regulate all livestock methane. (Apr-030.1)

**Comment:** 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. (15d1-221.8)

**Comment:** Regulation of dairy emissions – given the significant pollution associated with dairy operations in California and the ongoing challenges in addressing these emissions promptly through the LCFS, CARB should establish a date for the completion of direct regulation of dairy emissions in California.

- *CARB staff will embark on a multipollutant standard for dairies in support of local health improvement, attainment of climate standards, and attainment of ozone and annual*

*particle pollution standards, the latter of which was recently strengthened by US EPA and will require stronger controls. (15d2-275.6)*

**Comment: 1. In subsection 95488.9(f)(3)(A),** in response to public comment, **staff proposes to significantly lengthen the crediting periods for digester-based avoided methane emissions.** If a project is certified before the effective date of the regulation, staff proposes that it will be allowed three consecutive 10-year crediting periods. If it is certified on or after the effective date of the regulation and before January 1, 2030, then it will be limited to two consecutive 10-year crediting periods. The Executive Officer may renew crediting periods for fuel pathways that were certified before the effective date of the regulation, for up to three consecutive 10-year crediting periods, as well as fuel pathways representing projects that have broken ground on or after the effective date of the regulation and before January 1, 2030, for up to two consecutive 10-year crediting periods. These provisions maintain the rules for crediting periods described under the current regulation while providing clarity for projects developed between the effective date and January 1, 2030.

**2. In subsection 95488.9(f)(3)(B),** the existing regulation states that if a 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 eligible to continue to receive LCFS credits for those greenhouse gas emission reductions for the remainder of the project's current crediting period, although it may not request any subsequent crediting periods. Staff is proposing to focus this provision on fuel pathways associated with biomethane projects that break ground after December 31, 2029. This proposed change purportedly supports California's SB 1383 methane reduction goals by providing incentive certainty for project developers for methane capture projects.

*Comment:* Dairy methane from manure needs to be regulated and biomethane should be controlled by market forces if California is to have any chance of meeting our emissions reduction goals. CARB appears to view its primary duty as serving the biomethane industry its previous policies have helped create—rather than reducing methane and nitrous oxide.

Specifically, these provisions:

- a. Ignore the fact that only ten years of incentive payments is necessary for dairies using digester to break even.<sup>11</sup> The other 20 years being proposed is unearned profit. These profits are not justified for California dairies, but even less are they justified for all the dairies in states where there are no regulations on dairy methane.
- b. Ignore the fact that other industries are not paid for reducing their emissions. If, in order to impose regulations on a powerful industry, the state wants to provide incentives that will help dairies reduce emissions in various ways (not just by overfunding digesters) then the incentives should be carefully designed and recognize that the large dairies with the resources to install a digester are profitable enough to absorb many of the costs of mitigation.
- c. Ignore the fact that digesters favor large dairies. Providing them with the huge profit opportunities inherent in the LCFS puts smaller dairies at an extreme disadvantage.



- d. Ignore the fact that other methods of manure management – from liquid-solid separation to vermifiltration – are equally as effective as digesters.<sup>12</sup> Why is CARB fixated on this method? It appears to reflect the influence of the biomethane industry you have created.

<sup>12</sup> Aguirre-Villegas, Horacio A., Rebecca A. Larson, and Mahmoud A. Sharara. "Anaerobic digestion, solid-liquid separation, and drying of dairy manure: Measuring constituents and modeling emission." *Science of the total environment* 696 (2019): 134059. Miito, Gilbert J., Femi Alege, Joe Harrison, and Pius Ndegwa. Influence of earthworm population density on the performance of vermifiltration for treating liquid dairy manure. 2024.

- e. Ignore the fact that biomethane has supplied nearly one-fifth of the program's total credits despite it being used in less than 1 percent of the state's transportation fleet. Incentivizing dairy biomethane costs California drivers; and by perpetuating diesel engines, it is undermining our goal to electrify transportation. (15d2-281.7)

**Comment:** I want to voice support for -- by 2030 strong regulations on dairy multi-pollutant standards on the dairies. And again, I want to make sure that those standards move forward more quickly than are planned. (BHT-10)

**Comment:** Regarding the Board resolution, ABC strongly encourages that future regulation on livestock methane -- livestock methane appropriately recognizes the methane reduction achievements from dairy digesters and the dairy sector as a whole. Regulating dairy methane emissions outside of the LCFS is a mistake and would increase the abatement cost for California farmers, thus increasing the price of food for Californians. (BHT-59)

**Comment:** We really appreciate the inclusion in the resolution of a very clear direction to planning for a regulation on dairy methane. I've supported measures to regulate methane from landfills, and that one needs to be strengthened and updated by the way, as well as methane from oil and gas. It's long past time that we do the same for our methane emissions from dairies. (BHT-128)

**Comment:** For many years, residents of environmental justice communities and advocates for those communities have urged you to regulate factory farm methane. Accordingly, we appreciate that you properly directed staff to shift to a regulatory approach. (BHT-183a)

**Comment:** So finally, the resolution offers a timeline for 1383 regulation that is at odds with the statute. The resolution calls for staff to implement regulations starting in 2030, but SB 38 -- 1383 obligates CARB to meet the 40 percent reduction by 2030, not sometime after. The resolution misstates this mandated timeline. (BHT-221)

**Agency Response:** No changes to the Proposed LCFS Amendments were made in response to these recommendations for additional non-LCFS rulemaking, which are outside the scope of this regulatory proposal.

SB 1383 establishes a sector-specific methane emissions reduction target for dairy and livestock and calls for an incentives-first approach before implementing a regulation. Prior to implementing a regulation to reduce methane emissions from manure management, there are requirements the State must address. These requirements include the following:

- Work with stakeholders to address technical, market, and regulatory barriers to project development,

- Provide forums for public engagement in geographically diverse locations,
- Conduct or consider research on dairy methane reduction projects and adoption of emissions reduction protocols,
- Analyze progress made in overcoming barriers, and
- Determine that any regulation is technologically feasible, economically feasible, cost-effective, inclusive of provisions to minimize and mitigate potential leakage to other states, and inclusive of an evaluation of the achievements made by incentives.

While the first four requirements have been substantially addressed, the State's efforts on these requirements are ongoing.

In Resolution 24-14, along with approving the Proposed LCFS Amendments for adoption on November 8, 2024, CARB directed Board staff to prepare a plan for initiating, developing, proposing, and implementing a livestock methane regulation under Health and Safety Code section 39730.7 (from SB 1383).<sup>12</sup> The Board directed that the plan include:

- A timeline that includes rule development to begin in 2025 and Board consideration by 2028 that would allow for potential regulatory implementation starting in 2030;
- Evaluating data to better inform methane emission estimates and whether mandatory reporting and/or other requirements are appropriate, as called for by CARB and the California Department of Food and Agriculture's May 2024 response to a March 2024 California Climate Action petition for rulemaking;
- Incorporating the lessons learned and progress achieved to date from the incentives provided to livestock methane sources into the plan development;
- Addressing any other elements to ensure compliance with Health and Safety Code section 39730.7; including determining that any regulation is technologically feasible, economically feasible, cost-effective, inclusive of provisions to minimize and mitigate potential leakage to other states, and inclusive of an evaluation of the achievements made by incentives; and
- A recognition that a dairy with a digester installed prior to 2030 is not automatically exempt from any regulation that may be adopted pursuant to this plan.

In response to the comments requesting clarification on how LCFS crediting for avoided methane emissions might change should a California livestock methane regulation come into effect: The existing regulation states that if a law, regulation, or legally binding mandate requiring either GHG 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

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<sup>12</sup> California Air Resources Board. *Public Hearing to Consider Proposed Low Carbon Fuel Standard Amendments*. Resolution 24-14. November 8, 2024. Available at: <https://ww2.arb.ca.gov/sites/default/files/barcu/board/res/2024/res24-14.pdf>

eligible to continue to receive LCFS credits for those GHG emission reductions for the remainder of the project's current crediting period and may not request any subsequent crediting periods. In the second 15-day package, staff proposed to focus this provision on the fuel pathways associated with biomethane projects that break ground after December 31, 2029. This proposed change supports California's SB 1383 methane reduction goals by providing credit certainty for project developers for methane capture projects. For more detail on this proposed change, please see Response Z-1.8 below.

#### **Z-1.6 Multiple Comments: *Further Studies Needed***

**Comment:** We strongly urge CARB to conduct analysis and monitoring of whether low-income, rural communities outside of California are benefiting from biogas investment through the LCFS, including a process for direct public input from community-members (45d-042.2)

**Comment:** We further implore 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 California's recently stated goals of obligating jet fuel within the LCFS. (45d-155.5)

**Comment:** CARB should investigate the avoided methane crediting mechanisms, their potential to affect farm management practices, and the implications of resulting shifts in those practices. CARB should support research that uses data from the 2022 census (just released in mid-February 2024<sup>5</sup>) to investigate whether LCFS policies are accelerating the rate of consolidation in dairies participating in the LCFS in California and outside the state. Further analysis should evaluate if there is a correlation between farmers' intention to expand (based on permitting asks to increase herd size) and participation in the LCFS program. Note that because the LCFS benefits farms outside California, a simple comparison between California versus other states may represent a study bias, and the study design should account for that. These analyses would address some of the concerns around the LCFS credits supporting the deployment of anaerobic digesters in livestock farms. This could be achieved by convening an external working group comprised of experts that meet to review new science and data regarding the impacts of LCFS policy on farm management practices.

<sup>5</sup> <https://www.nass.usda.gov/AgCensus/>

(45d-206.3)

#### **Comment: 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.<sup>6</sup>

<sup>6</sup> 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](https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/lcfs_meetings/LCFSpresentation_02222023.pdf)

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 convince 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. (15d1-111.5)

**Comment:** 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 convince 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.

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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. (15d2-302.3)

**Comment:** · 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.

Board Members and folks, these two need to be explored much further scientifically. For example, if one was to even believe in methane emissions then farmers would be exploring in different types of feed and I could learn EVERYTHING about it. Fact is I can't, because it is a giant unknown. One study stated that methane is 80 times more more potent at warming than carbon dioxide. Well, then why worry about carbon dioxide then? There is no direct scientific link with methane, but are seeking people change their diets to processed plant food? Again taking away our freedoms. (BH-071.6)

**Agency Response:** These grouped comments recommend further study to inform potential future LCFS program implementation or adjustments, rather than changes to the regulatory proposal. Accordingly, no changes were made to the Proposed Amendments in response to these comments. CARB and the California Department of Food and Agriculture (CDFA) have funded or conducted multiple dairy and livestock research studies, literature reviews, measurement campaigns, and model development efforts, including the following:

- Onsite, Mobile, Flyover, and Satellite-based Emissions Measurement and Monitoring Campaigns,
- Effectiveness of Manure Management Strategies,
- Enteric Methane Reducing Strategies,
- Enteric Testing Standard Development and Calibration,
- California Dairy Emissions Model (CADEM) Development,
- Digestate Land Application Emissions, and
- Biomethane Constituents.

CARB has a research program that is legislatively mandated and uses sound science to inform CARB programs and support CARB goals. There is a five-year strategic research plan that includes operationalizing racial equity. When an emerging topic arises, there is an internal coordination and external community engagement. Next, in-house research is conducted, as well as contracted research projects. There are also collaborative research efforts that inform CARB program priorities. These research projects look at health, air quality, climate, economics, and environmental justice.

#### **Z-1.7 Add Avoided Methane Crediting for Enhanced Landfill Methane Collection Systems**

**Comment:** Specifically, this comment recommends that the California Air Resources Board (“CARB”) establish a safe harbor crediting period for early adopters of enhanced landfill methane collection systems including automated monitoring and control technologies for landfills (“Advanced LFG Control Systems”). The establishment of this crediting period would be consistent with the language and intent of SB 1383, the short-lived climate pollutant (“SLCP”) statute that underpins the SLCP Strategy that CARB developed. Under the LCFS program at section 95488.9(f)(4), similar safe harbor crediting periods already exist for dairy and swine digester pathways and for voluntary organics diversion pathways. The establishment of this safe harbor for enhanced landfill methane collection systems would incentivize landfill owners and operators to install these systems prior to the effective date of any future more stringent landfill methane regulation.

If implemented, this proposal would expedite and expand the capture of methane, the largest component of landfill gas by volume, and reduce methane emissions. The accelerated and expanded capture of methane would be highly beneficial to California’s greenhouse gas (“GHG”) and carbon neutrality goals given that methane is a potent short-lived climate pollutant. As stated in the 2022 Final Scoping Plan,

*Human sources of methane emissions are estimated to be responsible for up to 25 percent of current warming. Fortunately, methane’s short atmospheric lifetime of ~12 years means that emissions reductions will rapidly reduce concentrations in the atmosphere, slowing the pace of temperature rise in this decade. Further, a substantial portion of the targeted reductions can be achieved at low cost and will provide significant human health benefits. For example, the UN’s Global Methane Assessment (2021) found that over half of the available targeted measures have mitigation costs below \$21/MTCO<sub>2</sub>e, and that each million metric tons of methane reduced would prevent 1,430 premature deaths annually due to ozone pollution caused by methane.<sup>1</sup>*

<sup>1</sup> CARB, Final 2022 Scoping Plan (December 2022), at p. 225 (footnotes omitted), at <https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>

...

The largest landfills in California have been reporting gas collection operating performance annually for twenty years or more pursuant to measurement requirements and methodologies established by EPA Greenhouse Gas Reporting Program. This public data base provides a reliable benchmark for gas collection operations using industry standard manual wellfield tuning. An independent peer review of four landfills which utilized Loci’s Advanced LFG Control System found an increase in methane capture of 13-24% compared to the landfill’s previously

documented LFG capture performance. Utilizing a representative estimate of average performance improvement of 15% for implementation of Loci's Advanced LFG System would result in the following decreases in methane emissions from California landfills.

Year	% of California Landfill AGCCS Adoption (methane inventory basis)	Emissions Reduction Annually from Landfills with AGCCS - in metric tons/year CO <sub>2</sub> e	% reduction of Estimated CA Landfill Emissions relative to 2019 estimated baseline
2024	3%	163,400	2%
2025	6%	245,100	3%
<b>2026</b>	9%	408,500	5%
2027	12%	571,900	7%
2028	15%	653,600	8%
2029	18%	817,000	10%
<b>2030</b>	<b>21%</b>	<b>898,700</b>	<b>11%</b>
2031	25%	1,143,800	14%
2032	30%	1,307,200	16%
2033	35%	1,552,300	19%
2034	40%	1,797,400	22%
<b>2035</b>	<b>45%</b>	<b>2,042,500</b>	<b>25%</b>

#### Status of Future California Landfill Methane Regulations

Approximately one year ago, on May 18, 2023, CARB held an informal workshop entitled Public Workshop on Potential Improvements to the Landfill Methane Regulation with stakeholders to inform the development of future landfill methane regulations.<sup>4</sup> Since that time, there has not been another LMR workshop held or scheduled. It is anticipated that at some point in the future CARB may hold additional workshops and will subsequently proceed to develop the proposed regulations, and to prepare the necessary analyses that are necessary to support the review and approval of any future landfill methane regulations. At this time, it is uncertain when the public workshop process will complete, when the formal rulemaking process will begin, and when the future LMR will come into effect. As established by SB 1383, Health and Safety Code section 39730.6(b) provides that except as otherwise provided by this section and Public Resources Code section 42652.5, CARB “shall not adopt, prior to January 1, 2025, requirements to control methane emissions associated with the disposal of organic waste in landfills other than through landfill methane emissions control regulations.” SB 1383 does not establish a date by which CARB must adopt more stringent LFG regulations. During this period of regulatory uncertainty, most landfill operators can reasonably be expected to defer investments in enhanced landfill methane collection systems until the program specifics are conclusively determined by CARB and approved by the Governing Board.

<sup>4</sup> CARB, “Landfill Methane Regulation Meetings & Workshops,” at <https://ww2.arb.ca.gov/ourwork/programs/landfill-methane-regulation/meetings>

#### A Simple LCFS Program Amendment Will Speed Deployment of Enhanced Landfill Methane Collection Systems

In the interim period before more stringent regulations are established, the LCFS program does provide a market signal to incentivize the deployment of enhanced landfill methane collection systems even before the landfill methane regulations are proposed to the Governing Board, and likely years before future regulatory mandates will require large-scale deployment of Advanced LFG Control Systems. Unfortunately, due to the nature of LCFS program crediting, the possibility of future mandated installation of Advanced LFG Control Systems is likely to undercut that LCFS market signal. Specifically, the LCFS program structure provides incentives for reductions to the carbon intensity (“CI”) of transportation fuels based on a California regulatory baseline. In other words, while the use of RNG or electricity derived from nonmandatory methane capture would provide a recognizable CI reduction under the LCFS, the capture and use of the same RNG or electricity from mandated methane capture would not. Thus a landfill owner or operator that installs an enhanced landfill methane collection system in the near-term faces uncertainty regarding two critical investment decisions: 1) whether the Advanced LFG Control System or other system will meet the future LMR requirements that CARB has not yet established and 2) uncertainty regarding for how many years an early adopter facility will generate LCFS credits.

This hurdle could be overcome by the establishment of a safe-harbor LCFS crediting provisions for Enhanced Landfill Methane Collection Systems. This approach is consistent with the existing language of SB 1383 for the dairy and swine manure pathways and for qualified organics diversion. For these types of pathways, LCFS crediting is protected for a 10-year period by §95488.9(f)(3) even if CARB approves mandated methane control in the dairy sector or diversion of organic material from landfill disposal.<sup>5</sup> To the extent that CARB seeks to extend comparable treatment for landfill gas, §95488.9(f) of the LCFS could be amended to establish a 10-year crediting period for projects that capture biomethane that would otherwise be released to the atmosphere from the landfill and that commence prior to the establishment of any law, regulation, or legally binding mandate. Proposed regulatory changes to implement this proposal are included in attached Exhibit A.

<sup>5</sup> See LCFS Regulation entitled “Special Circumstances for Fuel Pathway Applications at §95488.9(f)(3) that provides for 10-year crediting periods for avoided methane emissions for dairy and swine manure pathways and for landfill-diversion pathways.

...

## **Exhibit A**

Section 95488.9(f) as proposed in rulemaking, proposed new language in black underline, proposed new Loci language in red underline/strike-out:

(f) *Carbon Intensities that Reflect Avoided Methane Emissions from Dairy and Swine Manure, or Organic Waste Diverted from Landfill Disposal*, *or Enhanced Landfill Methane Collection Systems*.

- (1) A fuel pathway that utilizes biomethane from dairy cattle or swine manure digestion may be certified with a CI that reflects the reduction of greenhouse gas emissions achieved by the voluntary capture of methane, provided that:



- (A) A biogas control system, or digester, is used to capture biomethane from manure management on dairy cattle and swine farms that would otherwise be vented to the atmosphere as a result of livestock operations from those farms.
  - (B) The baseline quantity of avoided methane reflected in the CI calculation is additional to any legal requirement for the capture and destruction of biomethane.
- (2) A fuel pathway that utilizes an organic material may be certified with a CI that reflects the reduction of greenhouse gas emissions achieved by the voluntary diversion from decomposition in a landfill and the associated fugitive methane emissions, provided that:
- (A) The organic material that is used as a feedstock would otherwise have been disposed of by landfilling, and the diversion is additional to any legal requirement for the diversion of organics from landfill disposal.
  - (B) Any degradable carbon that is not converted to fuel is subsequently treated in an aerobic system or otherwise is prevented from release as fugitive methane. Upon request, the applicant must demonstrate that emissions are not significant beyond the system boundary of the fuel pathway.
  - (C) The baseline quantity of avoided methane reflected in the CI calculation is additional to any legal requirement for the avoidance or capture and destruction of biomethane.
- (3) A fuel pathway that utilizes enhanced landfill methane collection systems may be certified with a CI that reflects the reduction of greenhouse gas emissions achieved by the voluntary capture of methane provided that:
- (A) The enhanced landfill methane collection system is additional to any legal requirement for the capture of methane from landfills.
  - (B) Any degradable carbon that is not converted to fuel is prevented from release as fugitive methane. Upon request, the applicant must demonstrate that emissions are not significant beyond the system boundary of the fuel pathway.
  - (C) The baseline quantity of avoided methane reflected in the CI calculation is additional to any legal requirement for the avoidance or capture and destruction of biomethane.
- (4) Carbon intensities that reflect avoided methane emissions from dairy and swine manure or organic waste projects are subject to the following requirements for credit generation:
- (A) *Crediting Periods.* Avoided methane crediting for dairy and swine manure pathways as described in (f)(1) above, for landfill- diversion pathways as described in (f)(2) above, and for enhanced landfill methane collection as described in (f)(3) above is limited to three 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 LRT-CBTS. The Executive Officer may renew crediting periods for fuel pathways certified before January 1, 2030, for up to three consecutive 10-year crediting periods. 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 that break ground after December 31, 2029, the Executive Officer may only approve avoided methane crediting through December 31, 2045.

(B) Notwithstanding (A) above, 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, **or enhanced landfill methane collection** 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. The project may not request any subsequent crediting periods.

(C) Notwithstanding (A) above, projects that have generated CARB Compliance Offset Credits under the market-based compliance mechanism set forth in title 17, California Code of Regulations Chapter 1, Subchapter 10, article 5 (commencing with section 95800) may apply to receive credits under the LCFS. However, the LCFS crediting period for such projects is aligned with the crediting period for Compliance Offset Credits, and does not reset when the project is certified under the LCFS.

(Apr-174.1)

**Agency Response:** No change was made in response to these recommendations. Because the Proposed Amendments do not propose to expand the narrow specified circumstances in which LCFS fuel pathway carbon intensities may reflect methane emissions avoided, the recommendations to add new types of avoided methane crediting go beyond the scope of this rulemaking.

#### ***Z-1.8 Multiple Comments: Removal of Crediting Period Limitation for Projects that Break Ground Before 2030***

**Comment:** Eliminate credit generation from factory farm gas projects that would have happened anyway due to other programs or investments. (45d-134.5, 45d-137.3, 45d-163.5, 45d-230.4, 45d-272.5, 45d-372.7)

**Comment: The LCFS Proposal Expands Lavish and Unjustified Incentives for Biomethane at the Expense of Environmental Justice.**

Despite longstanding calls to regulate emissions from industrial dairy and swine operations, and the plain text of Senate Bill 1383 which requires CARB to do so, CARB has continued to expand lavish incentives for these projects. By offering up to three 10-year crediting periods, CARB is locking California into decades of reliance on harmful methane production practices. Worse still, the LCFS proposes to allow projects to continue to receive new avoided methane crediting periods even if methane capture and reduction requirements are implemented under SB 1383, turning what was a stop-gap solution to the dairy methane problem into an ongoing

windfall from the LCFS. CARB further proposes greenwashing the electricity used for electric vehicle charging by allowing book-and-claimed biomethane attributes for this purpose.

CARB is operating under the assumption that methane emitters require LCFS subsidies in the form of avoided methane credits to build and operate dairy digesters. CARB provides no analysis to support this assumption, and a recent independent analysis shows it is wrong. According to a UC Berkeley review of industry digester cost data and existing subsidies, **“[a]fter the first 10 years [of avoided methane crediting], once capital costs have been paid, there is little economic justification for digesters to receive prevented methane LCFS credits.”**<sup>1</sup> This is because the federal Renewable Fuels Program “is providing enough to keep these digesters running.” As a result, **“California drivers are effectively donating additional dollars”** to digester companies, and sending most of those dollars out of state, as roughly two-thirds of LCFS dairy biomethane is from outside of California.<sup>2</sup> Why is CARB ignoring this evidence and guaranteeing decades of windfall profits to methane emitters at the expense of Californians?

<sup>1</sup> Smith, Aaron. How Much Should Dairy Farms Get Paid for Trapping Methane? (Oct. 14, 2024), <https://energyathaas.wordpress.com/2024/10/14/how-much-should-dairy-farms-get-paid-for-trappingmethane/> (emphasis added).

<sup>2</sup> *Id.* (emphasis added).

With each turn on this issue, the Proposal has ignored calls from not only affected community members and advocates but also its own Board Members to actuate effective policies that do not incentivize further consolidation and gift polluters with extravagant incentives rather than treating the emissions on par with other methane-emitting sources. CARB should shift the LCFS from a program predicated on factory farms being paid for their pollution to a program requiring that they clean up their own mess-the same approach that is taken for wastewater, landfills, and even oil and gas operations. (15d2-173.2)

#### **Comment: Gevo Supports CARB’s Proposal to Remove the Potential Statutory Change Limit for Early Dairy Biomethane Adopters (Section 95488.9(f)(3)(B))**

In the Second 15-Day Notice, CARB has proposed to revise the existing regulation applying to pre-2030 dairy biomethane projects that states that “if a 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 and may not request any subsequent crediting periods.” Gevo supports this proposal because, as CARB notes in the Second 15-Day Notice, it supports California’s “methane reduction goals by providing incentive certainty for project developers for methane capture projects.” At the same time, however, we question why CARB would retain the existing provision for 2030+ projects, as all dairy biomethane projects that bring emissions reductions need investment certainty. (15d2-226.4)

#### **Comment: Staff Proposes to Fundamentally Change the Possible Scope and Applicability of Livestock Methane Regulations**

A fundamental change in these Second 15-Day Changes is an insidious rejection of the board’s direction to shift to a regulatory approach for livestock methane. After the Board gave

direction to staff to draft a resolution to initiate rulemaking for livestock methane, staff added one clause into the proposed LCFS amendments that would effectively exempt for decades many of the biggest climate polluters in the livestock industry from whatever regulatory requirements CARB may adopt. The addition of “for pathways associated with projects that break ground after December 31, 2029” to section 95488.9 of the regulations<sup>7</sup> would exclude livestock operations with digester projects that break ground before 2030 from the existing rule<sup>8</sup> that avoided methane crediting is only available for the remainder of a pathway holder’s 10-year crediting period if CARB adopts regulations mandating reductions of livestock methane. In other words, CARB staff propose to lock in a bogus baseline for megadairies that is incompatible with its obligations under AB 32 and SB 1383 and is designed to sidestep board direction.

<sup>7</sup> *Id.* § 95488.9(f)(3)(B).

<sup>8</sup> Cal. Code Regs. Tit. 17, § 95488.9(f)(3)(B).

This wrongheaded amendment would:

- Create a regulatory framework that creates two classes of livestock operations and effectively suspends the regulatory impact on dairies with digesters for 20 years or more;
- Lock in perverse incentives and windfall profits for the production of methane and concentration of cattle, manure, methane, and other pollution;
- Exclude methane emissions reductions that are accounted for through LCFS credits from counting toward the state’s SB 1383 methane reduction requirement; and
- Unlawfully exempt livestock methane emissions reductions from additional requirements.

a. CARB Staff Intends to Create Two Classes Of Livestock Operations that Will Exist Under Two Opposing Regulatory Frameworks

The proposed regulatory framework will create two classes of livestock operations and will treat those two classes completely differently. One class could be subject to regulation and would need to modify its operations to actually *reduce* methane generation, and the other will be able to profit from at least two decades of lavish subsidies for the *production* of methane and its conversion into a combustion fuel and offset mechanism that benefits the oil and gas industry. Put differently, one class of dairies will be subject to baseline assumptions that require reduction of methane emissions, the other - those with digesters in place by 2030 - will be rewarded with a baseline assumption of freely vented methane from massive manure lagoons. This places the entire burden of compliance with SB 1383 on disproportionately smaller and less polluting operations that do not have digesters or LCFS pathways. Perversely, this would further reward the biggest polluters that have been able to tap into the LCFS money spigot for factory farm gas - the very polluters that necessitated SB 1383 in the first place because of megadairies’ large share of the state’s overall methane emissions.

This represents a sea change in SB 1383’s framework and CARB’s own policies toward livestock methane which called for an end to avoided methane crediting upon adoption of relevant regulations. This proposal, if adopted, would also severely hamper CARB’s ability to create an effective, fair, and equitable livestock methane rule that provides an opportunity for

different types and different sizes of livestock operations to thrive. It also distracts from cheaper, more effective means to reduce dairy manure methane emissions at the largest polluters in the sector. This would be arbitrary and contrary to CARB's legal obligations.

b. CARB Staff Signals to Livestock Operators and Factory Farm Gas Producers that They Need to Act Fast to Install Digesters and Generate Methane

This amendment would lock in perverse incentives and windfall profits for the production of livestock biogas that necessarily favor the concentration of cattle, manure, and pollution. This rule change will even further incentivize livestock operations to install digesters and maximize biomethane production as quickly as possible given the vastly different treatment livestock operations with digesters installed prior to January 1, 2030 and those after January 1, 2030 would receive under a bifurcated regulatory framework. As discussed in previous comments, this would have harmful and potentially irrevocable impacts on the groundwater, drinking water, air quality, and quality of life for people living in the San Joaquin Valley. (15d2-301.2)

**Comment: The Second 15-Day Changes Would Exclude Methane Emissions Reductions from Counting Toward Dairy Sector Methane Reduction Mandates for Decades to Come**

Additionally, as Commenters have explained numerous times, any emissions reduction allowed to generate LCFS credits through avoided methane crediting acts as an offset for the oil and gas sector. In other words, every metric ton of CO<sub>2</sub>eq captured at a factory farm operation that is transformed into an LCFS credit and purchased by a deficit generator in the transportation sector *locks in* those emissions with respect to the livestock sector. The greenhouse gasses are generated by the livestock sector, and making the capture of those emissions a transferable attribute has the unavoidable result of immutably assigning those emissions to the livestock sector once that transfer occurs. CARB staff either do not understand or wish to arbitrarily ignore the basic rules of environmental attribute trading.

This significantly undermines the integrity of CARB's climate change policies and threatens to put SB 1383 compliance out of reach. When oil and gas companies use those LCFS credits to meet the Carbon Intensity obligation for the transportation sector, those same emissions cannot simultaneously be said to achieve compliance in the agricultural sector. The latest 15-day changes effectively takes any alleged emissions reductions accounted for through LCFS avoided methane credits off the table for 20-30 years for the purposes of compliance with SB 1383. This makes a mockery of regulatory integrity as CARB staff seek to use the exact same methane reductions to satisfy separate regulatory programs and requirements - simply put, this is brazen double counting that exceeds CARB's statutory authority and is arbitrary and capricious. (15d2-301.3)

**Comment: The Proposed Rule Change in the 15-Day Changes Unlawfully Exempts Livestock Methane Emissions Reductions From Additionality Requirements**

CARB staff's proposal in the 15-day changes to allow ongoing credit generation despite adoption of a regulation mandating the very same emissions reductions, explicitly excludes livestock methane emissions reductions from any standard of additionality, a cornerstone of California's climate programs. As Commenters have already detailed in earlier comments with respect to additionality, Health & Safety Code § 38562(d)(2) requires additionality for the LCFS as a market based compliance mechanism. Furthermore, SB 1383 only allows an extension to

the extent authorized by Division 25.5, which includes section 38562. See Health & Safety Code § 39730.7(e). CARB thus has no authority to allow for non-additional credit generation after implementation of regulations adopted pursuant to SB 1383. (15d2-301.4)

**Comment:** On manure biomethane, the board signaled at the recent EJAC/Board meeting a recognition that crediting avoided methane emissions should end and be replaced by direct regulation of dairies. This is important, but the actual language in the amendments betrays this goal by introducing loopholes and exemptions that are not justified by economic analysis and undercut the idea that LCFS credits represent real science-based emission reductions. I urge the board to strip changes to subsections 95488.9(f)(3) (A) and (B) that extend crediting periods for avoided methane and introduce a last-minute grandfathering provision for manure digester projects that break ground before 2030, reverting to the version of these sections in the existing regulation. (BH-023.3)

**Comment:** While several useful changes were made to provisions governing transportation electrification in the October 15-day changes, the proposed changes pertaining to manure biomethane are a major step backwards and must be rejected. (BH-025.1)

**Comment:** Specifically, on biomethane we recommend removing the proposed changes to subsection 95488.9(f)(3) (A) and (B) that extend crediting periods for avoided methane and introduce a last-minute grandfathering provision for manure digester projects that break ground before 2030. (BH-025.3)

**Comment:** We strongly oppose the proposed changes to subsection 95488.9(f)(3) (A) and (B) that extend crediting periods for avoided methane and introduce a last-minute grandfathering provision for manure digester projects that break ground before 2030. The new language in both subsections should be rejected. The changes to 95488.9(f)(3) (A) would extend crediting periods far longer than is economically justified, and constitutes an excessive subsidy for dairies paid for by drivers. The changes to 95488.9(f)(3) (B) preempt a forthcoming rulemaking and allow credits for avoided methane pollution to continue for decades after the underlying regulatory structure that justifies crediting avoided methane emissions has changed. The existing rules provide for one 10-year period, which is sufficient to provide regulatory certainty and cover the costs of the digester. It is time to phase it out and hold dairies responsible to mitigate their own pollution with the same support available to other LCFS pathways. (BH-025.6)

**Comment: Phase out distortionary avoided methane emissions crediting.** Despite repeated and vehement concern from public health, environmental justice, environmental organizations, academic experts—and above all, low-income Californians of color—the Proposal fails to end the LCFS’s exceptional treatment of livestock methane pollution as a lucrative offset to fossil fuels. Nothing about livestock methane’s chemistry makes it better than landfill or wastewater methane at fighting climate change. The inflated avoided methane credits are premised entirely on CARB’s reluctance to use its clear authority to regulate livestock methane like any other major pollution source. The Second 15-day Change Proposal maintains excessive avoided methane emissions crediting for livestock gas and, worse still, undercuts CARB board members’ direction to initiate rulemaking for livestock methane. The Proposal all but guarantees at least 20 years of avoided methane credit generation for any livestock operation that breaks ground on a methane digester by 2030 even if CARB adopts

regulations that prohibit methane venting and require methane reductions. The exceptionalism attached to the dairy and livestock industry apparently knows no bounds: livestock operations that install digesters will enjoy lavish subsidies and windfall profits for the intentional generation of methane for decades, and a regulatory framework - if adopted - will have no impact on the ability of those livestock operations to generate profits from their methane emissions, effectively protecting this class of dairies and livestock operations from both the impact of regulations and additionality requirements that attach to other emissions reductions strategies. The long timeline for avoided methane emissions crediting--extending to 2054 for some projects--and the Proposal to allow ongoing credit generation for avoided methane for decades irrespective of the adoption of regulations runs counter to the recommendations of members of the public, scientists, the direction of the Board, and the demands of our changing climate and ongoing environmental justice crisis. (BH-030.5)

**Comment: Avoided biomethane:** The Board must **stop the flood of credits** for livestock-based biomethane. California's goals are to shift the transportation sector to zero emission vehicles, not natural gas engines. The LCFS should not be used as a subsidy for capturing methane from dairies, which it has turned into. Staff's proposal to grandfather the next five years or more of new projects is unacceptable and must be dramatically reigned in. (BH-034.3)

**Comment: BIOMETHANE:** 15-day change amendments to remove the following clause from Section 95488.9(f)(3)(B) Carbon Intensities that Reflect Avoided Methane Emissions from Dairy and Swine Manure or Organic Waste Diverted from Landfill Disposal.

(B) Notwithstanding (A) above ~~for pathways associated with projects that break ground after December 31, 2029,~~ 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. The project may not request any subsequent crediting periods. (BH-034.18)

**Comment:** Yet, even in this moment of acknowledgement, CARB staff is choosing to undermine possible future regulation of livestock methane emissions with a poison pill that staff snuck into a second round of 15-day changes. This poisoned pill would continue to greenlight pollution and paying polluters for decades. It would set up regulations for failure, where they would burden small and sustainable dairies that produce the least methane while paying the biggest polluters for years to come.

Nothing in today's resolution prevents this outcome. (BHT-22)

**Comment:** On manure biomethane, I urge the Board to strip changes to subsections 95488.9(f)(3)(A) and (B) that extend crediting periods for avoided methane and introduce a last minute grandfathering provision for manure digester projects that break ground before 2030, reverting to the version of the sections in the existing regulation. (BHT-73)

**Comment:** A staff proposal to grandfather the next five years or more of new projects is unacceptable. (BHT-156a)

**Comment:** The last minute change that allows dairies to enjoy avoided methane crediting far into the future, even if a regulation exists that mandates livestock methane emission reductions will have harmful short- and long-term impacts on the environment and in particular the San Joaquin Valley. (BHT-176)

**Comment:** But as others have noted, in response to your proper direction, staff immediately moved to undermine any such future regulation.

Specifically, staff inserted a poison pill sentence into Section 95488.9 of the LCFS Regulation in the second round of 15-day changes. This poison pill would shelter factor farms with digester projects that break ground before 2030 from the existing rule, which says that avoided methane crediting is only available for the remainder of a pathway holder's ten-year crediting period in the event the CARB adopts regulations mandating reductions of livestock methane.

This poison pill would lock in a bogus baseline for large dairies that is wholly incompatible with CARB's obligations under AB 32 and SB 1383. At the same time, it would create two classes of California dairies, small dairies that would be subject to regulation and large dairies that would not. In this way, it would ensure that the LCFS continues operating as cash cow for large dairies for decades by lavishly rewarding their intentional creation of manure and methane.

This scheme is unjust and ineffective and would fan the flames of factory farm consolidation and expansion, as well as the climate crisis. With all due respect to one of the recent commenters, the point of the LCFS is not to subsidize factory farms, but that is exactly what they thanks you for doing. (BHT-183b)

**Comment:** I'd like to echo the call that San Joaquin Valley residents, community advocates, and other organizations here today and ask you to reject the proposal, particularly reject the extension of the timeline for avoided Methane crediting under Low Carbon Fuel Standard.

Maintaining the avoided methane credits for decades to come for dairy biomethane rather than phasing it out immediately will simply entrench this highly polluting unsustainable system that is devastating nearby communities.

...

Again, as it stands, the State's current approach tilts the playing field in favor of the largest livestock operators that are positioned to capitalize on the policies and incentives rewarding methane -- biomethane production, as digesters are really only economically feasible for the largest farms. (BHT-212)

**Comment:** The resolution also compromises CARB's statutory obligation under SB 1383 to reduce manure methane emissions in the dairy sector. ... By pushing agricultural methane mitigation through the LCFS and treating it as this powerful offset mechanism, and then also saying you're going to comply with 1383 with the same reductions, you ignore the obvious and staff's own recognition of how methane capture in one sector, which is used to meet legal obligations, and another actually works. (BHT-220)

**Comment:** The proposed amendments will not only continue the policy of avoided methane crediting, but an 11th hour change in the second 15-day changes doubles down on avoided



methane crediting to incentivize more credit generation before and after any implementation of regulations required by Senate Bill 1383. (BHT-228)

**Agency Response:** No changes were made in response to these comments objecting to and in support of a removal of a conditional limitation on crediting periods reflecting avoided methane emissions for projects that break ground before 2030. The existing regulation states that if a 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 and may not request any subsequent crediting periods. In the Second 15-day package, staff proposed to limit the applicability of that provision to fuel pathways associated with biomethane projects that break ground after December 31, 2029. This proposed change supports California's SB 1383 methane reduction goals by providing credit certainty for project developers for methane capture projects. The structure of a potential future regulation on dairy methane emissions is outside the scope of the Proposed Amendments to the LCFS. The removal of the language from section 95488.9(f) regarding eligibility of avoided methane crediting periods with relation to a potential future regulation on dairy methane emissions does not create a conflict with real emissions reductions supported under the program. Such a regulation does not exist at this time, and LCFS crediting remains one of the only drivers to incentivize capture of methane from dairy operations. The Proposed Amendments provide investment certainty for development and long-term operation of digesters to ensure the State does not backslide on our methane reduction progress.

For comments related to the crediting period, please see Response Z-1.4 above.

Regarding comments related to additionality, see Response XX-7.

### **Z-1.9 *Encourage Participation of Small Dairies in LCFS***

**Comment:** 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. (15d1-131.5)

**Agency Response:** No changes were made in response to these comments. As part of the Proposed Amendments, staff modified the Tier 1 CI Calculator for Dairy and Swine Manure Biomethane, which will allow most applicable projects to qualify for a Tier 1 pathway instead of the longer and more intensive Tier 2 process. This will streamline the application process for small dairies, several of which are already participating in the

program. The LCFS regulation does not prohibit or preclude small dairies from submitting a fuel pathway to participate in the program. Their participation in the LCFS would depend on their own economics and not their qualification in the program.

## **Z-2 *Biomethane Deliverability***

### **Z-2.1 Multiple Comments: *Support Deliverability Requirement for Biomethane***

**Comment:** We support the proposal to curb credits for out-of-state projects that do not actually send fuel to - or support displacement of fossil gas use in - California. (45d-277.4)

**Comment:** Very liberal book-and-claim accounting requirements that allow dairies in Iowa and swine feedlots in Missouri to “deliver” RNG to California even though this results in hundreds of millions (and potentially billions) of dollars leaving the State annually for avoided methane reductions that do not count toward California’s statutory GHG reduction targets (15d2-183.7)

**Comment:** Very liberal book-and-claim accounting requirements that allow landfills in New York and Pennsylvania to “deliver” captured methane to California, even though the landfills were already capturing the methane prior to the LCFS adoption and would be sufficiently compensated by federal programs (without the LCFS) for delivering the fuel to NG vehicles in their own states, (15d2-183.8)

**Agency Response:** Staff appreciates the commenters’ support to add deliverability requirements to biomethane.

### **Z-2.2 Multiple Comments: *Align Deliverability Requirement for Biomethane with Existing Deliverability Requirements for Electricity***

**Comment:** ...align deliverability requirements for biomethane and bio-hydrogen pathways with the existing deliverability requirements for new electricity pathways. (45d-213.2)

**Comment:** CARB has proposed setting deliverability requirements on biomethane to better align project crediting with the state’s methane reduction targets and address the recent rise in book-and-claim crediting. Deliverability requirements stipulate that biomethane must flow through “common carrier pipelines that physically flow within [or toward] California...50% of the time on an annual basis” beginning in 2041 for biomethane and 2046 for bio-hydrogen. The proposed language is consistent with deliverability requirements that biomethane-based electricity must adhere to under the state’s Renewable Portfolio Standard (RPS); however, the ISOR does not specify how these requirements would translate to the natural gas grid and CARB has not provided further information on how it would be implemented and to what extent it would constrain the existing system. A simple geographic deliverability requirement will be more transparent, easier to implement, and is preceded by the deliverability requirements for low-CI electricity. (45d-213.21)

**Comment:** Drawing from an analysis conducted by the U.S. Department of Energy (DOE) for 45V tax credit implementation, we recommend that CARB limit geographic eligibility for biomethane to the states of Washington, Oregon, and California, as this would be roughly consistent with the geographic deliverability for electricity proposed for 45V.<sup>56</sup> Alternatively, CARB can reference geographic zones from the U.S. natural gas transmission network to set its deliverability boundaries.<sup>57</sup>

<sup>56</sup> <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>

<sup>57</sup> [https://www.eia.gov/naturalgas/archive/analysis\\_publications/ngpipeline/index.html](https://www.eia.gov/naturalgas/archive/analysis_publications/ngpipeline/index.html)

(45d-213.22)

**Comment:** The deliverability requirements proposed in the ISOR also fall short of initiating any meaningful change to current operating conditions. This is due to significant implementation delay and looser guidance granted to hydrogen producers. CARB has noted that this delay is intentional to encourage a “rapid buildout of biomethane capture projects” before the end of the decade to meet the state’s methane reduction goals. However, attributing biomethane capture to the LCFS program belies the reality that majority of these emissions reductions occur out of state and outside the transportation sector. Credited RNG volumes may also begin to exceed the quantity of natural gas consumed in California’s transportation sector, further stretching the plausibility of the argument that RNG contributes to reducing California’s transportation GHG emissions. Previous ICCT analysis has found that RNG volumes credited under the LCFS accounted for 98% of natural gas vehicle consumption in California in 2021.<sup>58</sup> As demand for CNG declines even further, new RNG production will have no little to no impact on displacing in-state petroleum consumption and meeting the goals of the 2022 Scoping Plan.

<sup>58</sup> <https://theicct.org/wp-content/uploads/2023/05/california-rng-outlook-2030-may23.pdf>

(45d-213.24)

**Comment:** In summary, we recommend that CARB implement stronger deliverability requirements for all pathways derived from biomethane within the next three years to prevent out of sector emission reductions within an in-state transportation policy. For pathways that are already certified, we recommend that deliverability requirements take effect at the end of the current 10-year crediting period. (45d-213.25)

**Comment:** BAC strongly supports the increased stringency of the proposed regulation, but is very concerned about the continued use of Book and Claim for undelivered biomethane and the phase-out of avoided methane credits. Failing to require delivery of biomethane means that California will continue to use fossil gas on the road and it will hurt in-state projects that are converting organic waste to energy to meet the state’s Short-Lived Climate Pollutant reduction, landfill diversion, wildfire reduction, and other important state policies. Phasing out credit for avoided methane emissions, even when they are not required by law, will also undermine efforts to meet the SLCP reduction requirements of SB 1383. BAC urges the Air Board, therefore, to revise the amendments to require biomethane delivery consistent with RPS and SB 1440, and to only phase out avoided methane emissions to the extent that they are required by law.

...

## **BOOK AND CLAIM SHOULD BE PHASED OUT CONSISTENT WITH THE RPS AND SB 1440.**

BAC urges the Air Board to go back to the staff recommendations in 2022 and 2023 that would have phased out undelivered biomethane consistent with the RPS and SB 1440. This is critical for several reasons, described below. At the same time, BAC urges the Air Board to allow Book and Claim for biomethane used to produce low-CI electricity, provided both the

biomethane and the electricity are produced and delivered consistent with the RPS and SB 1440.

### **1. Undelivered Biomethane Does Not Help California Reduce SLCP Emissions.**

SB 1383 requires significant reductions in methane and black carbon emissions by 2030, and diversion of 75 percent of organic landfill waste by 2025. Biomethane generated in other states that is never delivered to California does not help to meet these critical climate and public health goals. This is why the Legislature, in SB 1440 (Hueso, 2018) requires that eligible biomethane must help achieve the goals of SB 1383.<sup>1</sup> SB 1440 further requires that the capture or production of eligible biomethane must directly result in at least one of the following environmental benefits to California: reduction of air pollutants or greenhouse gas emissions, reduction of water pollution, or reduction of odors in California.<sup>2</sup>

<sup>1</sup> Public Utilities Code section 651(a)(1).

<sup>2</sup> Public Utilities Code section 651(a)(3)(B)(ii).

Only instate biomethane or biomethane that is actually delivered to California helps to meet the methane and black carbon reduction requirements of SB 1383 or to provide benefits to California's environment, as outlined in SB 1440.

The Air Board should phase out undelivered biomethane, as the 2023 staff proposals lay out, to help meet the requirements of SB 1383, reduce open burning and mitigate wildfire. Only instate or delivered biomethane provides these critical benefits.

### **2. Undelivered Biomethane Means that California Vehicles Will Continue to Use Fossil Gas.**

From its inception, the Low Carbon Fuel Standard has had two goals, reducing carbon emissions and reducing fossil fuel use in motor vehicles. Continuing to allow credit for undelivered biomethane means that natural gas vehicles on the road in California will in fact be using fossil fuel gas. This is not a desirable result since fossil fuel production, refining and transport have adverse impacts on the environment and public health. It will also undermine support for the LCFS program since California drivers will continue to pay a premium for low carbon fuels that aren't even being delivered to California – in other words, Californians are being asked to buy something that they never in fact receive.

Phasing out the use of fossil fuels on the road in California requires that low carbon and renewable fuels actually be delivered and used to displace fossil fuels.

### **3. Allowing Undelivered Biomethane Puts Instate Projects at a Severe Disadvantage.**

Allowing undelivered biomethane to participate in the LCFS reduces demand for instate biomethane, since instate production is significantly more expensive than out-of-state and undelivered fuels. California has stronger environmental, public health, labor, permitting, and other requirements. As an example, interconnection costs in California can be 2 to 10 times higher than in other states. California also has the most stringent pipeline biomethane standards in the country and the Air Board has recently proposed making pipeline biomethane standards even more stringent. Out of state biomethane projects do not have to meet California's standards to protect public health and pipeline integrity, which puts instate projects at a competitive disadvantage.

Continuing to make instate projects compete with undelivered biomethane will only slow the state's efforts to reduce SLCP emissions, landfilling, and wildfire as it makes it harder for instate projects to compete, both economically and in terms of the time needed to develop projects.

#### **4. The LCFS Should be Consistent with the Legislatively Mandated RPS and SB 1440 Programs.**

For all the reasons above, BAC urges the Air Board to go back to the staff proposals on the LCFS, which would have phased out undelivered biomethane consistent with the RPS and SB 1440. The 45-day language does not do this in any meaningful way. Projects built before 2030 will never be required to deliver their biomethane to California. And projects built after 2030 do not have to show delivery until 2040 or later and, even then, only have to inject the biomethane into a pipeline that flows in the general direction of California. This is not a clear standard and definitely does not ensure that the biomethane will help reduce SLCP emissions or provide other environmental benefits in California, as both SB 1440 and the RPS require.

#### **5. The LCFS Regulation Should Allow Book and Claim for Biomethane that is Delivered for Use in California, Including for Low-CI Electricity, Consistent with the RPS.**

BAC supports the use of Book and Claim for biomethane that is both generated and used in California or the western United States, whether it is used offsite as biomethane, for low-CI electricity generation or for hydrogen production. BAC urges the Air Board to clarify in the amendments to the LCFS regulation that book and claim for biomethane converted to low-CI electricity is allowed, provided that both the biomethane and low-CI electricity production are consistent with the RPS. This could be done by adding conversion of biomethane to low-CI electricity in Sections 95488.8(i)(2) and 95488.8(g)(1)(A)(2). (45d-246.1)

**Comment:** Brightmark supports the continued alignment of deliverability requirements for RNG with that 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. Unlike transmission power grids, gas pipelines can deliver biomethane from the East Coast to the West Coast. (45d-320.6, Apr-082.22)

**Comment: Immediately End the Practice of Allowing CNG Companies to Greenwash Fossil Methane through the Purchase of Unbundled Biomethane Credits.**

#### **Biomethane Deliverability**

**Summary of Problem:** A lack of deliverability requirements for biomethane allows fossil methane producers to greenwash their fuels by using unbundled "environmental attribute" credits that do nothing to contribute to California's climate goals.

**Earthjustice Recommendation:** Align LCFS deliverability requirements for all fuels, including biomethane, with the RPS beginning in 2025.

**Why Staff Proposal Is Inadequate:** Staff proposes a weak deliverability requirement to apply to biomethane dispensed at CNG stations in 2041 and for biomethane used for hydrogen

production in 2046. These extended timelines are unjustified and will perpetuate greenwashing for decades and fails to align with other programs.

Under Staff's proposed deliverability requirement, industry would only be able to buy biomethane credits from entities that inject biomethane into a pipeline that flows toward California, but they would still be able to characterize their fossil methane purchases as biomethane by buying unbundled credits.

The LCFS gives CNG companies a unique greenwashing opportunity that is not available to any other fuel provider: The CNG industry alone can take credit for using low carbon fuels that are never delivered to California. Consequently, the CNG industry is now generating lavish credits for purchasing unbundled credits that do nothing to advance the fundamental purpose of the LCFS, which is to reduce the carbon intensity of California's transportation fuels.<sup>58</sup> The Staff Proposal is yet another misdirection running counter to the Board's September comments to Staff. The deliverability requirement is completely excluded for pathways prior to 2030 (or later, based on the unclear "break ground" concept), and projects entering after 2030 have another 11 to 16 years of no deliverability requirements. This 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. By continuing to give public funds to support outdated technologies, CARB is undermining its own ZEV and carbon neutrality goals, for the profit of mostly out-of-state companies, and at the expense of Californians. This U-turn on what Staff told the Board they were considering in September flies in the face of Board direction to go even stronger on deliverability requirements at that meeting, where 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."<sup>59</sup>

58 ISOR at 6 ("The purpose of the LCFS regulation is to reduce the carbon intensity (CI) of transportation fuels used in California").

59 CARB Board Meeting Transcript (Sept. 28, 2023) at 315, <https://ww2.arb.ca.gov/sites/default/files/barcu/board/mt/2023/mt092823.pdf>.

To align its deliverability requirements with the Renewable Portfolio Standard (RPS), CARB should only allow an entity to claim it dispenses biomethane if it buys biomethane (bundled with its environmental attributes) and contracts for its delivery to California and any interstate deliveries via common carrier pipelines use pipelines that flow toward California. This commonsense reform will eliminate a stain on the integrity of the LCFS and align the LCFS with federal practice.

As shown in Table 1, the ISOR's delayed phase-in for the biomethane deliverability requirement is part of a troubling pattern. The ISOR's proposed amendments related to biomethane would not only fail to provide the immediate corrections that are necessary to end unjustified subsidies for polluting fuels—they are delayed beyond the unacceptably prolonged timelines discussed in public workshops.

**Table 1: Comparing the Timelines for Limiting Unjustified Biomethane Subsidies Proposed in Workshops with the those Proposed in the ISOR**

Policy	Public workshops	Staff Proposal	Issue	Fix
<b>Avoided Methane Crediting (AMC)</b>	<p>Allow AMC for 10 years for project certification or recertification before 2030.</p> <p>Allow AMC for 5 years for projects recertified between 2031 and 2035 (i.e., no new project AMC approved after 2030).</p> <p>AMC is phased out of LCFS by 2040, with no new AMC approved for new projects after 2030.</p>	<p>Allow projects that “break ground” prior to 2030 up to 30 years of AMC.</p> <p>Allow RNG used in CNG vehicles to get 10 years of crediting if applying between 2030 and 2041.</p> <p>Allow RNG used for book-and-claim hydrogen to get 10 years of crediting if applying between 2030 and 2046.</p> <p>Allows AMC through 2060 for certain projects, 2056 for others, and 2051 for others.</p>	<p>The original concept was flawed and the ISOR policy goes counter to Board direction provided to Staff in September 2023, what Staff have said numerous times in pre-rulemaking workshops, and Scoping Plan direction to move RNG out of transportation and to move the State away from combustion.</p>	<p>End AMC for all new pathways starting 2025. Allow current 10-year crediting periods to finish.</p>
<b>Biomethane Deliverability</b>	<p>Align deliverability concepts with RPS / CPUC 1440 Program beginning in 2028.</p> <p>Book-and-claim RNG-to-hydrogen is exempt.</p>	<p>Only apply deliverability requirements to project that “break ground” after 2029, and those requirements only begin in 2041 for CNG vehicles and 2046 for book-and-claim hydrogen.</p> <p>Lifetime exemption of deliverability requirement for projects that “break ground” before 2030. For projects entering LCFS after 2029, they only have to begin to show deliverability starting in 2041 (for vehicle combustion) or 2046 (for book-and-claim hydrogen).</p>	<p>The original concept was flawed as there is no reason to delay delivery requirements that have uniquely favored RNG, and no reason to exempt any pathways. These do not help meet State climate goals in AB 1279 because they are not included in California’s GHG inventory.</p> <p>Continues to treat biomethane differently from other fuels, which are required to be delivered to California.</p>	<p>Require deliverability for all pathways beginning in 2025.</p>
<b>“Break Ground” Concept</b>	<p>Never discussed by Staff. Workshop concept introduced phase-outs based on date “pathways certified or recertified.”</p>	<p>Allows projects that apply for LCFS years after the official policy has sunset that only applies to biomethane projects, including book-and-claim.</p>	<p>This nebulous concept will result in LCFS project approvals for years after 2030. Favors biomethane projects over ZEV. No such provisions for ZEV projects.</p>	<p>Remove this concept.</p>

**The Current Rules Grant Biomethane Special Status as the Only LCFS Fuel that Can Claim Unbundled Credits that Do Not Reduce Climate Pollution from California Transportation Fuels.**

Under the current LCFS rules, CNG companies can generate credits for supplying biomethane even when the fuel procurements for their fueling stations are 100% fossil methane. These companies purchase fossil methane in the natural gas commodities market and contract for delivery of their fossil gas via natural gas pipelines. These CNG fueling companies can generate valuable LCFS credits by using a process that the regulation refers to as “book-and-claim” accounting to characterize their fossil fuels as biomethane. Under this scheme, a CNG company must simply purchase the environmental attributes of biomethane that is injected into a common carrier pipeline anywhere in North America and submit attestations regarding those environmental attributes.<sup>60</sup> There is no requirement for the LCFS credit generator to purchase the biomethane itself or even that the biomethane flow toward California.<sup>61</sup> Thus, the unbundled environmental attributes essentially allow CNG companies to claim they offset emissions from the fossil fuels they procure and sell to the public.

<sup>60</sup> 17 California Code of Regulations (CCR) § 95488.8(i)(2).

<sup>61</sup> *Id.*

The purchase of biogas credits from Wisconsin cow manure illustrates how CNG suppliers generate outsized credits without reducing the carbon intensity of California’s transportation fuels. Wisconsin dairies that sell environmental attributes into the LCFS program sell the biomethane to their utilities, which inject the biomethane into their local gas distribution systems (i.e., the pipes that flow to their customers’ homes and businesses—not interstate pipelines).<sup>62</sup> The CNG industry uses these unbundled attributes to generate a bounty of credits, with CNG paired with Wisconsin manure credits currently garnering carbon intensity scores from -130 to -453 gCO<sub>2</sub>e/MJ.<sup>63</sup> These negative carbon intensity scores reflect bogus carbon accounting, as the dairies participating in the utility program had previously captured their methane and used it to generate electricity.<sup>64</sup> Nonetheless, the dairies receive such generous compensation for selling credits into the LCFS program that they are willing to sell their biomethane to the local utility for less than the price of fossil gas.<sup>65</sup> Driving down the price of methane in Wisconsin threatens to induce additional gas consumption, lock in dependence on gas, and, increase greenhouse gas emissions. CARB can avoid these perverse outcomes by treating biomethane like every other fuel—requiring credit generators to procure biomethane through bundled contracts and taking delivery of it.

<sup>62</sup> Chris Hubbuch, Wisconsin State Journal, Biogas: Wisconsin utilities partner with farmers to replace fossil gas (July 19, 2022), [https://madison.com/news/local/environment/biogas-wisconsin-utilitiespartner-with-farmers-to-replace-fossil-gas/article\\_a88d7d1f-ec1f-56ed-b5c1-d12d2cd3d814.html](https://madison.com/news/local/environment/biogas-wisconsin-utilitiespartner-with-farmers-to-replace-fossil-gas/article_a88d7d1f-ec1f-56ed-b5c1-d12d2cd3d814.html).

<sup>63</sup> This is the range of CI scores listed for unretired fuel pathways in CARB’s Current Fuels Spreadsheet for the CNG Fuel Type and with a Wisconsin Facility Location (Jan. 9, 2024 ed.), [https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/current-pathways\\_all.xlsx](https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/current-pathways_all.xlsx).

<sup>64</sup> Chris Hubbuch, Wisconsin State Journal, Biogas: Wisconsin utilities partner with farmers to replace fossil gas (July 19, 2022), [https://madison.com/news/local/environment/biogas-wisconsin-utilitiespartner-with-farmers-to-replace-fossil-gas/article\\_a88d7d1f-ec1f-56ed-b5c1-d12d2cd3d814.html](https://madison.com/news/local/environment/biogas-wisconsin-utilitiespartner-with-farmers-to-replace-fossil-gas/article_a88d7d1f-ec1f-56ed-b5c1-d12d2cd3d814.html).

<sup>65</sup> *Id.*

No other fuel suppliers can greenwash fossil fuels by purchasing the unbundled environmental attributes of fuels that are not delivered to California. For instance, as shown in Table 2, entities cannot generate LCFS credits by pairing their sales of fossil diesel with the renewable attributes of renewable diesel. To generate credits for selling renewable diesel, entities must procure and take delivery of that renewable diesel.<sup>66</sup> Similarly, the LCFS’ book-and-claim rules for low-CI electricity require electricity to be generated within California or meet the



deliverability requirements for Portfolio Content Category 1 Renewable Energy Certificates.<sup>67</sup> In practice, this commonsense requirement ensures that CARB will not consider an electric vehicle charged on the California grid to be powered by a renewable electricity generator unless that generator actually energizes the California grid. As CARB Staff explained in this rulemaking process, “CARB needs . . . pathway or documentation of feedstock usability in California” to consider a feedstock for the LCFS program.<sup>68</sup> CARB should immediately end biomethane’s unjustified exception from this rule.

<sup>66</sup> California Government Code § 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 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.”).

<sup>67</sup> CARB, LCFS Guidance 19-01 at 2,

[https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/guidance/lcfsguidance\\_19-01.pdf](https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/guidance/lcfsguidance_19-01.pdf).

<sup>68</sup> CARB, Staff Workshop Presentation (Nov. 9, 2022), slide 19.

**Table 2: Deliverability Requirements for LCFS Fuels: Biomethane Is the Outlier**

<b>LCFS Fuel</b>	<b>Is Delivery to California Required?</b>
Renewable diesel	Yes
Biodiesel	Yes
Ethanol	Yes
Aviation fuel	Yes
Electricity	Yes. Low-CI electricity used as a transportation fuel must be delivered to a California balancing authority. For out-of-state hydrogen producers, low-CI electricity must be delivered to their local balancing authority.
Fossil natural gas	Yes
Biomethane used for process energy (e.g., biomethane burned for heat or power at oil refineries)	Yes. Biomethane used for process energy “must be physically supplied directly to the production facility.” 17 CCR § 95488.8(h)(2).
Biomethane used for CNG fueling and hydrogen production	<b>No.</b> Staff proposes a weak deliverability requirement to apply to biomethane dispensed at CNG stations in 2041 and for biomethane used for hydrogen production in 2046, and these dates only apply to projects that “break ground” after 2029.

### **Staff’s Proposal Does Not Address the Problem and Would Continue the LCFS’s Status as an Outlier in Its Faulty Treatment of Biomethane.**

Staff propose a long-delayed and incomplete solution to the problem of the LCFS providing credits for biomethane that does nothing to meet State GHG and SLCP reduction goals. Staff propose adding a deliverability requirement for a very limited set of biomethane projects

starting in 2041, but the ISOR provides no rationale for this delay.<sup>69</sup> Rather than delay action for over a decade, CARB should immediately end the CNG industry's opportunity to generate credits for biomethane that does not reduce the carbon intensity of California's transportation fuels.

<sup>69</sup> ISOR at 31.

Staff's proposal is inferior to requiring purchases and delivery contracts for biomethane for multiple reasons. First, it provides a credit generation opportunity to CNG companies that prop up the fossil fuel industry by purchasing fossil methane. Second, Staff's proposed deliverability requirement fails to achieve its stated purpose of aligning with other programs, as it does not incorporate the basic standards that CARB's sister agencies require. The ISOR explains that Staff's approach is designed "to align 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."<sup>70</sup>

<sup>70</sup> *Id.*

However, neither the RPS nor 1440 programs allow industry to greenwash the fossil fuels with purchase of unbundled environmental attributes. Instead, these programs require entities that claim to use biomethane to procure biomethane and deliver it to California.<sup>71</sup> In fact, the CPUC has recognized that allowing "Utilities to purchase renewable attributes separate from physical RNG . . . would result in negligible to no direct environmental benefits to California, contradictory to the statutory and policy goals" of SB 1440.<sup>72</sup> Table 3 demonstrates the LCFS's outlier status. CARB should catch up with its sister agencies and put an end to this carbon accounting gimmick in the LCFS program.

<sup>71</sup> In the RPS program, facilities claiming to use biomethane must enter a biomethane procurement contract. CEC, RPS Eligibility Guidebook, Ninth Edition Revised (2017) at 7. To ensure entities claiming to use biomethane can legally take delivery of that biomethane, the CEC also requires entities to "enter into contracts for the delivery (firm or interruptible) or storage of the gas with every pipeline or gas storage site operator transporting or storing the gas from the injection point to the final delivery point." *Id.* at 9. SB 1440 authorized targets for biomethane procurement, not environmental attribute procurement. Cal. Public Utilities Code § 651(a). Once a utility procures biomethane, it can only legally take delivery of that fuel and provide it to its customers if it has legal access to the gas pipeline infrastructure that connects the biomethane supplier to the utility's customers. In implementing SB 1440, the Public Utilities Commission avoided double-counting environmental attributes by requiring the utilities that procure methane to "maintain exclusive ownership of all environmental attributes from contracted renewable fuel sources." Decision 22-02-25, Decision Implementing Senate Bill 1440 Biomethane Procurement Program at 57, Conclusion of Law 19, <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M454/K335/454335009.PDF>.

<sup>72</sup> Decision 20-12-022, Decision Adopting Voluntary Pilot Renewable Gas Tariff Program at 20, <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M356/K268/356268059.PDF>.

Moreover, the LCFS's subsidies for fossil fuel companies that purchase unbundled biogas credits set it apart from the commonsense approach at the federal level. 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.<sup>73</sup> It is particularly unacceptable for California's LCFS to lavishly subsidize fossil fuel users who purchase unbundled biogas credits, when such gimmicks are not tolerated at the federal level.

<sup>73</sup> 40 Code of Federal Regulations § 80.1426(f)(11)(ii).

**Table 3: Comparison of the LCFS with Other Programs that Include Biomethane**

<b>Programs that Include Biomethane</b>	<b>Does It Require Deliverability?</b>
CEC's RPS	Yes
CPUC SB 1440 Program	Yes
EPA's RFS	Yes
LCFS (process energy)	Yes
LCFS (CNG fueling and hydrogen production)	<b>No</b>

Although Staff's proposal regarding deliverability is insufficient as detailed above, its proposed approach to determining deliverability is workable. Specifically, Staff proposes requiring a "demonstration that eligible biomethane is carried through common carrier pipelines that physically flow within California or toward end use in California."<sup>74</sup> 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 lines.<sup>75</sup> The EIA has also synthesized this data into a map that shows that flow of the nation's interstate gas pipelines.<sup>76</sup> Thus, even if CARB decides to base its deliverability requirement on the direction of interstate pipeline flows, there is no barrier to implementing this requirement immediately.

<sup>74</sup> *Id.*

<sup>75</sup> 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>.

<sup>76</sup> EIA, Natural Gas Market Module of the National Energy Modeling System: Model Documentation 2022 (Aug. 2022) at 3, [https://www.eia.gov/outlooks/aeo/nems/documentation/ngmm/pdf/ngmm\(2022\).pdf](https://www.eia.gov/outlooks/aeo/nems/documentation/ngmm/pdf/ngmm(2022).pdf).

### **Real Solutions Are Needed in this Rulemaking.**

CARB should stop allowing industry to greenwash fossil methane with unbundled environmental attributes in beginning in 2025. To actually reduce the carbon intensity of California transportation fuels, CARB should immediately require entities that claim to use biomethane to justify their claims by actually purchasing and contracting for delivery of that biomethane. To adopt meaningful requirements, CARB can borrow model language from the RPS program. 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.<sup>77</sup> The ISOR provides no rationale for adopting a deliverability requirement that lacks these commonsense elements of the RPS requirements.

<sup>77</sup> CEC, RPS Eligibility Guidebook at 7, 9–10.

(45d-383.37)

### **Comment: Align Deliverability of Low-CI Electricity with other Clean Fuel Standards**

Under the existing LCFS regulation, biogas-to-electricity projects participating in the LCFS must physically wheel the power into California, while RNG projects may be located anywhere in North America and use 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. 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, would be to let such projects 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 and in Washington under their Clean Fuel Standard. In the ISOR staff mention exportability of the LCFS into other jurisdictions, and other jurisdictions are adopting or aligning their respective clean fuel standards with the LCFS. CleanFuture requests that CARB reciprocate and adopt beneficial rules and practices that may originate outside of California. (45d-393.1)

**Comment:** For all new biomethane-derived hydrogen pathways, implement geographic deliverability requirements within the next three years. (Apr-108.6)

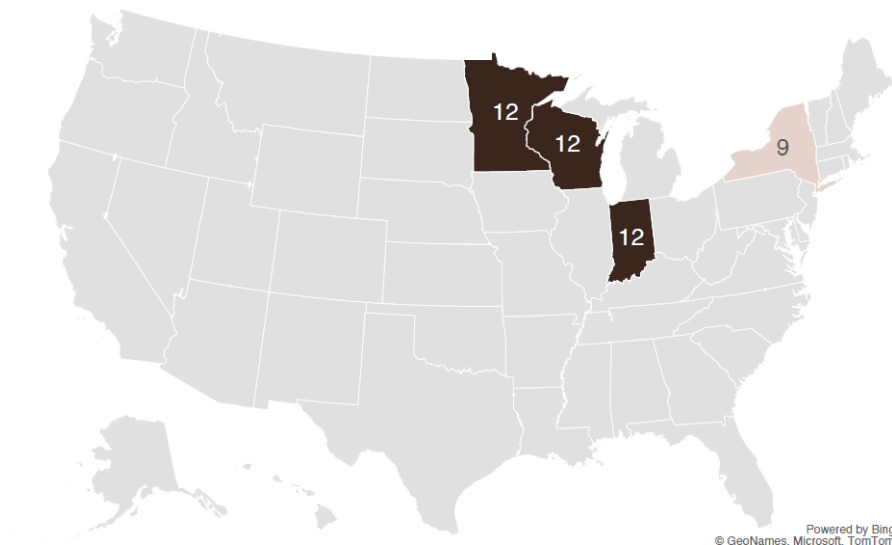
**Comment:** Data provided at the April workshop shows that ARB models a high reliance on dairy biomethane-derived hydrogen for its LCFS compliance. We find that by 2030, ARB's most ambitious scenario projects dairy biomethane-derived hydrogen will generate more credits than renewable diesel. The current book-and-claim system within the LCFS allows for indirect accounting of renewable natural gas (RNG) as long as it is injected into the North American natural gas grid. By virtue of the avoided methane emissions credit, this pairs high credit and compliance value with out-of-sector emissions reductions achieved at farms out of state. As a result, a hydrogen producer can purchase credits from an RNG producer, even when there is no direct, exclusive pipeline connection between the two facilities. The modeling does not distinguish between in state and out-of-state projects for dairy biomethane-derived hydrogen, thus making it difficult to determine to what extent future compliance will come from out-of-state projects.

Figure 4 provides an overview of existing dairy biomethane-derived hydrogen pathways certified under the LCFS by location, illustrating that 100% of these pathways in California are sourcing their biomethane from out-of-state digesters.<sup>21</sup> While the stated benefit of this system is to support hydrogen deployment, this accounting system favors existing fossil-based steam methane reforming (SMR) technologies by pairing them with a tradeable certificate for an out-of-state project. The high policy value for this pathway does not support the technology transition in California to more advanced technologies, such as hydrogen production via electrolysis, which would support emissions reductions in the long term. At present-day LCFS credit values, dairy biomethane-derived hydrogen would generate over \$4 per kg, roughly 3 times the value of zero-CI electrolytic hydrogen produced from renewable electricity which would only generate approximately \$1.50/kg.<sup>22</sup>

<sup>21</sup> California Air Resources Board, "Current Fuel Pathways," n.d.,

[https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/current-pathways\\_all.xlsx](https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/current-pathways_all.xlsx).

<sup>22</sup> Assuming an LCFS credit value of \$75/ton and an EER of 1.9 for the use of hydrogen in heavy-duty vehicle transport. Calculated via the LCFS credit price calculator. <https://ww2.arb.ca.gov/sites/default/files/2022-03/creditvaluecalculator.xlsx>



*Figure 4: Geographic source of certified dairy RNG projects for hydrogen production in California.*

Although deliverability requirements are proposed in the Initial Statement of Reasons (ISOR) released by ARB<sup>23</sup>, they would only go into effect after January 1, 2046, for biomethane hydrogen projects that break ground after December 31, 2029. No deliverability requirements will be in effect for the projects that break ground before January 1, 2030.

<sup>23</sup> California Air Resources Board, “Staff Report: Initial Statement of Reasons,” December 2023, <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>.

To assess the potential risk to the LCFS, we draw upon data from the recently-published Census of Agriculture<sup>24</sup> to identify how many large-scale, centralized farms could be eligible to participate in the program. We chose 2,500 heads of cattle as a cut-off since this number represents profitable digester projects according to our previous assessment.<sup>25</sup> Figure 5 below illustrates the geographic distribution of these large farms across the country. Although California is home to around 31% of these farms nationwide, it is evident from the Census that there is a large pool of out-of-state farms (579 total) that could qualify for LCFS credits, though it is not possible to quantify their potential fuel production from the data. The Census data also indicates that California’s overall number of dairy farms of this size increased 17% between 2017 and 2022. Although installing digesters is a viable method for methane mitigation, it may not result in overall, absolute emissions reductions if the dairy industry keeps growing in California.

<sup>24</sup> 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/](https://www.nass.usda.gov/Publications/AgCensus/2022/Full_Report/Volume_1,_Chapter_1_State_Level/).

<sup>25</sup> 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-rngoutlook-2030-may23/>.

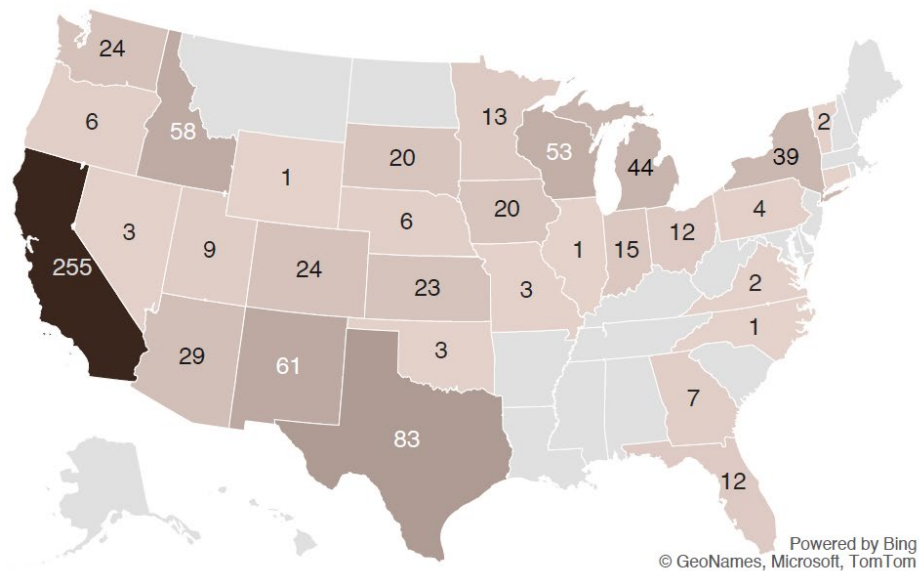


Figure 5: Distribution of dairy farms per state with dairy cattle head greater than 2,500.

Out-of-state swine farms capturing biogas could also take advantage of the generous LCFS credits. There are already several certified pathways for swine manure-derived RNG from Missouri being used as an offset for carbon intensity reductions for hydrogen production in California.<sup>26</sup> To show the risk from the swine farms, 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 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.

<sup>26</sup> California Air Resources Board, “Current Fuel Pathways.”

Allowing compliance from a broad, nationwide pool of farms also poses risks to the value of LCFS credit markets. Though the higher targets and AAM proposed in the ISOR are intended to lift LCFS credit prices, there is a risk that this goal may be diluted by out-of-sector avoided methane emissions supported by separate policies. For example, dairy digester-sourced RNG procured from outside of California benefits from D3 RINs, which trade at above \$3 per ethanol-equivalent gallon and are insulated from recent price declines for other RIN categories.<sup>27</sup> This biomethane may also benefit from next year’s 45Z Clean Fuel Production tax credit, which may award a further \$1 per gallon-equivalent. While this is no different from the combination of incentives available for other transport fuels eligible for the LCFS, it does indicate that the viability of these projects—and therefore, the attributability of avoided methane credits to the LCFS—is not solely attributable to the program and therefore an additional guardrail may be necessary.

<sup>27</sup> <https://www.epa.gov/fuels-registration-reporting-and-compliance-help/rin-trades-and-price-information>

In summary, the high compliance value of manure biomethane-derived hydrogen is inconsistent with its contribution to in-state methane reduction goals or transport sector decarbonization. The loose deliverability requirements will do more to facilitate the deployment of digesters in other states, rather than investment in hydrogen conversion technologies in California. The risk of moving forward with loose deliverability requirements is acute; there are

hundreds of out-of-state dairy and thousands of swine farms that could take advantage of these incentives.

To mitigate these risks, we recommend that ARB establish a geographic deliverability requirement that connects dairy RNG directly to hydrogen producers in California as soon as possible. Therefore, we recommend that ARB align the deliverability requirements for biomethane used as a hydrogen feedstock with geographic deliverability requirements similar to those required for low-CI electricity to ensure better geographic correlation and focus support on pathways which tangibly reduce emissions in California. A simple geographic deliverability requirement will be more transparent, easier to implement, and is preceded from the deliverability requirements for low-CI electricity. Drawing from an analysis conducted by the U.S. Department of Energy (DOE) for 45V tax credit implementation, we recommend that ARB limit geographic eligibility for biomethane to the states of Washington, Oregon, and California, as this would be roughly consistent with the geographic deliverability for electricity proposed for 45V.<sup>56</sup> Alternatively, ARB can reference geographic zones from the U.S. natural gas transmission network to set its deliverability boundaries.<sup>57</sup> (Apr-108.9)

**Comment:** The failure to adopt a meaningful delivery requirement will continue to put instate projects at a disadvantage since California has more stringent environmental, labor, pipeline injection, and other standards. (Apr-150.2)

**Comment: BOOK AND CLAIM SHOULD BE CONSISTENT WITH THE RPS AND SB1440.**

BAC urges the Air Board to go back to the staff recommendations in 2022 and 2023 that would have phased out undelivered biomethane consistent with the RPS and SB 1440. As BAC noted in its February comments on the 45-day language, continued credit for undelivered fuels harms California's climate and air quality goals for several reasons, including:

- Undelivered biomethane does not help California to reduce SLCP emissions.
- Undelivered biomethane means that California vehicles will continue to use fossil gas, contradicting one of two primary goals of the program, which is to reduce fossil fuel use on the road in California.
- Allowing undelivered biomethane puts instate projects at a severe disadvantage since instate production can be significantly more expensive due to stronger environmental, labor, pipeline injection, and other standards.
- Undelivered biomethane does not help to reduce landfilling, pollution from dairies, or wildfire risks, nor does it provide as many jobs and economic development in California.

For all these reasons, BAC urges the Air Board to go back to the staff proposals on the LCFS, which would have phased out undelivered biomethane consistent with the RPS and SB 1440. The 45-day language does not do this in any meaningful way. Projects built before 2030 will never be required to deliver their biomethane to California. And projects built after 2030 do not have to show delivery until 2040 or later and, even then, only have to inject the biomethane into a pipeline that flows in the general direction of California. This is not a clear standard and definitely does not ensure that the biomethane will help reduce SLCP emissions instate or provide other environmental benefits in California. (Apr-150.12)



**Comment: Failure to end the practice of allowing compressed natural gas (CNG) companies to greenwash fossil methane through the purchase of unbundled biomethane credits.**

- 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. (15d1-222.4)

**Comment: 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.**

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.<sup>17</sup> This failure persists in the proposed 15-day changes despite the fact that Staff had previously aspired to alignment with the RPS.<sup>18</sup> 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.

<sup>17</sup> 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.

<sup>18</sup> 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).

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.<sup>19</sup> 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.<sup>20</sup> 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."<sup>21</sup> Staff have done nothing of the sort.

<sup>19</sup> CARB, Proposed 15-Day Changes, § 95488.8 (i)(2)(B)(1).

<sup>20</sup> 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/nems/documentation/ngmm/pdf/ngmm\(2022\).pdf](https://www.eia.gov/outlooks/aeo/nems/documentation/ngmm/pdf/ngmm(2022).pdf).

<sup>21</sup> CARB Board Meeting Transcript (Sept. 28, 2023) at 315, <https://ww2.arb.ca.gov/sites/default/files/barcu/board/mt/2023/mt092823.pdf>.

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.<sup>22</sup> Similarly, the LCFS' book-and-claim rules for low-CI electricity require electricity to be generated within California or meet the deliverability requirements for Portfolio Content Category 1 Renewable Energy Certificates.<sup>23</sup> CARB must immediately end biomethane's unjustified exception from this rule.

<sup>22</sup> 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 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.").

<sup>23</sup> CARB, LCFS Guidance 19-01 at 2, [https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/guidance/lcfsguidance\\_19-01.pdf](https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/guidance/lcfsguidance_19-01.pdf).

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. (15d1-222.21)

**Agency Response:** No changes were made in response to these comments. The Proposed Amendments are designed to align with the deliverability policy for biomethane in the California Energy Commission's RPS program and the California Public Utilities Commission 1440 program. Specifically, the proposal requires that pathway holders demonstrate that eligible biomethane is carried through common carrier pipelines that physically flow within California or toward the 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. The 50% flow requirement helps to demonstrate physical deliverability of RNG molecules to California fuel suppliers. Biomethane fuel pathways that break ground before January 1, 2030, would not be subject to the deliverability requirements. That exemption from deliverability requirements is expected to encourage rapid buildout of biomethane capture projects at dairy and swine manure facilities across North America that have historically released large amounts of methane into the atmosphere. Rapid buildout is needed this decade to reduce methane emissions everywhere and to avoid the worst impacts of climate change. The proposed deliverability requirements also would not apply to biomethane matched to hydrogen fuel pathways participating in the LCFS program.

### **Z-2.3 Multiple Comments: *Enforce Deliverability Requirement Earlier***

**Comment:** CARB's current "deliverability" requirements that out-of-state biogas be simply added to a North American pipeline — without assurance that it will be used in California — run counter to the intention of the LCFS and greatly weaken the effectiveness of the policy. The proposed amendments to strengthen the "deliverability" requirement for projects started after 2029, with a 10-year grace period, unnecessarily delaying a much-needed fix that could and should happen next year.

CARB's own Initial Statement of Reasons (ISOR) admits that biogas takes up only a fraction of vehicle fuel use and that biogas use will decline as zero emission vehicles penetrate the market.<sup>14</sup> There is an acknowledgement that biogas as a transportation fuel will need to transition out of the fuel mix to avoid stranded assets. We agree and would argue that waiting until after 2029 (with an additional 10-year grace period) to phase out biogas crediting is an excessively long period and should be eliminated, particularly for a transportation fuel that depends on waste production and could add GHG emissions in its production.

<sup>14</sup> <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>

(45d-042.3)

**Comment:** 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. (45d-154.13)

**Comment:** 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 MMBtu<sup>19</sup> per 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. (45d-154.14)

**Comment:** The phase out timing for biogas credits is too long

CARB's current "deliverability" requirements that out-of-state biogas be simply added to a North American pipeline — without assurance that it will be used in California — run counter to the intention of the LCFS and greatly weaken the effectiveness of the policy. The proposed amendments to strengthen the "deliverability" requirement for projects started after 2029, with a 10-year grace period, unnecessarily delaying a much-needed fix that could and should happen next year.

CARB's own Initial Statement of Reasons (ISOR) admits that biogas takes up only a fraction of vehicle fuel use and that biogas use will decline as zero emission vehicles penetrate the market.<sup>14</sup> There is an acknowledgement that biogas as a transportation fuel will need to transition out of the fuel mix to avoid stranded assets. We agree and would argue that waiting until after 2029 (with an additional 10-year grace period) to phase out biogas crediting is an excessively long period and should be eliminated, particularly for a transportation fuel that depends on waste production and could add GHG emissions in its production.

<sup>14</sup> <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf>

(Apr-010.8)

**Comment:** Further, CARB doubles down on treating out-of-state dairy emissions favorably by not immediately requiring the gas to be delivered to California, unlike all other fuels in LCFS. As explained above, this means that the LCFS is sending a large portion of its revenues out of state, thereby undermining California's ability meet its short-lived climate pollutant reduction goals and other climate goals. Under the Proposal's weak deliverability provision, CARB does not require deliverability to California until 2041 for compressed natural gas ("CNG") and until 2046 for methane used to make hydrogen. CARB only moves up this requirement to 2038 if an arbitrary heavy-duty truck threshold is met. Worse, this 2038 provision only applies to dairy methane used as a final fuel (i.e., CNG)-which is already being phased out of California's transportation systems-and not for hydrogen. Why is the agency delaying for close to two

decades requirements that are necessary now? As we face climate disaster after climate disaster, we do not have the luxury to wait two decades for this commonsense provision. (15d2-173.3)

**Comment:** Third, because deliverability of biomethane paired with hydrogen is not required until 2046 ( explained above), dirty hydrogen producers in California will paper over their polluting fuel with out-of-state credits for at least the next 22 years. (15d2-173.6)

**Comment:** Crediting practices for bio-hydrogen may already be crowding out investment in alternative technology pathways

The impacts of overstated emissions from locked-in avoided methane credits are compounded by the practice of book-and-claim crediting. Today, approximately 70% biomethane credited under the LCFS comes from livestock farms located out of state that do not have to adhere to a traceability or deliverability requirement.<sup>24</sup> Further, according to LCFS pathways data, all certified bio-hydrogen projects source methane inputs from out-of-state farms.<sup>25</sup> We present the locations of dairy digesters that indirectly supply in-state hydrogen projects as of early 2024 in Figure 4.

<sup>24</sup> <https://theicct.org/wp-content/uploads/2023/05/california-rng-outlook-2030-may23.pdf>

<sup>25</sup> <https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities>

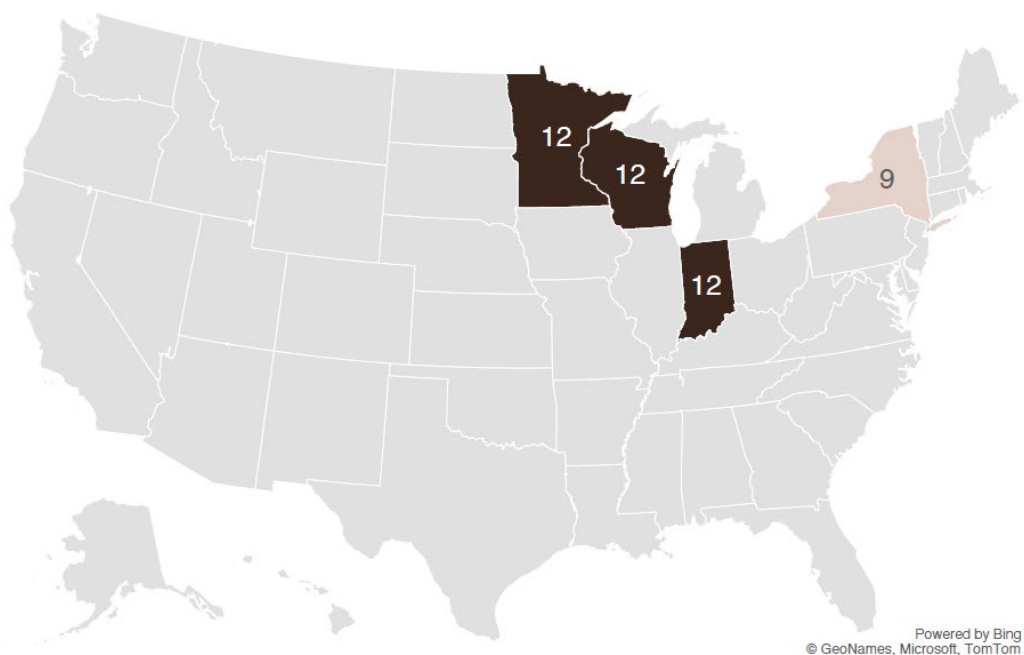


Figure 4. Number of projects and geographic source of dairy biomethane for certified hydrogen pathways in California

This trend is only expected to grow as ongoing book-and-claim crediting attracts out-of-state applicants. In the previous 15-day package, CARB proposed that deliverability requirements take effect in 2041 for biomethane-derived RNG and 2046 for biomethane-derived hydrogen consumed as a process input at refineries or in a fuel cell vehicle. The second package introduced a modification that if the number of registered Class 3-8 zero-emission vehicles

exceeds a threshold of 132,000 vehicles by the end of 2029, deliverability requirements are pushed up to 2038 for RNG pathways and remain the same for biomethane-derived hydrogen. CARB's proposal to delay action for the next 15 years fails to address the misapplication of program revenue to heavily subsidize changes to manure management in out-of-state farms rather than support in-state transportation decarbonization.

Importantly, the continuation of book-and-claim crediting to offset fossil fuel consumption can crowd out investment for alternative technologies. Nearly all of fossil natural gas consumed in the California transport sector has been replaced by an equivalent volume of RNG, so biomethane producers have looked toward alternative fuel markets such as hydrogen.<sup>26</sup>

<sup>26</sup> <https://ww2.arb.ca.gov/resources/documents/low-carbon-fuel-standard-report-ng-toolquarterly-summaries>

Dairy manure can receive up to \$8.8/kg H<sub>2</sub> in LCFS credits, nearly three times the quantity of the federal hydrogen tax credit (45V) for hydrogen that has a certified CI between 0 and 0.45 kg CO<sub>2</sub>e/kg H<sub>2</sub>.<sup>27</sup> Fossil and blue hydrogen producers that source biomethane as an input feedstock do not have to adhere to more rigorous sourcing requirements that apply to electrolytic hydrogen that require electricity producers to be located within the Western Interconnection system. This sourcing flexibility may already be crowding out room for development of electrolytic "green" hydrogen produced from grid-supplied electricity running counter to CARB's recognition that it will take time for non-fossil hydrogen to scale up.<sup>28</sup>

<sup>27</sup> <https://www.congress.gov/117/plaws/publ169/PLAW-117publ169.pdf>

<sup>28</sup> [https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/2nd\\_15day\\_notice.pdf](https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/2nd_15day_notice.pdf)

We calculate that a fossil SMR plant sourcing dairy manure biomethane offsite pays approximately \$47.9 per MMBTU of biomethane based on the citygate natural gas sale price in California and average value of LCFS credits for manure RNG.<sup>29</sup> This corresponds to \$5.03 per kg H<sub>2</sub>, assuming a hydrogen conversion efficiency of 0.42 kg per kg of biomethane. When combined with the conventional SMR hydrogen production cost of \$0.3 per kg H<sub>2</sub>, we calculate fossil SMR plants that purchase RNG produced offsite have a levelized production cost of \$5.33 per kg H<sub>2</sub>.<sup>30</sup> In comparison, we estimate the average cost of electrolytic hydrogen produced from grid-connected electricity in California in 2025 to be \$9.06 per kg H<sub>2</sub>. This includes the levelized cost of electrolysis over a 30 year project lifetime and renewable electricity sale price. We present this comparison in Figure 5.

<sup>29</sup> <https://www.eia.gov/dnav/ng/hist/n3050ca3m.htm>

<sup>30</sup> <https://netl.doe.gov/research/carbon-management/energysystems/gasification/gasification/technologies-hydrogen/with-carbon>

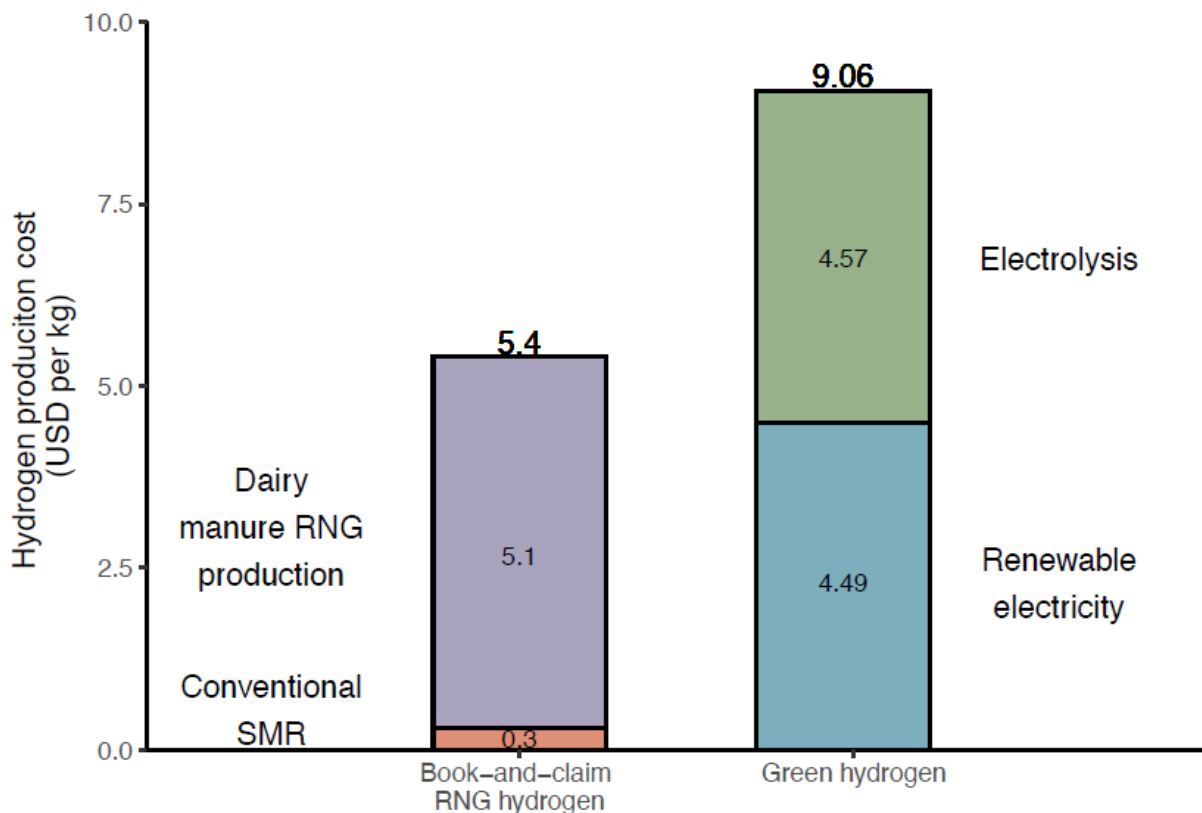


Figure 5. Fossil SMR and electrolytic hydrogen production cost comparison in California

As demonstrated in Figure 5, electrolytic hydrogen currently operates at a \$3.96 price premium relative to fossil SMR producers that offset fossil natural gas with manure biomethane purchased offsite. Though the costs of electrolysis are expected to decline in the future, this rate will not keep pace with high-value manure biomethane that remains exempt from a deliverability requirement through at least 2046. As stated in previous comments, we recommend that deliverability be put in place before 2030 to prioritize in-state and in-sector emissions reductions and that projects that fail to pass a legal or financial additionality test do not receive avoided methane crediting. (15d2-237.12)

**Agency Response:** No changes were made in response to these comments. See Response Z-2.2 above. As significant methane reductions are needed this decade, staff prioritized the rapid development of methane reduction projects by excluding pathways for projects that break ground before 2030 from deliverability requirements. This would encourage rapid buildout of biomethane capture projects this decade and supports the

need to reduce methane emissions. This is especially important given that building this infrastructure can be costly and have a long construction period.<sup>13</sup>

Implementing deliverability requirements immediately could run counter to CARB's goal to reduce methane emissions quickly. The lack of established protocols or guidance on tracking, reporting, and evaluating directional gas flow could lead to a pause or slowdown in the development of new methane reduction projects as potential pathway holders work to demonstrate deliverability. Biomethane pathways currently participating in the LCFS could also stop capturing methane due to a loss of credits if they cannot prove directionality. The proposed deliverability requirements will also give biomethane producers (who break ground on projects after December 31, 2029) time to contract with new off-takers as needed.

#### **Z-2.4 Multiple Comments: *Oppose or Recommend Modifications to Deliverability Requirement for Biomethane***

**Comment:** While we appreciate the reasonable implementation timeline for the newly proposed deliverability requirements, this also has the potential to deter growth and cause potential backsliding. 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. (45d-048.7)

**Comment Summary:** The stakeholders are also requesting CARB provide further guidance on the proposed deliverability requirements. The proposed amendments aim to adopt the California RPS requirement of ensuring biomethane injected into a common carrier pipeline physically flows towards California 50% of the time. This referenced RPS framework does not, however, provide clarity on how those 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. Moreover, limiting book-and-claim to physical deliverability requirements risks the LCFS becoming a less effective decarbonization program and undermines California's interest in rapidly ramping up the production and use of renewable hydrogen—a foundational principle in establishing ARCHES, which is at odds with CARB's proposal, to implement deliverability requirements for hydrogen projects utilizing biomethane.

It remains to be seen if and how the proposed deliverability requirements can be harmonized with the California Public Utilities Commission's (CPUC) SB 1440 program, as suggested. It has been clear over the past year that CARB was exploring potential deliverability requirements. However, throughout that process an actionable plan outlining the strategy and evidence necessary for imposing delivery requirements never emerged. Rather, stakeholders continued to raise concerns about the lack of a feasible plan which continues with the ambiguity of the proposed amendments. Therefore, the stakeholders recommend that the deliverability requirement language be removed from the proposal to allow for further

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<sup>13</sup> California Department of Food and Agriculture Dairy Digester *Research and Development Program, Report of Funded Projects (2015-2023)*. 20-33. July 12, 2023.  
[https://www.cdffa.ca.gov/oefi/ddrdp/docs/2023\\_ddrdp\\_legislative\\_report.pdf](https://www.cdffa.ca.gov/oefi/ddrdp/docs/2023_ddrdp_legislative_report.pdf)

stakeholder engagement in support of a clear and actionable plan for consideration in a subsequent rulemaking. (45d-096.9, 45d-168.10, 45d-168.11, 45d-169.5)

**Comment:** Avoided methane crediting and book-and-claim access for biogas projects are central to enabling biogas projects and associated emissions reductions. We urge CARB to avoid restricting avoided methane crediting or biogas book-and-claim accounting in the program.

...

We strongly oppose any restrictions to avoided emissions crediting, including avoided methane or N<sub>2</sub>O, or book-and-claim accounting of biomethane pathways. These elements are critical to supporting biomethane projects from manure and organic waste resources and emissions reductions from the most potent climate forcers, including methane and N<sub>2</sub>O. (45d-121.3)

**Comment:** Additionally, book-and-claim accounting of biomethane is necessary to bring additional volumes of biomethane to California and displace fossil-based natural gas, almost all of which comes from outside the State, and is itself acquired and delivered via similar book-and-claim procedures. (45d-121.4)

**Comment:** We urge CARB to maintain existing provisions for book-and-claim accounting of biomethane and avoided emissions, with the minor amendments proposed above, to support a growing organic waste biomethane market with the associated carbon, SLCP and N<sub>2</sub>O emissions benefits. (45d-121.5)

**Comment:** We are disappointed that the proposed changes fail to level the playing field for in-state producers of biomethane.

...

To give but one example of the uneven playing field, California biomethane producers face ever increasing standards for injection into California's pipeline system; California's biomethane injection standards are far more stringent than biomethane producers face in any other state. Yet biomethane producers in those more lenient states may use the same Book and Claim accounting without having to meet the same injection standards. In earlier comments to CARB, we suggested that out-of-state producers be required to meet California's injection standards to use Book and Claim, a concept we continue to support. California gets the vast majority of its pipeline natural gas from out-of-state, yet there is no mandatory testing of that gas as it enters our state. Hence a biomethane producer is actually (and no doubt inadvertently) encouraged to locate outside California's borders. That is at odds with the Independent Statement of Reasons (ISOR) provided in support of the proposed regulatory changes.

...

The proposed changes to the LCFS have abandoned this sensible approach in favor of applying the same restrictions to in-state producers as are applied to out-of-state producers. Frankly, we think both requirements should apply, i.e. that out-of-state biomethane producers that wish to use Book and Claim accounting both meet California's biomethane quality standards and demonstrate deliverability into California. (45d-141.1)



**Comment:** In addition to cleaning up California’s environment and encouraging in-state commercial activity, another of CARB’s laudable goals is to encourage enactment of LCFS-type regulations in other states (ex., page 15 of the ISOR). Those goals are actually (and, again, no doubt inadvertently) thwarted by CARB’s willingness to award California carbon credits for renewable fuel that is already in use in those other target states. (45d-141.2)

**Comment:** Ultimately, LCFS costs get passed on to California residents via higher vehicle fuel costs. We applaud that willingness to pay what it takes to help clean up the air we breathe. But awarding LCFS credits for biomethane that cannot be delivered into California forces Californians to pick up the tab to help clean the air in other geographic regions. That’s inappropriate.

It is a fact that new biomethane projects can achieve pipeline injection much quicker if they are out-of-state. While we don’t agree with the logic, we have heard that one reason to initially award LCFS credits for out-of-state biomethane projects that cannot deliver into California was to encourage the growth of in-state biomethane production. If so, that goal has been achieved; California biomethane producers are now capable of meeting California’s current, commercially attractive biomethane demand.

Continuing to offer LCFS credits for undeliverable biomethane is both unwarranted and detrimental to California biomethane producers. (45d-141.3)

**Comment:** We request that the deliverability requirement language be removed from the proposal to allow for further stakeholder engagement in support of a clear and actionable plan for consideration in a subsequent rulemaking. (45d-152.7)

**Comment:** Accordingly, Gevo recommends that CARB continue to support biomethane projects that benefit the climate, regardless of location, pipeline flow directionality or end-use, thereby providing a level playing field for projects that provide the same GHG mitigating practices. Much like carbon capture and sequestration (CCS) is not limited by its location in the U.S. and is judged by the fact that GHG emissions are removed from the atmosphere, these same principles should be applied to biomethane projects throughout the U.S., without the limitations proposed in the current round of LCFS revisions and as outlined below.

...

Gevo urges CARB to continue to expand book-and-claim and deliverability requirements within the LCFS in general, and to not place book-and-claim (or other) restrictions on biomethane projects. CARB’s proposals in the LCFS package that would place restrictions on biomethane projects risk the LCFS program’s ability to decarbonize through biomethane projects. In particular, Gevo opposes CARB’s proposal for biomethane projects breaking ground after December 31, 2029, which would mandate that “[s]tarting January 1, 2041...the entity...must demonstrate that the...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.” Instead of singling out certain biomethane projects for such restrictions, Gevo supports consistency in LCFS pathways and believes biomethane projects be evaluated and credited on the science-based merits of GHG emissions reduction, rather than the project location or directionality of biomethane flow in U.S. pipelines.

Gevo supports CCS projects across the U.S. for the GHG reducing merits and believes this same concept should apply to existing and future biomethane projects. In the same way that carbon dioxide does not have to be transported and injected into California's geologic pore space to provide value to the climate, biomethane projects should not be geographically limited. In sum, Gevo supports the expansion of book-and-claim accounting mechanisms, rather than restrictions, promoting the tangible reductions in GHG reductions that result from this type of program flexibility. (45d-187.27)

**Comment: Renewable Natural Gas is needed to decarbonize the industrial sector, any additional limitations will slow the use of renewable natural gas in the industrial sector.**

CARB recognizes renewable natural gas as a low carbon intensity fuel in its use as a feedstock to hydrogen production. CARB allows the use of book-and-claim accounting to connect the environmental attributes of renewable natural gas produced at one location to the use of natural gas in hydrogen production at another location. Book-and-claim accounting is vital to renewable natural gas production and growth as many renewable natural gas facilities are not located in the same geographic regions where the hydrogen facilities are located. Because book-and-claim accounting has been available, renewable natural gas production facilities continue to be built throughout the country and have not been isolated to locations near hydrogen production facilities, California or adjacent states. If CARB were to limit the ability of renewable natural gas producers to use book-and-claim accounting, CARB would slow the growth of renewable natural gas and its use in industrial facilities producing fuels supplied to the California market. Marathon thus supports the continued use of book-and-claim accounting. (45d-213.2, 45d-217.6)

**Comment:** Air Products appreciates CARB's proposal to provide additional time to allow biomethane use for hydrogen in a book-and-claim scenario and enabling avoided methane crediting in the calculation of the CI. We do also note and appreciate that these new restrictions do not apply for projects initiated during the balance of this decade which incentivizes early action on projects that will accelerate decarbonization. However, we still believe that none of these requirements should be imposed for hydrogen supporting zero-emission solutions – even in 2045 as proposed. Eliminating these proposed requirements will not only continue to incent beneficial use of biomethane wherever it can be cost-effectively developed, but also help lower the CI of hydrogen to enable broad use of low carbon hydrogen across many transportation sectors, especially large off-road equipment like locomotives, marine, and aircraft, consistent with the 2022 Scoping Plan through 2045. The use of low-CI hydrogen in fuel cell vehicles is fully aligned with California's goals of phasing out combustion in the transportation sector. In fact, placing constraints on biomethane that is used to produce low-CI hydrogen for fuel cell vehicles advantages electricity over hydrogen even though both support zero emission transportation. We request that CARB not impose any new requirements for biomethane book-and-claim used in the production of hydrogen.

In a parallel concept to what is proposed in the 45-day package for hydrogen produced and processed using low-CI electricity, we request that CARB clarify that biomethane book-and-claim provisions can be used to displace fossil methane used both as a reactant in the stoichiometric conversion to hydrogen and for the thermal energy needed to catalyze the reaction. We believe that the combined reactant and thermal energy demand for fossil

methane should be considered “production” for the purposes of biomethane book-and-claim provisions. Please confirm. (45d-214.20)

**Comment:** It remains to be seen if and how the proposed deliverability requirements can be harmonized with the California Public Utilities Commission SB 1440 program, as suggested. It has been clear over the past year that CARB was exploring potential deliverability requirements. However, throughout that process an actionable plan outlining the strategy and evidence necessary for imposing delivery requirements never emerged. Rather, stakeholders continued to raise concerns about the lack of a feasible plan which continues with the ambiguity of proposed amendments. Therefore, Prairie Farms recommends that the deliverability requirement language be removed from the current amendments to allow for further stakeholder engagement to support a clear and actionable plan for consideration in a subsequent rulemaking. (45d-219.3)

**Comment:** We are aligned with CARB’s continued acknowledgment of the importance of methane reduction to address Global Climate Change and that the responsible use of RNG as a feedstock to hydrogen production can be a strong proponent of methane reductions regardless of the sourced location. We strongly support the changes in regulatory language which provide visibility to the eligibility of RNG as a feedstock for extended years, a necessary step in our investment in these technology and energy sources. We make the following additional recommendations:

Deliverability Language The creation of barriers to prevent the importation of RNG into California markets or for use as a feedstock in both in-state and out-of-state production of fuels should not be adopted. RNG is physically interchangeable with fossil natural gas and can be distributed in the same natural gas pipeline networks across the US. This established distribution network provides a proven, national distribution network that should be leveraged, not restricted in the deployment of low carbon fuels. The 50% flow requirement is arbitrary and unjustified. (45d-223.6)

**Comment:** 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 continues to allow for this type of accounting to ensure GHG reductions continue at a successful rate. Although the policy concept of new deliverability requirements has been mentioned throughout the stakeholder process, specifics never emerged. We strongly request that deliverability language, in the Proposed Rule, be removed to allow for greater stakeholder engagement on the specific topic. (45d-232.6)

**Comment:** We recommend that CARB remove the requirement that eligible pipelines must flow towards California at least 50% of the time.

CRS supports the LCFS program rules that biomethane use may be demonstrated via book-and-claim accounting. But we are concerned by the requirement that eligible pipelines must flow towards California at least 50% of the time. We request more information regarding the overall the purpose or need for this restriction, the rationale behind the 50% number, and how it will be verified and how often.

The use of book-and-claim accounting, without the pipeline flow restriction, is an appropriate and successful use of book-and-claim accounting as it recognizes the realities of common carrier pipelines—in which fossil methane and biomethane are blended and indistinguishable—and values incentivizing biomethane production without undue restrictions regarding physical traceability. Limiting book-and-claim accounting based on the physical flow of pipelines is inconsistent with its premise and the contractual basis for credible claims of biomethane use from common carrier pipelines that CARB has established. The direction of physical flow on the pipeline does not affect the biomethane use claim of the entity holding the attestation of environmental attributes. (45d-235.4)

**Comment:** 2.3.1 Because it is Physically Interchangeable with Fossil Natural Gas, Renewable Natural Gas can be Distributed in the Same, Longstanding Natural Gas Pipeline System that has Served California for Decades

Natural gas currently flows throughout the United States depending on shifts in production, demand, weather, export pricing, and natural gas balancing. All major North American gas pipelines are interconnected, sharing gas flow and balancing, which can be contrasted with the power sector that is currently a more balkanized system, with some limits on wheeling between regions—despite the efforts mentioned above to increase interconnection of the power grid.

When RPS limitations were developed, gas was just beginning to come from all over the country to California. The map in Figure 3 below shows cross-country flows, dating back to 2011, illustrating the interconnectedness of the natural gas pipeline system in the United States at that time.<sup>50</sup>

<sup>50</sup> U.S. Department of Transportation Federal Highway Administration, *Interstate Movements of Natural Gas by Pipeline: 2011 Map*, [https://ops.fhwa.dot.gov/freight/freight\\_analysis/nat\\_freight\\_stats/interstatenatgas2011.htm](https://ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/interstatenatgas2011.htm) (last modified Mar. 23, 2020).

Natural gas has long been distributed through these pipeline systems tracking volumes being injected and withdrawn throughout the entire system. These volumes are carefully tracked, as the pipeline system has state and federal regulatory oversight and third-party pipelines have metering throughout the system. Not only does this create a robust and liquid market for physical gas delivery across North America, that market already optimizes moving gas from supply to demand in a least cost (and lowest GHG)<sup>51</sup> fashion.

<sup>51</sup> Moving gas requires additional energy and emissions from compression stations and potential methane leakage. These factors are already correctly accounted for in the LCFS CI modeling, which assumes physical gas flow from source to sink, regardless of the ability to trace actual molecule path. This provides a fair and appropriate disincentive that recognizes GHG disbenefits of moving gas from projects located farther from California, all else equal.

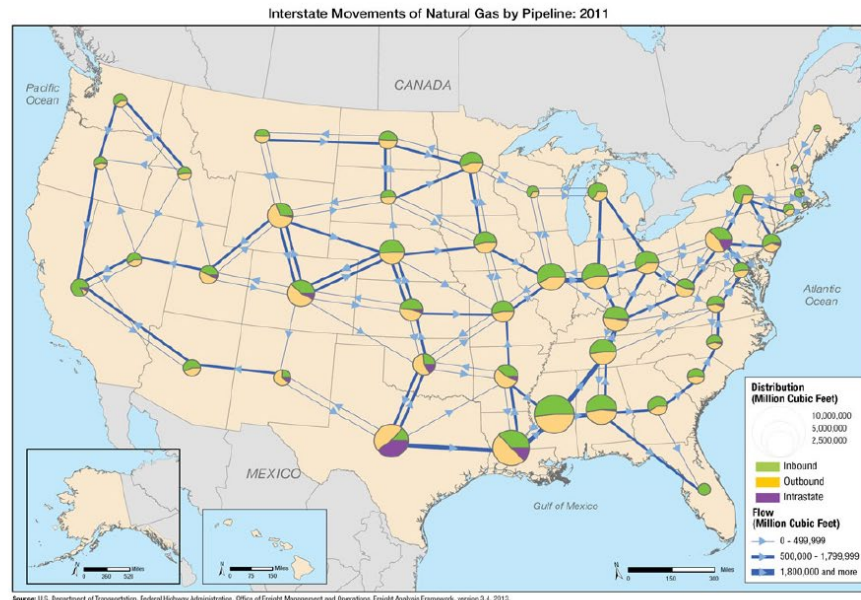


Figure 3. The Natural Gas System Has Interconnected Flows Across North America

The conventional gas market did away with point-to-point service long ago and created trading hubs and flexible receipt and delivery points to give suppliers a variety of options for getting gas to market. Generally, price signals are sent, and liquid trading occurs where the gas is produced, traded, and consumed without having to track individual gas sources throughout the value chain.

2.3.2 This System Can Move Gas Bidirectionally Across North America, therefore, a 50% Flow Requirement is Arbitrary and Unjustified.

Since the RPS provisions were developed, North American pipelines have evolved even further toward one unified system. For example, natural gas can now flow from the Northeast region to all areas of the United States, from Texas to California, and from the Rockies to California. The entire pipeline system in the United States is interconnected and in many cases is now bidirectionally flowing. Examples are provided below.

According to EIA,<sup>52</sup> the Appalachian Basin's large shale formations—which were developed after the RPS proposal was implemented—have dramatically changed gas flows. The Appalachian Marcellus and Utica formations:

<sup>52</sup> EIA, *Natural Gas Weekly Update* (for the week ending Sept. 1, 2021),

[https://www.eia.gov/naturalgas/weekly/archivenew\\_ngwu/2021/09\\_02/#itn-tabs-1](https://www.eia.gov/naturalgas/weekly/archivenew_ngwu/2021/09_02/#itn-tabs-1).

- Accounted for 34% of all U.S. dry natural gas production in 2021. On its own, the Appalachian Basin would have been the third-largest natural gas producer in the world in the first half of 2021, behind only Russia and the rest of the United States.
- Since the development of these formations (which cover parts of Kentucky, Maryland, New York, Ohio, Pennsylvania, Virginia and West Virginia) there has been an increase in natural gas flows and pipeline infrastructure from the Mid-Atlantic and Ohio regions to the West and other regions.

- From 2008 to 2020, total pipeline takeaway capacity from the Northeast increased from 4.5 Bcf/d to 24.5 Bcf/d. Most of the increase in takeaway capacity happened between 2014 and 2020, when pipeline capacity increased by 16.5 Bcf/d.

In January 2022, for the first time in its history, the Rocky Mountain Express (REX) natural gas pipeline—which moves bidirectionally from Ohio to Wyoming—had larger gas flows westward than eastward, indicating growth in supply in the eastern U.S. and use to serve demand in the western U.S.<sup>53</sup> Ruby Pipeline interconnects with the Rockies Express Pipeline to bring Appalachian natural gas to the West Coast.<sup>54</sup>

<sup>53</sup> Jon Bowman, *Rex Flows Into the Rockies in January – a Fluke or a Sign of Things to Come?* FACTSET, Feb. 23, 2022, <https://insight.factset.com/rex-flows-into-the-rockies-in-january-a-fluke-or-a-sign-of-things-to-come>.

<sup>54</sup> Sheetal Nasta, *Ruby, Ruby, When Will You be Mine-Tallgrass Bid Breathes New Purpose into Languishing Ruby Pipeline*, Jan. 8, 2023, <https://rbnenergy.com/ruby-ruby-will-you-be-mine-tallgrass-bid-breathes-new-purpose-into-languishing-ruby-pipeline>.

**Selected natural gas production basins and Rockies Express natural gas pipeline**

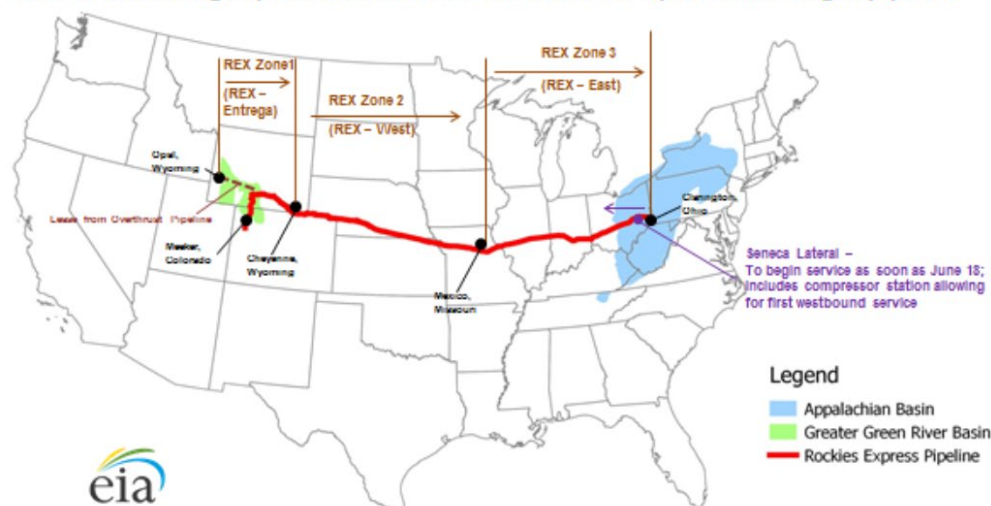


Figure 4. Rocky Mountain Express Pipeline Flows Bidirectionally and Can Bring Gas from East to West<sup>55</sup>

<sup>55</sup> Figure Source: EIA, *Today in Energy: First westbound natural gas flows begin on Rockies Express Pipeline*, June 18, 2014, <https://www.eia.gov/todayinenergy/detail.php?id=16751>

Any successful framework for RNG must build off existing gas system realities, but it does not need to assume that the gas system is static or that RNG supply should be limited to regions that currently supply most of the conventional gas to California. Repurposing existing natural gas infrastructure to rapidly deliver a blend of low-carbon fuels, including RNG, across North America will complement initiatives to cut demand for gas through expanding energy efficiency and electrification.

As demonstrated above, gas system flow can shift over time. Fossil gas demand reduction and RNG supply growth will surely also create large changes in the gas system and the map of the system today is unlikely to match the map of the system in 2040. However, RNG is still a nascent market and cannot be expected to dramatically impact gas flows immediately, unless and until fossil gas use also declines. Therefore, pipes that currently supply less than 50% flow

toward California may eventually be adjusted to be capable of supplying more than this percentage. Conversely, prevailing flows may shift over time and pipes that currently serve California with more than 50% of their flow may not do so in perpetuity. Given this uncertainty, RNG developers could not invest in a long-lived (e.g., 20-year) asset, based on the LCFS value, if the program has such a 50% flow test. The prevailing flows in gas pipelines are completely outside of the control of any one developer and thus represents an unacceptable risk unless the facility is sited in California.

Finally, the 50% flow concept is not applied to limit delivery of any other fuels in either the Current or Proposed Rule. Analogous non-sensical requirements could certainly be conceived for other fuels. For example, the majority of rail traffic on a given line could be required to move in the direction for California (perhaps even when not specifically carrying ethanol, to create a full analogy).

Alternatively, will California stop accepting fossil gas deliveries through pipelines that do not flow toward California 50% of the time? Imagine how catastrophic such a limit would be when supply crunches occur, such as the one that occurred in Southern California in late 2022.<sup>56</sup>

<sup>56</sup> U.S. Energy Information Administration, *Daily Natural Gas Spot Prices in Western United States Exceed \$50.00/MMBtu in December*, January 24, 2023. <https://www.eia.gov/todayinenergy/detail.php?id=55279>

While RNG opponents may desire to create administrative complexities to artificially increase costs or impose barriers to RNG use, CARB should not be swayed by such arguments. The existing CA RPS language is simply a canard to disincentivize out-of-state RNG development, distract from the legitimacy of RNG's environmental benefits, and turn a key advantage of RNG (it's compatibility with the existing gas system) into a perceived weakness. We strongly recommend that CARB avoid implementing arbitrary RNG deliverability requirements—and treating fossil gas preferentially to RNG—simply because RNG must currently share the gas system with fossil gas.

### 2.3.3 Guarantee of Origin Systems (Book-and-Claim) are the Industry Standard in Europe

As described above, because it is not possible to physically segregate delivery of renewable gas once it is intermingled with fossil gas in the pipeline system, other chain of custody methods must be utilized. “Book and claim” is a guarantee of origin concept that was pioneered in the European Union's renewable fuel policies. A key advantage is that such accounting lowers administrative barriers and facilitates matching sources of renewable fuel production to demand centers.

Given the physics of how gases quickly intermix in pipeline systems, no feasible alternative exists to book and claim accounting for RNG. Requiring redundant RNG-only pipeline infrastructure and/or physically segregated trucking/rail of gas would clearly increase GHG emissions and the non-climate environmental impact of RNG delivery. Requiring an RNG developer to hold long-term firm pipeline capacity from production source to end use does not ensure that the renewable molecules flow in that path. Instead, it only adds an extra layer of cost because it does not allow market participants to take advantage of liquid supply trading hubs and pipeline displacement, which can bring transportation costs down significantly.

The renewable gas strategies of leading European countries, such as Denmark<sup>57</sup> which currently have around 40% RNG in their gas system (and expect to reach 100% by 2034),

should be more closely studied by CARB as it relates to these issues. Denmark's Green Gas Strategy<sup>58</sup> prioritizes free trade of green gases across borders and states that:

<sup>57</sup> [https://ens.dk/sites/ens.dk/files/Naturgas/groen\\_gasstrategi\\_en.pdf](https://ens.dk/sites/ens.dk/files/Naturgas/groen_gasstrategi_en.pdf)

<sup>58</sup> Ibid.

“When a biogas plant feeds biogas into the gas system, it is mixed with other gas. In the gas system, both biogas and natural gas are mixed to form a uniform gas. In order for the gas supplier to prove the origin of the gas supplied to the final customer, guarantees of origin are used. Energinet issues guarantees of origin, thereby ensuring that it can be documented that a consumed volume of gas is matched by an equivalent production of green gas. This system prevents double counting of renewable energy, allowing companies and other consumers to pay for green gas.”

There are now ongoing efforts to move from national RNG registries to a European-wide registry to track RNG volumes using the book-and-claim concept. The European Renewable Gas Registry (ERGaR) was established as an independent documentation scheme for tracking RNG and other renewable gases distributed along the European gas network.<sup>59</sup> Recently there was also a €3 million EU-funded project known as REGATRACE<sup>60</sup> to develop an efficient trading system based on the issuance and trading of Guarantees of Origin (GO) for RNG.<sup>61</sup> The final report<sup>62</sup> from this process contains the following statements:

<sup>59</sup> <https://www.ergar.org/about-us/>

<sup>60</sup> <https://www.regatrace.eu/>

<sup>61</sup> Given the recent gas crisis in Europe, the EU now plans to increase biomethane deployment to displace 17 bcm of gas imports in the short-term (approximately equivalent to all natural gas demand for power production in California). [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/repower-eu-affordable-secure-and-sustainable-energy-europe\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/repower-eu-affordable-secure-and-sustainable-energy-europe_en)

“The European Renewable Gas Registry (ERGaR) was started by and continues to be composed of long-established registries and stakeholders of the biomethane and renewable gas industry. A growing imbalance between biomethane production and consumption in several countries necessitated cross-border transfers. Individual bilateral solutions were established, but in most cases member states refused to grant any benefits to imported biomethane. As such, it has been in its best interest to create a system in which the cross-border transfer of gas certificates could be both technically facilitated and recognised in the target country.

GOs serve only for consumer disclosure, which means that the “green gas” attribute is separated from the gas physical volume. This model is called “book and claim” and is useful for setting the path to the European biomethane market because the GOs help document the volumes being produced, distributed and consumed.”

(45d-240.8)

**Comment:** 2.3.5 The Current LCFS RNG Framework Aligns with Fuel Use Reporting in the US Renewable Fuels Standard and with State-level Partners. This Alignment Should be Enhanced, not Dismantled.

A key market reality today is that most RNG projects need both LCFS and RIN credits to be viable. Currently only NGV end uses offer full alignment between both programs, which is why that end use has been so popular for RNG thus far. Unlike California's RPS, the US EPA's



Renewable Fuel Standard has consistently created a strong framework for RNG growth and is a much better model for CARB's LCFS to continue to align with.

Deliverability rules in the RFS program have long recognized that once RNG and fossil gas is co-mingled there is no way to ensure deliverability of just the subset of renewable molecules. For a recent example of EPA's analysis of this issue, the preamble<sup>64</sup> for the RFS "Set" rulemaking explicitly stated that:

<sup>64</sup> US EPA, Federal Register, Vol. 87, No. 250, Friday, December 30, 2022, Proposed Rules. See page 80637. <https://www.govinfo.gov/content/pkg/FR-2022-12-30/pdf/2022-26499.pdf>

"When RNG moves through a pipeline system for distribution, the RNG is mixed with a much larger proportion of fossil natural gas using the same system. The two natural gases—one derived from renewable sources, the other from fossil sources—are fungible at that point. Consequently, by the time the natural gas is used to fuel a vehicle, there is no meaningful way to identify which molecules of methane were originally sourced from biogas and which came from fossil sources. As discussed above, and in light of this dynamic, when EPA introduced RNG as a transportation fuel in the RFS program in the Pathways II rule, we set up a system whereby the demonstration that RNG was used as transportation fuel relied on accounting protocols, recordkeeping requirements, and requirements for contracts and affidavits attesting that a specific volume of RNG was used as transportation fuel, and for no other purpose."

EPA correctly recognized that efforts to trace deliverability (e.g., based on securing gas transmission rights or tracing prevailing pipeline physical flows) still cannot guarantee that the RNG molecules flow along preferred paths (or separate paths from fossil molecules). Therefore, any attempts to impose such tests simply increases compliance costs for parties creating and using RNG without achieving any additional environmental benefit.

The current LCFS's book-and-claim rules allow for consistent claims in RNG volume across the RFS and the LCFS. Deviating from this approach for imports will inherently create misalignment in claims, administrative confusion at both reporting entities and CARB, and fewer financially viable projects. The US EPA may also eventually enhance the incentive for the biogas/RNG resource to be sent toward electricity generation for electric vehicle use (eRINs), use in hydrogen production, and as a biointermediate to producing liquid fuels. We recommend that CARB consider even further alignment between the LCFS and RFS, especially with respect to matching biogas/RNG electricity pathways to EV fleets and hydrogen pathways, if they wish to see these end uses for RNG grow.

Following US EPA and California's currently positive example, book-and-claim accounting has emerged as the preferred method to track RNG in all analogous North American Clean Fuel programs. For example, the Canadian Clean Fuel Standard, the Oregon Clean Fuel Standard, and the Washington Clean Fuel Standard all use book and claim for RNG projects as well as for electricity and hydrogen. Gas utility procurement programs for RNG use similar concepts.

Given that the California LCFS pioneered such reporting in North America, it should not abandon it now. The fact that analogous programs are close to being established in other states reduces the likelihood of California being overly reliant on imported RNG in the long term. Each new state that adopts an LCFS-style policy creates a new demand center, which

regional supply will likely consider serving first before California (assuming similar credit pricing).

Finally, in summary, many fuels in the LCFS have a relatively high import market share and all fuel categories credited by the LCFS involve lifecycle emissions (and emission reductions) that occur outside of California. For example, a significant share of California's grid mix of electricity (~44%)<sup>65</sup> is produced from conventional natural gas, over 90% of which is imported.<sup>66</sup> Reducing *all* GHG emissions (including the upstream emissions performance) of *all* fuels (including imports) continues to be a critical advantage of the lifecycle approach taken by the LCFS. RNG imports should not be singled out from other fuels for different treatment, especially considering the critical importance of reducing methane to mitigate the effects of near-term warming.

<sup>65</sup> See Table 1-2 of CARB's 2023 *Carbon Intensity Values for California Average Grid Electricity Used as a Transportation Fuel in California and Electricity Supplied Under the Smart Charging or Smart Electrolysis Provision*

[https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/comments/tier2/2023\\_elec\\_update.pdf?\\_ga=2.5711222.418438686.1678413739-188703561.1626734718](https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/comments/tier2/2023_elec_update.pdf?_ga=2.5711222.418438686.1678413739-188703561.1626734718)

<sup>66</sup> <https://www.energy.ca.gov/data-reports/energy-almanac/californias-natural-gas-market/supply-and-demand/natural-gas-california>

(45d-240.19)

**Comment:** Request to amend or delete the proposed deliverability amendment language. CARB's requirements, influenced by concepts from California's Renewable Portfolio Standard (RPS), propose mandates for deliverability starting in 2041 for specific biomethane pathways. However, the 50% standard lacks environmental benefit or justification in the current physical gas system. Due to administrative complexity, this requirement could drastically reduce RNG use in California from sources outside of the state under the LCFS. Past experiences, such as RPS deliverability language, have historically created a barrier to imports, hindered facility development, increased costs, and were, ultimately, unsuccessful in creating a well-functioning California-only electric grid. We encourage CARB to revisit the state's learnings from the RPS example and remove the Proposed Amendments deliverability language.

Furthermore, a successful RNG framework should leverage existing gas system realities, avoiding assumptions of a static nature or limiting supply to specific regions. The U.S. natural gas pipeline system is interconnected and bidirectionally flowing, carefully tracking volumes throughout the system with state and federal oversight and third-party pipeline metering. Repurposing the established natural gas infrastructure for efficient delivery of a low-carbon fuel blend, including RNG, aligns with efforts to reduce gas demand through enhanced energy efficiency and electrification. Given RNG's physical interchangeability with fossil natural gas, distributing it within the longstanding pipeline system that has efficiently served California for decades is feasible. Therefore, a 50% flow requirement is arbitrary and unjustified, as the gas system's bidirectional nature allows for effective RNG movement across North America.

We encourage building an RNG framework based on the realities of existing gas systems without assuming static conditions and urge CARB to avoid implementing RNG deliverability requirements that favor fossil gas in the interest of fairness and practicality within the gas system. (45d-275.4)

**Comment:** Additionally, as described in our previous comments,<sup>17</sup> California imports nearly all of its natural gas,<sup>18</sup> 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. 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.

<sup>17</sup> <https://www.arb.ca.gov/lists/com-attach/125-lcfs-wkshp-nov22-ws-VzZcN1EgAg5QOghr.pdf>

<sup>18</sup> 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/californiasnatural-gas-market/supply-and-demand-natural-gas-california>

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 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.** (45d-323.16)

**Comment:** Do not phase out avoided methane crediting and book-and-claim eligibility for all RNG pathways, including RNG-to-hydrogen. (45d-323.17)

**Comment:** *Indirect accounting without a deliverability requirement should continue, provided that out-of-state biogas systems contribute to the overall improvement of the local environment and community.*

Continuing to allow indirect accounting of biomethane without a deliverability requirement, serves to lift the conversation on manure methane emissions across the country and push other states to engage in how to address agriculture methane emissions. Since methane emissions are a global pollutant, the current LCFS regulation helps reduce methane emissions in a broader context than just California.

As the supply of RNG from manure digestion represents less than 1.5% of current natural gas production, limiting deliverability will decrease the number of offset credits available for the LCFS.<sup>16</sup> Another implication of limiting delivery is the quenching effect it would have on livestock methane capture across large sections of the US as well as the amount of low CI hydrogen produced.<sup>17</sup>

<sup>16</sup> <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks>

<sup>17</sup> <https://gasfoundation.org/wp-content/uploads/2019/12/AGF-2019-RNG-Study-Full-Report-FINAL-12-18-19.pdf>

As the market regulator, CARB has the ability and responsibility to ensure that out-of-state manure biogas systems are being implemented in a manner that protects local water quality and air quality, and meaningfully reduces the impact of livestock on local communities. It's imperative that CARB utilize its authority to ensure full compliance with LCFS regulations to not only ensure fraud is prevented in indirect accounting, but that biogas producers contributing to local pollution are held accountable. Biogas systems are complex operations

and if farm systems are not currently meeting equivalent environmental regulations and expectations to those followed by California biogas systems, out-of-state biogas systems should not be eligible for participation in the LCFS.

There are numerous examples across the US of manure biogas systems that, upon reaching the current technology end-of-life, are no longer being used and manure methane emissions are again being released into the atmosphere. Without ongoing appropriate economic incentives, will not continue to operate manure biogas systems and will not reinvest in the technology. CARB needs to consider how best to address manure biogas systems when they reach the end of the ten-year avoided methane crediting period. (45d-327.5)

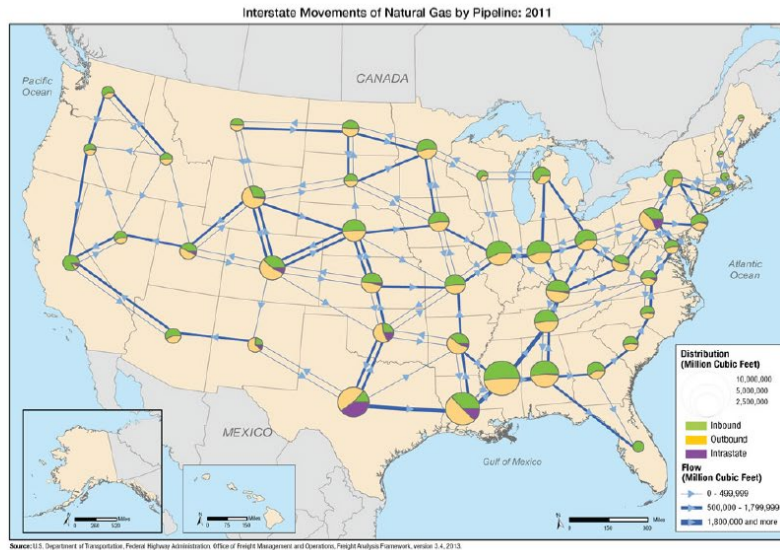
**Comment: Because it is Physically Interchangeable with Fossil Natural Gas, Renewable Natural Gas can be Distributed in the Same, Longstanding Natural Gas Pipeline System that has Served California for Decades. This System Can Move Gas Across North America, therefore, a 50% Flow Requirement is Arbitrary and Unjustified.**

In the Proposed Rule, CARB staff is proposing a deliverability requirement on biomethane projects and is requiring projects to demonstrate that eligible biomethane is carried through common carrier pipelines that physically flow within California or toward end use in California 50% of the time on an annual basis. Divert understands that this requirement would be put in place to ensure that California is making progress on the State's methane reduction targets, but the requirement would be detrimental to projects that are aimed at helping the state realize its short lived climate pollutant goals.

Natural gas currently flows throughout the United States depending on shifts in production, demand, weather, export pricing, and natural gas balancing. All major North American gas pipelines are interconnected, sharing gas flow and balancing, which can be contrasted with the power sector that is a more balkanized grid with limits on wheeling between regions—despite the efforts mentioned above to increase interconnection of the power grid.

When RPS limitations were developed, gas was just beginning to come from all over the country to California. The map below shows cross-country flows, dating back to 2011, illustrating the interconnectedness of the natural gas pipeline system in the United States.<sup>11</sup>

<sup>11</sup> U.S. Department of Transportation Federal Highway Administration, *Interstate Movements of Natural Gas by Pipeline: 2011 Map*, [https://ops.fhwa.dot.gov/freight/freight\\_analysis/nat\\_freight\\_stats/interstatenatgas2011.htm](https://ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/interstatenatgas2011.htm) (last modified Mar. 23, 2020).



California, and from the Rockies to California. The entire pipeline system in the United States is interconnected and in many cases is now bidirectionally flowing.

Natural gas has long been distributed through pipeline systems tracking volumes being injected and withdrawn throughout the entire system. These volumes are carefully tracked, as the pipeline system typically has state and federal oversight and third-party pipelines have metering throughout the system. Not only does this create a robust and liquid market for physical gas delivery across North America, that market already optimizes moving gas from supply to demand in a least cost (and lowest GHG)<sup>12</sup> fashion.

<sup>12</sup> Moving gas requires additional energy and emissions from compression stations and potential methane leakage. These factors are already correctly accounted for in the LCFS CI modeling, which assumes physical gas flow from source to sink, regardless of the ability to trace actual molecule path. This provides a fair and appropriate disincentive that recognizes GHG disbenefits of moving gas from projects located farther from California, all else equal.

Given the interconnected nature of the US Gas pipeline, deliverability requirements can create a difficult burden on producers of natural gas to prove compliance. In addition, it will limit the production of biomethane for use in organics processing and in sectors that are hard to electrify. We strongly recommend that CARB avoid implementing deliverability requirements and instead maintain the status quo of the program to allow for book and claim for RNG Programs across North America. As California currently sets the precedent for the nation's decarbonization efforts, it is crucial that the state accept book and claim requests for projects across North America to better incentivize states to decarbonize. As new states adopt LCFS programs, it is important to consider what such a precedent would create as they adopt policies championed by CARB. Instead, Divert would welcome the opportunity to work with CARB to better explain the ramifications of such a policy move and discuss alternatives for a productive outcome. (45d-330.6)

**Comment: The proposed deliverability requirements support rapid buildout of biomethane capture projects**

SoCalGas appreciates that CARB's proposed revisions to deliverability requirements acknowledge the importance of sustaining existing procurement agreements with out-of-state biomethane projects. The Proposed Amendments will encourage and expedite the expansion of biomethane capture projects throughout this decade, aligning with the imperative to reduce methane emissions.<sup>7</sup> California will need both in-state and out-of-state supplies of biomethane to decarbonize hard-to-abate sectors, including cement and steel manufacturing, as well as promoting methane capture and GHG emissions throughout the west, since GHG emissions are a global pollutant rather than a local pollutant. An uninterrupted flow of biomethane into California is a strategic imperative that fosters its adoption across diverse economic sectors over time.

<sup>7</sup> Draft EIA at 18.

Furthermore, the Book-and-Claim (B&C) deliverability approach not only supports the production of clean fuel sources that mitigate global pollutants but facilitates the cost-effective procurement of biomethane in support of California's clean energy policies and prioritization of energy security for all Californians. This is crucial for maintaining affordability while decarbonizing challenging sectors. As biomethane phases out of the LCFS, its limited availability for hard-to-abate sectors underscores the need for current policies to concentrate on boosting both production and demand. Allocating funds for developer incentives and consumer programs can drive greater end-use applications, bolstering production. Hence, it is critical for CARB to maintain biomethane B&C provisions in future policies supporting biomethane. Such a measure is essential to maintaining the positive momentum and success attained in the realm of affordable and reliable procurement thus far. (45d-341.2)

**Comment:** Book and claim accounting for natural gas deliveries is standard across the RNG industry in North America and much of Europe. We ask CARB not to create new obstacles to the delivery of RNG which will confuse and inhibit production or RNG and/or abatement of dairy methane. Again, the message coming from CARB in these kinds of proposed changes is that RNG should expect more regulatory downsides. Such messages make it very hard to take risks on future projects. (45d-351.5)

**Comment:** We appreciate that CARB has resisted pressure to include immediate new 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. (45d-363.6)

**Comment:** Avoided methane crediting and book-and-claim access for biogas projects are central to enabling biogas projects and associated emissions reductions. **We urge CARB to avoid restricting avoided methane crediting or biogas book-and-claim accounting in the program.** (Apr-026.8)

**Comment:** In addition, and as we have stated previously in more detail, it is our view that CARB should maintain eligibility for delivery of biomethane without added restrictions. There is no evidence that new deliverability requirements would help to ensure progress toward the

state's methane reduction targets. We therefore do not agree with CARB's ISOR proposal to impose new requirements for projects that break ground after 2030. (Apr-069.5)

**Comment:** The requirement for physical delivery of biogas or biomethane, i.e., RNG, to a production facility proposed in section 95488.8(i)(2)(C)(2) would add significant cost burden and environmental impact as truck transport of RNG apparently would be required to decarbonize thermal energy. In addition to unduly burdening RNG suppliers like Gevo, it would be counterproductive to the State's emissions reduction goals. To avoid these results, we encourage CARB to allow for biogas or biomethane to be supplied as process energy using the book-and-claim provisions under the regulation. This would bring the CA-LCFS into alignment with the recent changes in the Renewable Fuel Standard (RFS) Biogas Regulatory Reform – which now allows for biogas to be delivered via commercial natural gas pipelines and used to decarbonize thermal demands. Such an approach encourages future GHG emitting projects to be leveraged at production facilities to lower fuels' carbon intensities and expands the understanding that natural gas in pipeline systems is fungible. (Apr-078.6)

**Comment:** Gevo urges CARB to continue to expand book-and-claim and deliverability requirements within the LCFS in general, and to not place book-and-claim (or other) restrictions on biomethane projects. CARB's proposals in the LCFS package that would place restrictions on biomethane projects risk the LCFS program's ability to decarbonize through biomethane projects. In particular, Gevo opposes CARB's proposal for biomethane projects breaking ground after December 31, 2029, which would mandate that "[s]tarting January 1, 2041...the entity...must demonstrate that the...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." Instead of singling out certain biomethane projects for such restrictions, Gevo supports consistency in LCFS pathways and believes biomethane projects be evaluated and credited on the science-based merits of GHG emissions reduction, rather than the project location or directionality of biomethane flow in U.S. pipelines. Gevo's support in this regard is consistent with CARB's newly developed CCS pathways that aren't restrictive to project location or pipeline directionality. (Apr-078.7)

**Comment:** 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. (Apr-082.24, 15d2-290.11)

**Comment:** CARB should be looking for ways to *establish* crediting mechanisms, such as by removing the limit on book-and-claim treatment for biomethane used for process energy in refineries and crude production facilities. (Apr-094.24)

**Comment:** The Proposed Rule's long term **deliverability requirements are unvetted and unproven** and therefore still problematic for RNG development. However, there is time to address this issue in future work. We encourage CARB staff to develop a dedicated public

process (outside of this rulemaking) for increasing stakeholder understanding on this topic. (Apr-098.11)

**Comment:** We also urge CARB to maintain and add elements that will support continued innovation and development of additional low carbon fuels, even as the state's vehicle fleet evolves. Among other items, these include:

- Maintaining avoided methane crediting and book-and-claim accounting for biogas-based pathways, ... (Apr-101.16)

**Comment:** The Proposed Rule's long term **deliverability requirements are unvetted and unproven** and therefore still problematic for RNG development. However, there is time to address this issue in future work. We encourage CARB staff to develop a dedicated public process (outside of this rulemaking) for increasing stakeholder understanding on this topic. (Apr-180.7)

**Comment:** Moreover, CARB may be overestimating the availability of RNG for use in hydrogen production within California. Separate from the provisions related to hydrogen, the Proposed Rules 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, 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. The Proposed Rule's inclusion of a limited pathway for crediting projects using RNG as a feedstock to produce hydrogen until only 2045 is unlikely to be enough to support the volumes of RNG needed meet the 2022 Scoping Plan's goals for low-CI hydrogen. Removing RNG crediting from LCFS may result in producers sending RNG to Oregon and Washington to capture more value under those state low carbon fuel programs. In addition, 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 standard 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 carbon hydrogen production does not appear to consider this factor. (Apr-181.14)

**Comment:** 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. (15d1-042.7b)



**Comment:** 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. (15d1-052.5)

**Comment:** EcoEngineers is concerned about the proposed regulations regarding RNG directionality requirements.

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. (15d1-059.6)

**Comment: 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.** (15d1-066.6)

**Comment:** 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. (15d1-094.4)

**Comment:** 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.”<sup>16</sup> 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.

<sup>16</sup> American Biogas Council, *Statement on Proposed Changes to California’s Low Carbon Fuel Standard* (Aug. 13, 2024).

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 standard<sup>17</sup> 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.

<sup>17</sup> New Mexico House Bill 41, *Clean Transportation Fuel Standards* (Mar. 5, 2024).

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.<sup>18</sup> 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.

<sup>18</sup> See Krieger, Elena, et al., *Green Hydrogen Proposals Across California*, PSE Healthy Energy, at 93 (May 21, 2024).

(15d1-098.3)

**Comment:** 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. (15d1-105.5)

**Comment:** 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. (15d1-106.3)

**Comment: 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,<sup>7</sup> 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.

<sup>7</sup> <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>

(15d1-111.7)

**Comment:** 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 directionality language by CARB in the 15-day proposed language will further disincentivize investment in these critical RNG projects. (15d1-120.3)

**Comment:** 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.”<sup>6</sup> 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.<sup>7</sup> Leadership Counsel anticipates this additional modification will only further incentivize the expansion of herds and installation of digesters in California.

<sup>6</sup> ISOR, at 30-31.

<sup>7</sup> Notice of Additional Modifications, at 12.

(15d1-123.3)

**Comment:** 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. (15d1-144.7)

**Comment:** 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. (15d1-167.3)

**Comment:** 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.

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. (15d1-178.2)

**Comment:** 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:

- 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 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. (15d1-192.3)

**Comment:** 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.

...

### **Proposed Changes to Demonstrate Deliverability into the California Market Impose Unnecessary Barriers**

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. (15d1-199.5)

**Comment:** As the Agency implements final changes to the rulemaking, we strongly encourage CARB to implement the following modification:

- Avoid unnecessary deliverability requirements into the California market. (15d1-199.9)

**Comment:** Commenters urge CARB to ... not accelerate deliverability requirements unless and until CARB first eliminates avoided methane crediting, or, at minimum, clarify how avoided methane crediting and deliverability requirements will interact; (15d1-211.4)

**Comment:** 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. (15d1-211.10)

**Comment:** 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. (15d1-212.7)

**Comment: CARB SHOULD AVOID ARBITRARY SUNSETS FOR BOOK-AND-CLAIM ACCOUNTING AND AVOID IMPOSING ADDITIONAL DELIVERABILITY REQUIREMENTS**

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,<sup>5</sup> 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.

<sup>5</sup> 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/californiasnatural-gas-market/supply-and-demand-natural-gas-california>

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 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. (15d1-212.17)

**Comment:** 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. (15d1-212.18)



**Comment:** 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. (15d1-220.13)

**Comment:** 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 these new deliverability requirements is that these requirements would "help ensure that California is making progress on the state's methane reduction targets."<sup>5</sup> 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.

<sup>5</sup> ISOR, p. 31.

(15d1-220.14)

**Comment:** 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. (15d1-220.15)

**Comment:** Modifications to deliverability requirements for book-and-claim biomethane accounting further undermine LCFS' fuel-neutral principle. (15d1-224.5)

**Comment:** 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-liquefied 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. (15d1-224.25)

**Comment:** 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. (15d1-224.26)

**Comment:** 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. (15d1-231.6a)

**Comment:** 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. (15d1-234.3)

**Comment:** 4) CARB should clarify how an entity can demonstrate the deliverability requirements within section 95488.8(i)(2)(B); (15d1-237.4)

**Comment: 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. (15d1-237.11)

**Comment:** 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. (15d1-237.12)

**Comment:** 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. (15d1-241.5)

**Comment: 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. (15d1-249.4)

**Comment:** 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.”*

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. (15d1-252.3)

**Comment:** Maintain Existing Rules for RNG Deliverability

We urge CARB to reconsider the proposed rules regarding the physical deliverability of RNG included in the latest rulemaking package. There is no environmental benefit from this requirement; it would serve solely as a thumb on the scale to disfavor one type of decarbonization solution at exactly the moment when we cannot afford to be picky about which types of climate solutions we promote. Physical deliverability rules would result in many RNG projects shutting down and would result in increased methane emissions, counter to CARB's and California's overarching goals.

The environmental benefits of RNG are predominantly achieved upstream through methane emission abatement; after that point, the RNG is chemically identical to fossil gas and there are no climate advantages to requiring physical delivery of these molecules. **For the upstream activity to occur, though, there must be an economically viable end market for the downstream product;** the LCFS market has enabled methane abatement to be economically attractive, which is why we have seen such outstanding progress made on reducing methane emissions over the past several years.

This proposed rule, however, would add unnecessary complexity and barriers for methane abatement projects, particularly for existing projects that were developed under the assumption that CARB's prior set of rules would hold. The proposed deliverability rule ignores the operational realities of the American natural gas distribution system, which is based on mass balancing (a system approximating the book-and-claim methodology already used in the LCFS) rather than a point-to-point delivery system. Given this, **it is entirely unclear if the proposed rules are even possible to comply with.** Further, the contingent trigger based on ZEV adoption means that investors and developers will be in the dark as to what the future economics of their projects will be; this will mean only expensive, risk-seeking capital will finance these projects, slowing methane abatement and making the outputs more expensive for consumers.

We urge CARB to reconsider this requirement, as it threatens both the viability of existing projects and the potential for investment in future methane abatement. (15d2-166.4)

**Comment:** In addition to the proposed amendments to avoided methane crediting, we have consistently opposed changes to book-and-claim accounting, which are arbitrary and singularly designed to disadvantage biomethane compared to other alternative fuels and even fossil-based natural gas, which is almost entirely imported into California from elsewhere in North America. We continue to oppose limitations on book-and-claim access for biomethane projects, and we hope to work through future rulemakings to ensure that biomethane has access to the California market, regardless of its origin in the United States. Still, while we are opposed to the proposed deliverability requirements, we appreciate that the second 15-Day changes provide additional clarity on the program requirements and respond to concerns that other stakeholders and we have expressed regarding the previous proposal and uncertainty around potential approval of a gas system map. Nonetheless, we are concerned by the proposal to tie dates for deliverability requirements to targeted levels of zero emission Class 3-8 vehicles. (15d2-172.3)

**Comment:** And imagine what their response will be upon further learning that a good portion of the added cost is the result of CARB support for:... Very liberal book-and-claim accounting requirements that allow dairies in Iowa and swine feedlots in Missouri to “deliver” RNG to California even though this results in hundreds of millions (and potentially billions) of dollars leaving the State annually for avoided methane reductions that do not count toward California’s statutory GHG reduction targets, (15d2-183.7)

**Comment:** Furthermore, we recommend CARB avoid opening a pandora’s box involved in changes in 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. (15d2-188.5)

**Comment:** The target of 132,000 Class 3-8 ZEVs or NZEVs is arbitrary and does not justify advancement of delivery requirements by 4 years. The ZEV or NZEVs target does not create the certainty of demand for RNG placement. Altogether, any delivery requirements are simply arbitrary—with no additional environmental benefit or grounding in the physical gas system. This change has the potential to deter growth and cause backsliding. (15d2-207.23)

**Comment:** 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, depending on progress toward full implementation of the State’s medium and heavy duty zero emission vehicle regulations.

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 would like to continue to engage with CARB staff on this point with a view to include modifications in future LCFS revisions. (15d2-212.8)

**Comment: Proposed Changes to Demonstrate Deliverability into the California Market are Unworkable**

DTE Vantage appreciates the changes that have been made to the previously proposed restrictions on book-and-claim deliveries for bio-CNG, bio-LNG, and bio-L-CNG pathways. While the updated proposal now limits the application of these changes to projects that break ground after December 31, 2029, the restrictions are still not justified, necessary, or comprehensible enough to give projects needed clarity going forward. There is no issue with tracking or double-counting with the existing book-and-claim approach and imposing a future

restriction on gas delivery that cannot be verified at the time of construction creates a major obstacle for investors to initiate new projects for the LCFS program. (15d2-224.6)

**Comment:** Furthermore, the ABC would like to reiterate that we do not believe the addition of deliverability requirements under the program is necessary. The ABC urges CARB to work with biomethane stakeholders to come up with a better solution for these issues. (15d2-256.6)

**Comment:** Furthermore, Newtrient would like to reiterate that we do not believe the addition of deliverability requirements under the program is necessary. We urge CARB to work with biomethane stakeholders to come up with a better solution for these issues. (15d2-260.4)

**Comment:** Book-and-claim is successfully contributing to reduced amounts of carbon and avoided methane emissions and we support CARB's position to protect it. It is the preferred method for delivering RNG in North American clean fuel programs, including EPA's Renewable Fuel Standard,<sup>1</sup> the Canadian Clean Fuel Regulation, the Oregon Clean Fuels Program, and the Washington Clean Fuels Program, as well as for electricity and hydrogen projects. Gas utility procurement programs for RNG also primarily use similar concepts, and Europe's Renewable Energy Directive requires book-and-claim for successful RNG project buildout in the European Union.

<sup>1</sup> <https://www.biocycle.net/biogas-rng-projects/>

The second 15-day package includes a new proposal that if the number of unique Class 3-8 ZEVs reported or registered in California exceeds 132,000 ZEVs or NZEVs on December 31, 2029, then the entity reporting under bio-CNG, bio-LNG and bio-L-CNG pathways for CNG vehicles must demonstrate physical flow toward California after December 31, 2037 and not 2041. The first 15-day package required the Executive Officer to approve a "gas system map identifying interstate pipelines and their majority directional flow based on specified flow data by July 1, 2026", and therefore bio-LNG, and bio-L-CNG combustion in vehicles would need to demonstrate physical flow to California after December 31, 2037."

**PROPOSED AMENDMENT:** While a creative alternative since the previous proposal was difficult in which to collect mapping data, we are concerned that including classes 7-8 in this single broad threshold could inaccurately trigger this requirement when most ZEVs produced by December 31, 2029, could be light to medium-duty classes 3-6, which do not utilize much if any RNG. A trigger exclusive to classes 7-8 is a more accurate measurement of heavy-duty ZEV readiness and would better protect the RNG market and California's emission goals should estimates fall short. (15d2-266.7)

**Comment:** First, the changes to deliverability requirements remain problematic for RNG development, as the proposal ties these requirements to Zero Electric Vehicles (ZEV) and Near ZEV's (NZEV) vehicle penetration in California. While we understand CARB's intention to prioritize RNG use in ZEVs if penetration goals are met, the unpredictable trigger makes it difficult for RNG developers to plan and invest. In addition, we question CARB's proposal to bar imported RNG from the North American gas system, given California's reliance on broad energy markets and the recent in-state RNG production increase. Achieving methane reductions and displacing fossil gas should remain the primary focus of California's RNG policy, and we would welcome further discussions with CARB staff on this issue. (15d2-267.2)

**Comment:** Further, complex triggers on RNG deliverability rules and timing for reduced recognition for avoided methane crediting remain unclear. These arbitrary decisions have ensured there will be fewer RNG projects motivated by the LCFS and have limited how the RNG industry can contribute to California's methane reduction goals. (15d2-269.4)

**Comment:** *Deliverability Trigger is Impossible to Predict*

The Second 15-Day Package's changes to deliverability requirements are also still problematic for RNG development. The new proposal is to trigger the timing of deliverability requirements for RNG to natural gas vehicle pathways based on medium- and heavy-duty zero-emission (ZEV) and near-zero-emission (NZEV) vehicle penetration.

While we understand conceptually that CARB may not want RNG to be used in natural gas vehicles if ZEV penetration goals succeed, and we support ZEV uses of RNG, the trigger itself is not something that RNG developers are comfortable predicting. Because LCFS crediting requires having an established end use for the RNG (to receive pathway approval) and because projects need to understand eligibility for federal Renewable Fuel Standard credits, investment in methane reduction cannot be made with much certainty based on this trigger.

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,<sup>8</sup> with in-state production increasing from 6.74% in 2021 to 18.23% in 2023—we continue to question why CARB would propose eliminating 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. RNG stakeholders will be happy to engage further with CARB staff on this topic. (15d2-269.10)

**Comment:** We recognize and appreciate CARB's efforts to enhance the integrity and accuracy of the proposed RNG deliverability requirements, consistent with RPS eligibility rules. We note the ZEV penetration metric in the Second 15-day package delivers an improved level of transparency from the previous language concerning "if the Executive Officer approves a gas system map by July 1, 2026".

While we wish to highlight that we do not believe imposing deliverability requirements is necessary to achieve the goals of the LCFS, and we respectfully urge CARB to work with biomethane stakeholders to find a better solution to these concerns, we also note below the implications that the early trigger date for the proposed deliverability requirements could have on biomethane stakeholders. The RNG deliverability requirements are slated to begin in 2041 or 2046 depending on end use, with the potential early trigger advancing the 2041 deliverability requirement for bio-CNG, bio-LNG, and bio-L-CNG pathways for CNG vehicles to apply after December 31, 2037, if the number of unique Class 3-8 ZEVs or NZEVs on December 31, 2029, exceeds 132,000 vehicles.

The early trigger, if reached, would impose unforeseen requirements on businesses and investors who may have already committed to long-term agreements. RNG offtake typically operates on long-term agreements, with contracts frequently spanning 10 years or more. This

long-term framework allows for stability and predictability, which are essential to securing investment, ensuring operational viability, and achieving decarbonization goals. It is important to note that many RNG agreements are finalized well in advance of the contract start date, with contracts often signed multiple years prior to the commencement of offtake obligations and multiple years before the project breaks ground. This means that even projects with offtake agreements signed several years before December 31, 2029, could face deliverability requirements that were unforeseen at the time of contracting significant RNG volumes and before an early trigger was determined.

We respectfully urge CARB to reconsider the necessity of RNG deliverability requirements and to avoid the introduction of an early trigger mechanism. Should CARB not be amendable to this reconsideration, we encourage CARB to incorporate resolution intent language that honors the integrity of long-term offtake agreements finalized on or before December 31, 2029, for exception from the early trigger mechanism. Such language would provide a more certain and transparent timeline for developers, operators, and investors to base critical business decisions upon, while still aligning with the state's broader climate objectives. (15d2-278.7)

**Comment: In subsection 95488.8(i)(2), staff proposes to allow for book-and-claim accounting of biomethane to produce electricity for electric vehicle charging, provided the electricity is generated using a fuel cell.** This proposal is apparently intended to increase flexibility for biomethane projects to produce low-CI electricity and support California's zero emission vehicle goals, while also prioritizing electricity generated using non-combustion technology.

**Comment:** The residents near booking dairies will thank you. However, it appears that this provision is not being required of California dairies. There is only one digester using a fuel cell today (according to the CARB *workshop* August 22, 2024). According to LCFS data there are a total of 9 dairies producing electricity in California. Existing dairies should be given two years to switch to fuel cells and using a fuel cell should be a requirement for new pathways. It is hard to imagine you would apply this requirement outside the state and not in the Central Valley which is an air-pollution non-attainment zone. (15d2-281.6)

**Comment: § 95488 (i)(2)** - This proposed change modifies language about the use of book-and-claim accounting to track RNG used as a transportation fuel, an input to the production of specified fuels, or to produce electricity for EV charging. The change to § 95488 (i)(2) states

“Indirect accounting may be used for RNG used as a transportation fuel, to produce electricity using a fuel cell for EV charging, or to produce hydrogen for transportation purposes” (underlined text indicates the additions in the 2nd 15 day package).

The word choice in this clause is unclear, one reading of it would imply that book-and-claim accounting can only be used when RNG is being used to generate electricity using a fuel cell for EV charging or to produce hydrogen, i.e. excluding its use in CNG or LNG fueled vehicles. A following sub-part, § 95488 (i)(2)(A) states

“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 to produce electricity using a fuel cell for EV charging, or as an input to



hydrogen production, without regards to physical traceability. “ (underlined text indicates the additions in the 2nd 15 day package).

This section (as well as § 95488 (i)(2)(B), which has language similar to § 95488 (i)(2)(A) makes it clear that use of RNG in CNG or LNG fueled vehicles would also allow for book-and-claim accounting. Based on prior statements by CARB staff, this reading appears to match the intent of these provisions. Simply adding the word “or” immediately before “to produce hydrogen” in § 95488 (i)(2) would match the wording in § 95488 (i)(2)(A) and remove any ambiguity from this section. (15d2-287.11)

**Comment:** BAC continues to have serious concerns about... the ongoing use of Book and Claim for undelivered biomethane, but we addressed those issues in our August 27 comments. (15d2-294.4)

**Comment:** *Deliverability trigger creates a barrier to imports and should not be adopted in the LCFS*

The Second 15-Day Package’s changes to deliverability requirements are still problematic for RNG development. The new proposal is to trigger the timing of deliverability requirements for RNG to natural gas vehicle pathways based on medium- and heavy-duty zero-emission (ZEV) and near-zero-emission (NZEV) vehicle penetration.

While we understand conceptually that CARB may not want RNG to be used in natural gas vehicles if ZEV penetration goals succeed, the trigger itself is not something that RNG developers are comfortable predicting. Because LCFS crediting requires having an established end use for the RNG (to receive pathway approval and to understand eligibility for federal Renewable Fuel Standard credits), investment in methane reduction cannot be made with much certainty based on this trigger.

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,<sup>3</sup> with in-state production increasing from 6.74% in 2021 to 18.23% in 2023—we continue to question why CARB would propose eliminating 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.

<sup>3</sup> <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>

(15d2-302.4)

**Comment:** 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. (15d1-147.3, 15d2-290.7)

**Comment: 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. (15d2-302.7)

**Agency Response:** For a summary of the policy necessity and underlying authority guiding the approach of these LCFS amendments for incentivizing near-term methane reductions within the scope of California's broader climate goals, please refer to Response Z-1.3 above.

In response to the comments related to the 50% flow requirement and the December 31, 2029 deadline, see Responses Z-2.2 and Z-2.3 above.

In response to comments related to timing limitations, staff proposed to modify the deliverability requirements in the Second 15-day package by aligning the conditional acceleration from 2041 to 2037 with a CARB determination of full implementation of the State's medium- and heavy-duty zero emission vehicle regulations on December 31, 2029. This determination, of whether the number of unique Class 3-8 ZEVs reported or registered in California exceeds 132,000 ZEVs or NZEVs on December 31, 2029, would be based on the evaluation and notification specified by subsection 95488(d)(1). The determination would show that acceleration of the deliverability requirement would be appropriate because California would be on track to transition to zero emission vehicles and would be less reliant on combustion vehicle fuels.

## ***Z-2.5 LCFS RNG Framework and a Unified North American RNG Registry System***

### **Comment: 2.3.4 CARB Should Promote a Unified North American RNG Registry System**

Given that Europe is expanding RNG trade, built on a clear guarantee of origin system (book and claim), one centralized registry, and the same conceptual principles that CA LCFS currently uses, we think North America can achieve the same objective if leading jurisdictions, such as California, continue to support such a framework.

It is a better outcome for the climate if we start by setting up one well-functioning North American system for RNG, rather than create unnecessary delays with balkanized programs (that likely must be consolidated at some point in the future, in line with the European experience).

The RNG Coalition continues to support development of one North American registry for tracking RNG production and end use to ensure no double counting of RNG volumes. The leading registry system tracking RNG and other forms of renewable thermal energy is the Midwest Renewable Energy Tracking System (M-RETS).<sup>63</sup> The use of M-RETS to supplement LCFS reporting would reduce administrative burden on CARB staff and offer California a chance to harmonize the design of such systems with other jurisdictions who are now undertaking similar RNG-supportive policies. Use of M-RETS aligns well with the existing RNG accounting methods in the LCFS.

<sup>63</sup> <https://www.mrets.org/m-rets-renewable-thermal-tracking-system/>

(45d-240.9)

**Agency Response:** No changes were made to the Proposed Amendments in response to this recommendation. Staff appreciates the commenter's suggestions, but the recommendations for developing a renewable natural gas registry system outside of the LCFS are not within the scope of this rulemaking.

### **Z-3 Breaking Ground Clarification**

**Comment:** §95482 (g) - As discussed in the definition of "Break ground," above, the current proposal could allow projects to perform a minimal amount of earthmoving during a period while a given class of pathway is open to new applications, but delay the majority of construction (along with completion and commissioning) by a significant amount of time. Provisions in the HRI and FCI protocols that allow, but do not require, a pathway application to be canceled if the project is not operational within 24 months of pathway approval offer (e.g. § 95486.3 (a)(4)(F) ) offer some assurance that delayed construction can not allow a pathway to be certified after it would otherwise be ineligible, however delays during the pathway approval process plus the 24 month allowed window between pathway approval and the station becoming operational mean projects may not actually go online until significantly more than 2 years after the window of eligibility has nominally closed. Not all potential pathways with limited temporal windows of eligibility have equivalent limitations, as well. Specifying the need for groundbreaking to be shortly followed by continuous construction, or extending requirements for prompt completion of pathways could reduce this risk. (45d-391.30)

**Agency Response:** No changes were made in response to this comment, but staff appreciates the commenter's concern. The infrastructure crediting provisions include an operational deadline because there is a limited amount of credits that can go toward the overall infrastructure crediting categories. Therefore, it is important that delayed projects do not occupy the queue. The upper limit on project approvals do not exist for dairy and swine manure (DSM) pathways, so the operational deadline is not needed.

### **Z-4 Multiple Comments: *Alternative Incentive Program to Support Transition of Biomethane to Hard-to-Decarbonize Sectors***

**Comment:** CARB should establish a complimentary policy such as an industrial clean fuels standard to promote the growth of the biomethane market for use in hard-to-electrify sectors;

...

**CARB should establish a complimentary policy such as an industrial clean fuels standard to promote the growth of the biomethane market for use in hard-to-electrify sectors**

SoCalGas appreciates that the Proposed Amendments recognize the need for more methane capture projects in California to reduce short-lived climate pollutants (SLCP) emissions.<sup>2</sup> We agree with CARB staff that immediate action to curtail these potent emissions will yield local health benefits and mitigate global warming as we transition to low-carbon energy systems and pursue carbon neutrality.<sup>3</sup>

<sup>2</sup> DRAFT ENVIRONMENTAL IMPACT ANALYSIS for the Proposed Low Carbon Fuel Standard Regulation (Draft EIA) at 17.

<sup>3</sup> ISOR at 29.

More specifically, the proposed modifications to avoided methane crediting maintain a pathway for projects established before 2030 to recover initial capital costs of methane capture. These projects constitute some of the most cost-effective investments for carbon reduction in the state and merit fortification.<sup>4</sup> A complementary program to advance the deployment of biomethane beyond the transportation sector is essential to the sustainability of methane capture projects post-crediting phase-out.

<sup>4</sup> CARB, California Climate Investments 2022 Mid-Year Data Update, September 2022, indicates that investments in dairy digesters and diverted organic waste cut carbon emissions by approximately \$9 and \$10 per ton, respectively. CARB's 2021 Annual Report on Climate Investments also showed that investments in organic waste to energy were the most cost-effective of the State's climate investments; at 119.

We support the policy direction outlined in CARB's 2022 Scoping Plan for the long-term deployment of biomethane for hydrogen production and its expanded use in stationary sources. To sustain this momentum, the State should establish a clear pathway with concrete milestones and appropriate offramps before the complete phase-out of avoided methane credits. Since California's industrial sector is a significant contributor to natural gas consumption and greenhouse gas emissions, incentivizing biomethane use in sectors beyond transportation becomes crucial.<sup>5</sup> CARB could achieve this by opening the current LCFS program to stationary sources or using the current LCFS program as a model to create a new Industrial Clean Fuel Standard program. This new standard would aim to institute a set of gradually declining emissions-based targets for regulated entities, empowering the industrial sector to reduce emissions through diverse approaches including electrification, procuring low and zero-carbon fuels, carbon capture and sequestration, and enhancing energy efficiency. CARB should also evaluate pathways to utilize other programs such as the Cap-and-Trade Program to support the transition of biomethane into other sectors.

<sup>5</sup> Decision 22-02-025, Finding of Fact 16 at 53.

The ongoing success of the LCFS program is pivotal to fortifying the biomethane market, especially as its applications extend beyond transportation. To support a robust biomethane market with competitive pricing and a consistent supply, SoCalGas recommends expediting discussions on potential initiatives, such as an Industrial Clean Fuel Standard or expanding the utilization of other program funds like Cap-and-Trade for biomethane procurement. The proposed amendments to the avoided methane crediting underscore the need for establishing a complementary policy before 2030. This proactive measure not only incentivizes the market to lower prices but also provides clear guidance and procedures for funding opportunities, encouraging businesses to invest in biomethane projects.

As championed by CPUC-supported programs<sup>6</sup>, the benefits of biomethane procurement are based on the avoided costs of well gas, encompassing upstream interstate transmission, and the avoided social cost of methane. Hence, it is crucial for CARB, as a regulatory body, to adopt programs that equally incentivize multiple cost-effective means of decarbonization to more rapidly achieve net-zero goals, benefiting society at large.

<sup>6</sup> Decision 22-02-025, Finding of Fact 16 at 53.

(45d-341.1)

**Comment: PG&E urges CARB to develop an alternative incentive program or policy lever to support the transition of biomethane to hard-to-decarbonize sectors.**

As noted in CARB staff's Initial Statement of Reasons (ISOR) report on the proposed LCFS amendments, PG&E agrees that capturing methane from California's methane sources is critical for achieving the State's climate targets and that actions to reduce methane emissions will provide immediate benefits. The 2022 Scoping Plan also identifies a long-term role for biomethane in decarbonizing California's energy use, either through the production of renewable hydrogen or for use in non-transportation sectors. To this end, CARB is proposing to phase out crediting for biomethane used in CNG vehicles after 2040. While PG&E supports this long-term transition for biomethane to hard-to-decarbonize sectors, CARB should ensure that this proposed phase-out from the LCFS program does not stymie the growth of critical methane capture projects in the near-term, which can take many years for design, build, and connection. (45d-388.19)

**Comment:** 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. (15d1-224.6)

**Comment:** 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. (15d1-224.27)

**Comment:** 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; (15d1-237.1)

**Comment: CARB should establish an Industrial Clean Fuels Standard to advance clean fuel use in the industrial sector.**

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.<sup>1</sup> While RNG made up 5.1% of all on-road alternative fuels dispensed by volume, it generated 19.2% of all carbon dioxide equivalent (CO<sub>2</sub>e) emission reductions of on-road alternative fuels reported under the California LCFS in 2023.<sup>2</sup> If CARB applies its proven methodology beyond the transportation sector to industrial fuel uses, it will have an even greater impact.

<sup>1</sup> [https://ww2.arb.ca.gov/sites/default/files/2024-03/2024.3.15%20LCFS%20EJAC%20Slides\\_final.pdf](https://ww2.arb.ca.gov/sites/default/files/2024-03/2024.3.15%20LCFS%20EJAC%20Slides_final.pdf)

<sup>2</sup> 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>.

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.<sup>3</sup>

<sup>3</sup> 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.

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.<sup>4</sup> 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.

<sup>4</sup> <https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>; pg 88, 207 & 2012.

(15d1-237.7)

**Comment:** Looking forward, clean fuels will need additional support as LCFS credits phase out. Since California's industrial sector is a significant contributor to natural gas consumption and greenhouse gas emissions, incentivizing biomethane use in sectors beyond transportation becomes crucial. CARB could achieve this by opening the current LCFS program to stationary sources or using the current LCFS program as a model to create a new Industrial Clean Fuel Standard program. This new standard could institute a set of gradually declining emissions-based targets for regulated entities, empowering the industrial sector to reduce emissions through diverse approaches including procuring low and zero-carbon fuels, carbon capture and sequestration, and enhancing energy efficiency. (15d2-279.4)

**Agency Response:** No changes were made to the Proposed Amendments in response to these comments. Staff appreciates the commenters' recommendations, but the recommendations for a new, separate rulemaking are beyond the scope of this current rulemaking.

## **Z-5 Multiple Comments: *Continue to Support Renewable Natural Gas Under LCFS***

**Comment:** While Brightmark prefers the current rule mechanisms for avoided methane and book and claim deliverability continue as is, we can support the proposed rule language applying to projects that break ground after December 31, 2029, to phase out pathways for crediting biomethane used in CNG vehicles after December 31, 2040, and pathways for biomethane used to produce renewable hydrogen would be eligible to receive credits until December 31, 2045. (45d-320.7)

**Comment:** We are also supportive of the proposal that for projects that break ground after December 31, 2029, deliverability rules won't be modified until January 1, 2041 for pathways which include biomethane used in CNG vehicles and January 1, 2046 for biomethane used for hydrogen production. (45d-328.3)

### **Comment: Continue to support Renewable Natural Gas (RNG) under LCFS.**

- For MTS, the transition from natural gas buses to battery electric buses will take many years, with a plan to complete the transition by 2040. This is not only due to the life cycle uses of current buses, but also the tremendous investment to install zero-emission infrastructure along with the premium cost factors of electric buses. If RNG is no longer generating credits in the LCFS program, many transit agencies, including MTS, could not afford RNG to fuel its fleet during transition years. This could result in agencies needing to revert to fossil natural gas temporarily to balance cost implications. In order to ensure transit agencies continue to operate the cleanest vehicles, it is critically important to continue to support RNG under LCFS. (Apr-004.4)

**Comment:** Rather than limit crediting for biomethane under the LCFS program, we encourage CARB to look for ways to *establish* credit. As CARB seeks to focus biomethane use in hydrogen production and non-transportation uses, WSPA believes that the most appropriate way to do so is to establish incentives that encourage use in those applications, rather than by creating uncertainty and establishing bad precedent by removing incentives elsewhere. Such an approach is more likely to slow or even reverse investments in methane capture projects, and stranding investments. This approach also runs counter to existing programs incentivizing the development of projects to address Short-Lived Climate Pollutants. (Apr-094.23)

**Comment:** Although the Workshop did not focus on RNG topics, additional RNG changes are needed to restore confidence in LCFS as a tool for driving RNG development. (Apr-098.6)

**Comment:** At the Workshop CARB continued to state they'd like to see the biogas/RNG resource be shifted toward Zero Emission Vehicles (ZEVs) over time. Barriers can be removed through rule changes to help this occur. For example, **a temporary pathway for biogas to power should be established** and accounting frameworks should **allow RNG delivery to non-colocated power generation facilities**. (Apr-098.14)



**Comment:** CARB should move forward on the development of new markets for biomethane, as committed to in the Advanced Clean Fleets resolution adopted in April 2023. (Apr-150.5)

**Comment: CARB Should Identify and Develop New Markets for Biomethane, as Committed to in its Advanced Clean Fleet Resolution.**

In its April 2023 Resolution on Advanced Clean Fleets, CARB recognized the need to develop new markets for biomethane to move it to hard to electrify end uses. As the Board Resolution stated:

“the Board recognizes that the successful implementation of the food waste diversion requirements and methane emissions reductions mandated by SB 1383 are critical to the State’s climate goals. The Board further recognizes that multiple reliable uses for non-fossil biomethane will be needed for successful implementation . . . As such, the Board directs staff to prioritize policy discussions related to SB 1383 and SB 1440 implementation and discussions on how to transition biomethane into hard to decarbonize sectors, or as a feedstock to produce hydrogen for FCEV fuel and to produce electricity to charge BEVs to achieve the SB 1383 target.”

BAC urges CARB staff to move forward on the development and implementation of new, reliable markets for biomethane as directed by the Board more than a year ago. This is critical to avoid backsliding on the state’s SLCP reductions, which will happen if biomethane is phased out of the transportation sector before new markets are developed. (Apr-150.14)

**Comment:** Additionally, Promus requests CARB to begin outlining and provide clarity around its desire to long-term channel biomethane to other hard-to-decarbonize sectors. Knowing that there will be sectors outside of the transportation market that will be a market for biomethane will further incentivize the capture of methane and help California meet its emissions reductions goals. (Apr-152.6)

**Comment:** Reiterate CARB’s support of RNG’s role as a central component of the LCFS. Following the passage of SB 1383, California’s efforts to reduce short-lived climate pollutants, specifically methane from agriculture, have been successfully advanced through the implementation of dairy-to-RNG projects across the Central Valley. In addition to capturing methane for conversion into negative CI RNG transportation fuel, dairy digesters have demonstrably improved air quality and reduced Greenhouse Gas emissions in local communities – many of which are disadvantaged and have been negatively impacted by pollution. Additionally, thousands of jobs have been created or supported by the construction and operation of digester projects, with billions of dollars of investment in the state’s economy. The program has been very successful, and with the flexibility of RNG as both a transportation fuel and potential feedstock for clean hydrogen or electricity, it will continue to play a central role in the LCFS for decades to come. (Apr-180.5)

**Comment:** 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. (15d1-042.7)

**Comment:** At the same time, however, we strongly oppose proposed changes that: ... Exclude biomethane used in natural gas vehicles after 2040;

...

### **The Proposed Changes Should Not Eliminate Credit for Biomethane Used in Natural Gas Vehicles.**

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 divert 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. (15d1-136.4)

**Comment:** 3) Biomethane used in natural gas vehicles should continue to earn credits to support legacy vehicles beyond 2040; (15d1-237.3)

**Comment: Biomethane used in natural gas vehicles should continue to earn credits to support legacy vehicles beyond 2040.**

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 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. (15d1-237.10)

**Comment Summary:** Additionally, the stakeholders recommend that CARB, starting with the 2024 amendments to the LCFS, send a clear policy signal that biomethane is a necessary and effective decarbonization strategy in these other sectors (e.g., residential, commercial, industrial) that are fundamental to the state meeting its ambitious GHG reduction targets. (15d2-256.9, 15d2-260.8)

**Comment:** Operating our existing projects, let alone increasing our impact, depends on the LCFS maintaining stable policy for methane reduction and RNG pathways. We are disappointed with some of the proposed amendments that arbitrarily restrict RNG pathways, but we appreciate amendments that attempt to avoid retroactively changing the rules on projects that have already been developed. (BHT-166)

**Comment:** CASA continues to disagree with the proposed phaseout of avoided methane crediting for both biomethane and hydrogen pathways from wastewater treatment, as well as the eventual phaseout of credit for our biomethane as a transportation fuel, which supports and will continue to support wastewater sector fleets in maintaining essential public services of wastewater collection and treatment to protect public health and the environment, and to meet the need for immediate reductions to meet SIP requirements in nonattainment zones or ozone, a priority especially in the South Coast. (BHT-213)

**Agency Response:** See Response Z-1.3 regarding transitioning biomethane and biomethane incentives to support biomethane use in non-combustion applications and other sectors.

## **AA. Land Use Change (LUC) Modeling**

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### **AA-1 Multiple Comments: *Table 6 LUC Values Should be Updated***

**Summary:** CARB's LUC values that were established in 2015 by an expert working group need to be updated. These commenters contend that LUC values are based on outdated data, modeling parameters, and assumptions and should be updated. Some stakeholders argue that LUC values underestimate crop-based fuels, while other stakeholders argue that LUC values are overstated and will cause crop-based fuels to be phased out from credit generation by 2035.

Some commenters call for an update to the GTAP-BIO model used by CARB, while others contend that an economic model like GTAP is fundamentally incapable of providing scientifically accurate LUC estimates, resulting in far lower estimates than biophysical models. Some commenters also suggest that, given the limitations and uncertainty around LUC assessment with the GTAP-BIO model, CARB should use an alternative model or a combination of models to generate a more scientifically robust analysis. Some commenters also suggest that updated LUC assessments should inform the design of the proposed sustainability provisions.

Some commenters object that CARB's refusal to update LUC modeling violates requirements that CARB use the best available science. There are also concerns that when the federal Clean Transportation Production Credit (Section 45z) goes into effect in 2025, it will double-count LUC values for LCFS fuel pathways, and some commenters argue that CARB should not double-count carbon emissions assigned to crop-based fuels under the state LCFS program that have already been accounted for under federal biofuel programs.

(45d-200.14, 45d-213.10, 45d-213.11, 45d-213.12, 45d-221.2, 45d-243.10, 45d-266.6, 45d-269.2, 45d-304.4, 45d-304.11, 45d-304.14, 45d-304.19, 45d-354.13, 45d-354.14, 45d-366.6, 45d-371.1, 45d-383.1, 45d-383.8, 45d-383.9, 45d-383.10, 45d-383.15, 45d-383.16, 45d-389.1, 45d-391.2, 45d-391.5, 45d-391.49, Apr-036.7, Apr-048.7, Apr-073.4, Apr-079.11, Apr-079.15, Apr-079.16, Apr-085.1, Apr-085.8, Apr-088.1, Apr-088.14, Apr-093.1, Apr-093.16, Apr-095.14, Apr-112.1, Apr-112.11, Apr-112.14, Apr-124.6, Apr-140.2, Apr-140.16, Apr-146.3, Apr-163.10, Apr-163.19, Apr-182.3, Apr-182.10, Apr-183.2, 15d1-021.2, 15d1-032.2, 15d1-037.3, 15d1-037.6, 15d1-056.3, 15d1-070.4, 15d1-077.3, 15d1-078.2, 15d1-078.4, 15d1-079.5, 15d1-087.3, 15d1-101.2, 15d1-101.3, 15d1-115.1, 15d1-115.6, 15d1-130.4, 15d1-138.2, 15d1-138.6, 15d1-139.1, 15d1-139.5, 15d1-144.2, 15d1-155.4, 15d1-166.5, 15d1-181.17, 15d1-187.7, 15d1-187.8, 15d1-194.4, 15d1-194.5, 15d1-194.6, 15d1-196.6, 15d1-197.6, 15d1-218.3, 15d1-218.4, 15d1-218.5, 15d1-218.9, 15d1-218.10, 15d1-219.5, 15d1-219.20, 15d1-219.24, 15d1-222.18, 15d1-228.13, 15d1-236.12, 15d1-244.7, 15d1-251.14, 15d2-184.13, 15d2-184.21, 15d2-192.2, 15d2-192.6, 15d2-194.14, 15d2-255.14, 15d2-197.24, 15d2-208.24, 15d2-214.24, 15d2-239.24, 15d2-240.24, 15d2-243.24, 15d2-268.24, 15d2-285.24, 15d2-293.24, 15d2-211.3, 15d2-237.3, 15d2-259.7, 15d2-274.3, 15d2-275.9, 15d2-286.5, 15d2-286.7, 15d2-197.13, 15d2-208.13, 15d2-214.13, 15d2-239.13, 15d2-240.13, 15d2-243.13, 15d2-268.13, 15d2-285.13, 15d2-293.13, 15d2-205.3, 15d2-237.4, 15d2-244.1, BH-040.2, BH-040.5, BHT-88, BH-040.5, BH-051.8, BH-040.6, BHT-54, BHT-66, BHT-239, BHT-8)

**Agency Response:** Changes were made in response to these comments. A wholesale update to land use change emissions quantification, which might include assessment of waste/residue-based fuels produced from used cooking oil, tallow, and distillers corn oil, was not included within the scope of the Proposed Amendments. Estimates of land use change emissions associated with crop-based biofuels range above and below the existing land use change values in Table 6 of the LCFS regulation, and staff has not observed a consensus in the scientific community or research on this topic. Some stakeholders have highlighted what they consider to be deficiencies in the existing land use change assessment used for LCFS, but disagree sharply on the directional impact on carbon intensity of these deficiencies. As a result of this lack of consensus and the time- and resource-intensive process that would be necessary to pursue a

comprehensive reevaluation of land use change modeling (the previous effort required a multi-year process with a working group convened from industry, academia, non-profits and more), staff did not propose changes to the values in Table 6. Accordingly, comments requesting specific updates to these values or identifying suggested deficiencies in the current regulatory land use change modeling framework are generally beyond the scope of this rulemaking (See CEQA RTC Master Response 2 for more detail on the approach to land use change reflected in the Proposed Amendments).

While comprehensive LUC updates were beyond the scope of the current rulemaking, modifications to the initial amendment proposal included a mechanism to assign more conservative LUC values to feedstocks sourced from higher deforestation and LUC risk regions. With those modifications to section 95488.3(d), the Proposed Amendments specify the geographic region in Table 6 where land use change (LUC) carbon intensity was modeled for specific feedstock/fuel combinations. LUC carbon intensity of feedstocks from regions other than those modeled may not be equivalent with the Table 6 values. 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, the modified amendments include a mechanism for CARB to assign more conservative LUC carbon intensity values to feedstock/fuel combinations from regions with higher LUC risk. This proposal is informed by the review of an 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.

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. As modified, the Proposed Amendments aim to provide more granularity to LUC carbon intensity values where appropriate. 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 assessment will use satellite-based, remote sensing studies and datasets that attribute LUC to empirical crop expansion. These land use change empirical estimates may be used in lieu of the GTAP-estimated land requirements, along with empirical data on yields and carbon stocks to estimate an empirical/regional LUC carbon intensity of a given feedstock/fuel combination (see Response AA-3 for more details on this approach). The empirical/regional LUC value will be compared to its respective modeled/global LUC carbon intensity value in Table 6, and the more conservative value will be assigned.

Staff's proposal leverages empirical LUC data to address feedstocks from regions of higher LUC risk or uncertainty, while providing industry with an established LUC CI value for planning and projecting fuel production costs and benefits under the program. In addition to implementing the proposed amendments to 95488.3(d), as directed by Resolution 24-14, CARB staff will also convene a public forum in 2025 on the latest LUC science, including the most commonly used models, for consideration in a future LCFS update.

## **AA-2 Multiple comments: *LUC of Argentinian Soybean Oil-Based Diesel***

**Summary:** There were several comments on the accuracy of the LUC value assigned to fuels derived from Argentinian soybean oil during staff's recent review of a fuel pathway life cycle analysis. Some commenters argue that the LUC assessment was deficient, and the staff assigned LUC value is grossly underestimated, citing increased trends of cattle and soy-driven deforestation in the country. Other commenters argue that, going forward, Argentinian soy should be assigned an equivalent, or even lesser, LUC value than the Table 6 value for US soybean oil-based diesel.

(45d-340.6, 15d1-155.4, 15d1-187.9, 15d1-196.7, 15d1-222.18)

**Agency Response:** No changes were made in response to these comments. Comments recommending specific updates to LUC values for individual fuel pathways or pointing out suggested deficiencies in the LUC modeling framework are beyond the scope of this rulemaking. See comment response AA-1 for additional information on the approach reflected by the Proposed Amendments to LUC updates.

## **AA-3 Multiple Comments: *Empirical Indirect Land Use Change (iLUC) and Designation of Production Region Is Not a Substitute for Updated Table 6 iLUC Values; Empirical iLUC Evaluations Will Not Have Meaningful Impact on Reducing Deforestation if They Do Not Account for Market-Driven iLUC***

**Comment:** Slide 65 proposes using an empirical approach to establishing LUC values for certain crop-based fuel-feedstock combinations. This could be an important step forward, depending on how it is done, but the empirical approach must include market-driven indirect land use change, rather than focus only of feedstocks sourced directly from converted areas. (Apr-073.2)

**Comment:** Increasing LUC for certain fuel/feedstock combinations may be warranted but is not sufficient to address market wide impacts of expanded lipid-based fuel consumption in California. In the workshop slides, CARB staff mentioned that they are evaluating the option of increasing LUC for certain fuel/feedstock combinations. This is a reasonable idea for feedstocks sourced in areas with supply chains more directly linked to damaging land use change. However, because soybean and soybean oil are fungible commodities traded on global markets, this disincentive will have little meaningful impact on reducing deforestation. (Apr-086.19)

**Comment:** The Proposed ILUC Approach for Un-Specified Feedstock Types is Inadequately Protective Against ILUC Risk, Methodologically Unsound, and Could Benefit Imported Fuels Compared to Domestic Ones.

Slide 65 indicates that in cases where a pathway uses feedstock not covered by Table 6, Staff would make a case-by-case determination based on empirical sub-national production data. The use of land cover data, including remote sensing or satellite imagery was proposed as one option for obtaining the required empirical data. Few details on the nature of this analysis were provided, and it is difficult to effectively evaluate the efficacy of such a solution without knowing more about the methodology to be employed in making these determinations.

At a conceptual level, however, ILUC analysis is not amenable to purely, or even primarily empirical solutions. ILUC cannot be directly measured, because it is a phenomenon that works indirectly, through global markets. While sensors can provide empirical data to show that a given parcel of land was cleared for cultivation, there is no empirical way to conclusively identify why that clearance, or any land use change decision, occurred; not all land clearance is due to ILUC. More importantly, many ILUC impacts occur in different regions, or different countries than the activity that causes them. For example, reduced U.S. soybean oil exports results in un-met demand for vegetable oils in the countries that formerly received those exports. The land use change that occurs because of reduced U.S. soybean oil exports may occur in South America, Asia, Africa, or elsewhere. A sub-national data analysis will not capture impacts outside of its geographic scope.

Beyond the geographic limitations, empirical approaches cannot effectively quantify ILUC. ILUC is assessed through consequential analysis, typically comparing the outcomes or expected outcomes of a given project against a counterfactual scenario in which the project did not exist. Counterfactual scenarios, by their very nature, do not exist and so cannot be empirically assessed. The emphasis on empirical analysis therefore conflicts with the methodologies needed to effectively assess ILUC.

The assessment of ILUC, like any life cycle analysis, requires making certain analytical assumptions related to system boundaries, allocation methodology, additionality determinations, and establishment of counterfactuals.

Allowing case-by-case empirical analysis creates an opportunity for different assumptions to be used by different applicants, leading to pathway certified carbon intensities that are not comparable and create an unequal playing field for LCFS market participants. Establishing a consistent model-based methodology ensures that pathway applicants cannot leverage favorable analytical assumptions to gain a competitive advantage. This is especially important given that the proposal would require pathways using feedstocks that are included on Table 6 to continue using those ILUC values; foreign producers or those using a novel feedstock could obtain a competitive advantage from the non-comparable and probably less strict empirical methodology. (Apr163.18)

**Comment:** Additional authority to consider adjusting land use change values will not absolve the need for immediate action on the surge of crop biofuels. Staff added a provision 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.

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, 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.

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, despite comments from experts that highlighted the problems. In that case, CARB accepted the applicant's proposal to apply the existing LUC impact value of 29.1 gCO<sub>2</sub>e/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. (15d1-222.18)

**Comment:** 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. (15d1-240.2)

**Comment:** 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. (15d1-240.27)

**Comment:** 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. CARB should substantively correct carbon intensity valuation by studying regional producers land use change effects, and incorporating findings into regional carbon intensity valuations. (15d1-240.28)

**Comment:** 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. (15d1-240.29)

**Comment:** Underestimating carbon intensity based on low LUC calculations, and permissive sustainability certification will adversely impact refinery communities. (15d1-240.30)

**Agency Response:** No changes were made in response to these comments. The Proposed Amendments' option for the use of a conservative LUC value based on specified regulatory conditions and evidence is not a substitute nor is it directly comparable to Table 6 LUC values. Rather, it provides an evidence-based mechanism

to apply a more conservative value for feedstock/fuel combinations from regions where land conversion risks are higher. Modeled LUC values are global estimates of direct and indirect LUC associated with increased biofuel demand and market-mediated effects, while empirical LUC considers direct land use conversions associated with crop feedstocks in a specific region as a conservative estimate of LUC.

Some commenters requested that staff provide more methodological details and transparency on the empirical LUC analysis, particularly when and how the mechanism is triggered during staff evaluation of feedstock sources. Empirical LUC will be considered whenever a pathway is received with feedstock/fuel combination(s) from regions not listed in the updated Table 6. If remote sensing data or analyses are available that can attribute the specific crop feedstock in question to regional land use changes, staff will work with the applicant to leverage this information to produce empirical estimates that will be used in lieu of the GTAP-estimated land requirements. Emission factors from the AEZ-EF model (or updated empirical datasets of carbon stocks) and local crop yields and fuel properties from CA-GREET 4.0 will also be used.

Given the time and analytical requirements of the empirical LUC analysis, it is infeasible and unnecessary for CARB to conduct these analyses pre-emptively for subnational production regions and create a list of empirical LUC values in a format similar to Table 6. Similarly, it would be infeasible and speculative for CARB to comprehensively evaluate region-specific production shocks within the scope of this rulemaking in order to compare empirical LUC with modeled iLUC, as some commenters have recommended. Large commodity-producing countries in the tropics could each contain dozens of subnational regions of production. LCFS pathway applications are appropriately processed on a case-by-case basis as specified by regulatory requirements.

Fuel pathways sourcing crop-based feedstocks from novel regions may require application submission under the Tier 2 classification process specified by section 95488.7 of the LCFS regulation. Under the public posting requirements of Tier 2 pathways, empirical LUC analyses conducted for such an application will be included in fuel pathway application materials posted for public review and comment prior to CARB certification.

The empirical LUC mechanism will not create an unfair advantage for international feedstocks, as some commenters have objected could occur, because the amendments specify that CARB may only assign the more conservative value between the empirical LUC value and the Table 6 value for a given fuel/feedstock combination. For example, if CARB determined through empirical analysis that sugarcane ethanol produced from a novel region had a lower LUC carbon intensity than Brazilian sugarcane ethanol in Table 6, the more conservative Table 6 LUC value would still be assigned to the pathway as specified by the amended regulatory framework.

Empirical LUC does not account for market-mediated, indirect land use changes in other regions or countries. As the commenters point out, empirical methods are incapable of providing this level of detail due to a lack of counterfactual scenarios and causal attribution. Only (quasi) experimental designs at smaller scales, or modeling approaches on larger scales, can estimate indirect LUC, but these methods all rely on establishing a set of assumptions that can vary widely. For this reason, staff view the empirical approach as a more objective mechanism for assessing LUC regions for individual pathways.

Assessment of empirical case-by-case LUC values as appropriate will not be a substitute for more comprehensive updates to LUC values that account for market-mediated, indirect land use change. Following Board direction from Resolution 24-14, staff will convene a public forum in 2025 on the latest LUC science, including the most commonly used models, for consideration in a future LCFS update. Empirical LUC provides staff with an additional tool to reduce LUC risks.

For comments related to the potential impacts of refineries on communities, see CEQA RTC Master Response 4.

#### **AA-4 Multiple Comments: *CARB Should Allow Empirical iLUC Evaluations to Lower iLUC Values, Including for Table 6 Region/Feedstock/Fuel Combinations***

**Summary:** Commenters argue that CARB should apply an empirical LUC analysis to lower values for feedstock/fuel combinations from Table 6. They argue that this would acknowledge the maturity and sophistication of US and Canadian agricultural sectors and incentivize the market to develop more sustainable feedstocks by unlocking the carbon reducing benefits of better crop management practices, double-cropping, and cover crops, particularly in future CI scores for renewable diesel and SAF. By not allowing empirical analysis to lower LUC scores, some commenters argue that the proposal will be detrimental to those using modern farming practices to develop lower CI feedstocks and will set back the development of new feedstocks that are key to decarbonizing the road and aviation sectors. 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.

(Apr-066.13, Apr-143.4, Apr-146.3, Apr-169.1, 15d1-018.1, 15d1-019.5, 15d1-079.5, 15d1-110.5, 15d1-130.4, 15d1-139.5, 15d1-153.1, 15d1-165.1, 15d1-228.39, 15d2-244.7, BH-059.4, 15d1-181.16a, 15d1-171.29)

**Agency Response:** No changes were made in response to these comments. As described in Responses AA-1 and AA-3, a possible case-by-case empirical LUC analysis does not replace or substitute the existing LUC values. Empirical LUC values only apply to the fuel and feedstock combinations and regions not included in Table 6 and will be evaluated on a case-by-case basis. Table 6 “Land Use Change Values for Use in CI Determination” are the LUC default to which only more conservative values may be applied based on the specified possible empirical LUC analysis. See Response

AA-1 for a response to comments recommending additional public process on updating LUC values.

**AA-5 Multiple Comments: *Staff Should Apply Empirical iLUC Evaluations to Table 6 Region/Feedstock/Fuel Combinations to Increase iLUC Values***

**Comment:** Furthermore, new empirically based LUC emission values are needed for all crop-based fuel pathways, including those that are covered in Table 6 of the current LCFS regulation. This is because the LUC values in Table 6 calculated with 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. (Apr-073.3)

**Comment:** 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. (15d1-070.4)

**Comment:** 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. 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.

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. (15d1-251.14)

**Agency Response:** No changes were made in response to these comments. The empirical LUC analysis provides a mechanism for assigning more conservative LUC values to the fuel/feedstock combinations from regions not included in Table 6 or fuels produced from entirely new feedstocks. Following Board direction in Resolution 24-14, CARB staff will convene a public forum in the next 12 months on the latest science on land use change related to feedstocks used in production of transportation fuels and their impact on greenhouse gas emissions, including the most commonly used models. This multi-stakeholder process can inform the consideration of updates to Table 6 values in a future LCFS update. See Response AA-1 for further response on recommendations to update Table 6 values.

**AA-6 Multiple Comments: *General Support for Using Empirical Data to Monitor and Report Land Use Changes***

**Comment:** Neste supports CARB's proposal to establish empirical methods to evaluate ILUC of feedstocks, ensuring consistency and fairness across feedstocks. (Apr-066.13)

**Comment:** Similar to our comments above that a “one size fits all” approach to address sustainability requirements isn’t appropriate, any determination on ILUC must also take a nuanced approach, using best available science and data. In this regard, we appreciate that CARB intends to consider higher LUC values to high-risk crop-based feedstocks entering the LCFS. (Apr-100.4)

**Comment:** 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 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. (15d1-058.3)

**Comment:** 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. (15d1-070.4)

**Comment:** 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. (15d1-219.24)

**Comment:** 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. (15d1-236.11)

**Comment:** In subsection 95488.3(d)(2), staff proposes to remove the word “crop” in the context of feedstocks not listed in Table 6. This clarification ensures that non-crop feedstocks, such as woody biomass, may also be assessed by the Executive Officer to determine and assign an appropriate land use change value, based upon empirical land cover data, yields, and emission factors. (15d2-281.4)

**Comment:** Thank you for making woody biomass eligible for land use change assessment. (15d2-281.4)

**Agency Response:** No changes were made in response to these comments. Staff appreciates the support for this aspect of the proposed amendments.

#### **AA-7 Multiple Comments: *Opposition to Empirical LUC Proposal***

**Comment:** CARB should not attempt to introduce new and complex topics such as the “Land Use Change Evaluation – Initial Concept” this late into the rulemaking process. While we understand that CARB staff would like to finalize this rulemaking for Board adoption by year-

end, it is essential for CARB to finalize revisions that are both aligned with statutory requirements and implementable to ensure the continued success of the LCFS program. Providing additional opportunity for public engagement will support this long-term development. (Apr-094.4, Apr-094.11)

**Comment:** 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.” 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. (15d1-064.13)

**Comment:** 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. (15d1-087.2)

**Comment:** In addition, 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. We urge CARB to adopt a policy that eliminates inconsistencies in its iLUC emissions calculations. (15d1-087.3)

**Comment:** 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 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. (15d1-130.4)

**Comment: 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. 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.

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." (15d1-171.28)

**Agency Response:** No changes were made in response to these comments. Please see Response AA-3 for more details on the methodology, application, and limitations of the empirical LUC approach. The application of an empirical LUC assessment, if appropriate, will be evidence-based, as specified by the amendment provisions.

Specifying the regions of production as proposed by the amendments is an appropriate addition to Table 6 based on the methodology of the 2015 GTAP-BIO modeling. While GTAP-BIO does not dictate feedstock origin, it is based on modeling a biofuel shock to a specific region. GTAP-BIO seeks the least cost source of biofuel feedstocks needed to sustain market demand. When modeling biofuel shocks in the US market, for example, it assumes that when additional acreage is needed, American farmers are most likely to convert one cropland to another and bring new land into productivity—particularly when returns from exports are high. When returns from exports are low (less exports), biofuel demand is met more through reduced exports, driving a greater proportion of the LUC impact overseas to US trading partners. Feedstocks produced in the region subject to the demand shock (and their associated land use changes) are sourced first by the model as lower cost options, which are then supplemented with feedstocks from other regions through trade. The region where the shock is modeled will therefore have an important influence on the market responses and overall predicted LUC emissions, and the Executive Officer is justified in specifying regions of origin for the 2015 modeling results in Table 6.

More comprehensive LUC updates were beyond the scope of this rulemaking. Following Board direction in Resolution 24-14, staff will convene a public forum in 2025 on the latest LUC science, including the most commonly used models, for consideration in a future LCFS update. See also Response AA-1 for further response on recommendations to update Table 6 values, and Response AA-4 on recommendations to use empirical evaluations to lower LUC values.

#### **AA-8 Multiple Comments: *Recommendations for Clarifications on Empirical LUC Assessments and Further Public Consultation and Workshopping***

**Comment:** 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 ILUC evaluations. (Apr-066.13)

**Comment:** 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. (15d1-018.1)

**Comment:** 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. (15d1-059.7, 15d2-211.5)

**Comment:** 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. (15d1-087.4)

**Comment:** 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. (15d1-130.4)

**Comment:** 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. (15d1-130.6)

**Comment:** When reviewing and revising LUC values, CARB should undertake a rulemaking and provide an opportunity for public comment on the proposed revisions. (15d1-153.1)

**Comment:** 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. (15d1-165.1)

**Comment:** WSPA reiterates that any Land Use Change amendments to Table 6 must be subject to formal rulemaking. (15d1-171.8)

**Comment:** 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. (15d1-228.39)

**Comment:** RFA has commented extensively on how the land use change (LUC) emissions estimates used for the LCFS are in serious need of updating. Yet, this was not included as a topic in the public workshops during the amendment process, and CARB did not include LUC revisions in its LCFS proposal. Instead, in the first 15-day comment package, CARB included broad new discretion for the Executive Officer to unilaterally adjust LUC factors for existing pathways and to assign new LUC factors for feedstock/fuel combinations not included in the current lookup table.

RFA noted in its August 27 comments that the language in section 95488.3(d) was overly vague and that it appeared to allow new discretion for the Executive Officer to unilaterally increase LUC factors but not decrease them. However, no material clarifications or modifications were made to this section in the second 15-day package.

Given the magnitude of the implications of the LUC provisions, it seems inappropriate and outside of the bounds of California regulatory guidelines for CARB to make unilateral changes to LUC factors without following a well-defined process, including public workshops and a formal rulemaking. Additionally, greenhouse gas reductions from climate-smart agricultural practices should be incorporated into the LCFS the next time LUC emissions are considered. When carbon deficits are assessed for LUC without the very real and offsetting credits generated from improved agricultural practices, it unfairly disadvantages the use of biofuels to meet the LCFS. (15d2-254.5)

**Agency Response:** No changes were made in response to these comments. Please see Response AA-3 for more details regarding the methodology, application, and limitations of the empirical LUC approach included in the Proposed Amendments. Developing a determination of regions that may be considered higher LUC risk based solely on AEZs, as one commenter recommended, is unnecessary. As described in Response AA-3, LUC risk may be assessed through the proposed case-by-case empirical assessment, which considers other factors beyond carbon stocks, including direct land conversions and crop production factors. Under Board Resolution 24-14, staff will convene a public forum in 2025 on the latest LUC science, including the most commonly used models, for consideration in a future LCFS update. See also Response AA-1 for further response on recommendations to update LUC values.

***AA-9 Brazilian Sugarcane Should Not be Considered High-Risk Crop-Based Feedstock for Empirical LUC Analysis***

**Comment:** At the workshop, there was a discussion regarding a possible mechanism to assign higher Land Use Change (LUC) values to high-risk crop-based feedstocks entering the California LCFS Program. Since Brazilian sugar-cane base ethanol had been evaluated by CARB Team in the past, no further analysis is required at this moment. (Apr-110.1)

**Agency Response:** No changes were made in response to this comment. The possible empirical LUC analysis only applies to feedstock/fuel/region combinations not listed in Table 6. Brazilian sugarcane ethanol is listed in Table 6 and was therefore already modeled in the 2015 GTAP-BIO analysis.

***AA-10 Expand the Geographic LUC Region for Soy***

**Comment:** 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. (15d1-235.16)

**Agency Response:** No changes were made in response to this comment. Staff have not evaluated LUC risk from soy produced elsewhere in North America (i.e., Canada, Mexico). However, upon submission of a fuel pathway application using North American soy not produced in the US, CARB may determine based on the specified regulatory

criteria that this feedstock does not pose additional LUC risk, and assign it the representative value for US-produced soy in Table 6.

#### **AA-11 Multiple Comments: *LUC Values for Winter Canola***

**Comment:** Second, Table 6 could be interpreted to require a higher ILUC value for winter canola than is justified by the scientific research. The current regulatory text does not make clear how winter canola would be treated for purposes of LUC accounting under § 95488.3(d) and Table 6.4 Table 6 includes ILUC values for six “region/feedstock/fuel combinations,” including “canola biomass-based diesel” from North America.<sup>5</sup> Although that ILUC value reflects 2015 modeling of conventional North American canola—i.e., canola grown as a primary crop—Table 6 does not specifically say so. As a result, there is risk that Table 6 could be read to mean that same “canola biomass-based diesel” ILUC value applies to North American winter canola, even though its cropping practices justify a lower value. (15d2-201.2)

**Comment:** Third, we recommend making clear that the canola LUC value in Table 6 applies only to conventional canola by revising “Canola Biomass-Based Diesel” to read “Primary-Crop Canola Biomass-Based Diesel.” (15d2-201.5, 15d2-207.12)

**Comment:** Fourth, we recommend inclusion of the phrase “cropping practices” throughout § 95488.3(d) to confirm (1) that the pathways in Table 6 may be specific to certain “cropping practices,” and (2) that CARB has authority to designate a distinct pathway and LUC value depending, in part, on cropping practices. (15d2-201.6)

**Comment:** First, the proposed oilseed cap might be read to include winter canola. In the first 15-day package, CARB proposed a cap on LCFS crediting for canola oil and soybean oil. In the second 15-day package, CARB added sunflower oil to the cap and included other clarifications.<sup>2</sup> CARB has stated that the oilseed cap is intended to address the “potential adverse impacts” of these crops.<sup>3</sup> However, CARB did not clarify in the second 15-day package that the cap does not apply to winter canola. Because the cropping practices used to grow winter canola result in a low or zero ILUC risk, LCFS crediting for winter canola would not cause the “adverse impacts” CARB is trying to address in production of conventional canola, soybean, or sunflower feedstocks. If the cap is interpreted to include winter canola, that would prevent this innovative market from scaling.

Second, Table 6 could be interpreted to require a higher ILUC value for winter canola than is justified by the scientific research. The current regulatory text does not make clear how winter canola would be treated for purposes of LUC accounting under § 95488.3(d) and Table 6.4 Table 6 includes ILUC values for six “region/feedstock/fuel combinations,” including “canola biomass based diesel” from North America.<sup>5</sup> Although that ILUC value reflects 2015 modeling of conventional North American canola—i.e., canola grown as a primary crop—Table 6 does not specifically say so. As a result, there is risk that Table 6 could be read to mean that same “canola biomass-based diesel” ILUC value applies to North American winter canola, even though its cropping practices justify a lower value. (15d2-262.1)

**Agency Response:** No changes were made in response to these comments. CARB will evaluate and determine appropriate LUC values for feedstocks not listed in Table 6 following the specified applicable regulatory processes. CARB will make determinations

based on feedstock crop as well as cropping practices on a case-by-case evidentiary basis as necessary when fuel pathway applications are received.

## **BB. Crop-Based Fuels**

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### **BB-1 Multiple Comments: *Support Volumetric Cap on Crop-Based Fuels***

**Summary:** These commenters argue that CARB should place a cap on crop-based fuels, particularly fuels made from virgin vegetable oils that carry larger land use change (LUC) risks and uncertain climate benefits. Current evidence suggests that demand for biomass-based diesel and other biofuels is affecting global vegetable oil markets and contributing to deforestation. Soy is the third largest driver of tropical deforestation behind palm oil and cattle production. Because feedstocks such as soybean oil and canola oil are diverted from existing markets to fuel production, they are backfilled by other vegetable oils, such as palm oil, that cause deforestation, land use changes, and other social and environmental impacts on local communities including water scarcity and criteria pollutant emissions. Commenters argue that the US now imports more soy oil than it exports, and biofuels markets contribute to global food insecurity by diverting feedstocks from human consumption and increasing commodity prices. In light of the methodological and modeling challenges with the current LUC approach, more direct safeguards against excessive and damaging diversion of food to fuel use are required to effectively prevent negative outcomes, commenters argue. Some commenters also emphasized the importance of including non-oilseed crops like corn under the cap, to prevent problems associated with the renewable diesel boom from simply shifting to other crop feedstock/fuel combinations.

Some commenters argue that the rapid growth of biofuels entering the California market, particularly lipid-based renewable diesel, has contributed to depressed credit prices in the LCFS program. They argue that California drivers have seen little additionality from these biofuels, or emissions reductions that are additional to existing requirements, since they are already required for compliance under the U.S. EPA's Renewable Fuels Standard. Some commenters argue that CARB staff's ISOR overstates the benefits of virgin-oil fuels, which delay the transition to electrification. They argue that PM and NOx emissions benefits do not provide a compelling reason to reject caps on crop- or lipid- based biofuels because these benefits, as cited by staff from the Proposed Scenario that does not limit the use of biofuels, are minimal and significantly smaller than the uncertainty inherent in the modeling tools used to perform this analysis. Commenters argue that 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 oils and other crop-based fuels. Some commenters also argued that in addition to a volumetric cap, CARB should end support for biofuels and phase them out of the LCFS program. Some comments call for a phase out of all biofuels, while others propose specific crop-based feedstocks be phased out.

Some commenters recommend that staff should adopt the Environmental Justice Advisory Committee (EJAC) cap recommendation or place a similar volumetric limit on the amount of biomass-based diesel and other fuels. The purpose of a cap on crop- or lipid-based biofuels is, in part, to limit the potential damage if real-world GHG emissions exceed certified pathway CI scores. They argue that given the likelihood that LUC impacts from lipid-based fuels are

significantly higher than the values currently used in the LCFS, it is possible that the purported GHG benefits of scenarios with no cap or limitation on consumption are less than expected. Some commenters argue that a volumetric cap on lipid-based fuels would also 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.

(45d-001.5, 45d-011.1, 45d-015.1, 45d-101.1, 45d-148.3, 45d-154.1, 45d-154.24, 45d-166.1, 45d-200.14, 45d-204.2, 45d-206.6, 45d-207.1, 45d-210.8, 45d-210.9, 45d-210.10, 45d-210.11, 45d-213.1, 45d-213.9, 45d-213.14, 45d-213.15, 45d-226.1, 45d-276.3, 45d-276.5, 45d-277.1, 45d-279.2, 45d-280.1, 45d-281.1, 45d-286.3, 45d-297.11, 45d-304.3, 45d-337.3, 45d-366.6, 45d-366.9, 45d-379.4, 45d-379.14, 45d-383.1, 45d-389.2, 45d-389.3, 45d-389.8, 45d-391.1, 45d-391.7, 45d-391.8, 45d-893.3, 45d-3022.3, 45d-5809.3, Apr-024.1, Apr-039.1, Apr-055.5, Apr-059.1, Apr-059.2, Apr-059.6, Apr-073.5, Apr-086.1, Apr-086.2, Apr-086.4, Apr-086.6, Apr-086.7, Apr-086.8, Apr-086.10, Apr-086.12, Apr-086.14, Apr-086.15, Apr-086.20, Apr-086.22, Apr-091.3, Apr-091.5, Apr-108.5, Apr-108.8, Apr-117.3, Apr-117.6, Apr-117.8, Apr-117.9, Apr-117.10, Apr-117.11, Apr-117.12, Apr-117.13, Apr-117.14, Apr-136.7, Apr-136.10, Apr-136.11, Apr-136.14, Apr-136.19, Apr-154.3, Apr-159.4, Apr-163.1, Apr-163.5, Apr-163.7, Apr-163.8, Apr-163.17, Apr-182.5, Apr-182.6, Apr-182.10, Apr-182.24, Apr-182.30, 15d1-068.1, 15d1-095.1, 15d1-095.2, 15d1-095.3, 15d1-095.4, 15d1-095.5, 15d1-101.1, 15d1-177.1, 15d1-217.2, 15d1-222.12, 15d1-222.14, 15d1-240.9, 15d1-240.10, 15d1-240.11, 15d1-240.14, 15d1-240.22, 15d1-240.23, 15d1-240.25, 15d1-251.3, 15d1-251.6, BH-040.1, BH-040.3, BH-040.7, BH-040.8, BH-051.2, BH-051.7, BH-051.5, BH-051.12, BH-051.6, BH-051.13, BHT-14, BH-025.11, BH-093.3, 15d1-239.12, 15d1-172.2, BH-025.13, Apr-163.14, 45d-204.2, 15d1-239.20, 45d-037.1, 45d-089.2, 45d-143.1, 45d-200.14, 45d-340.1, 45d-340.2, 45d-340.7, 45d-372.2, 45d-379.2, 45d-379.4, 45d-383.10, 45d-383.11, 45d-389.2, 45d-389.3, 45d-389.4, 45d-399-3399.3, 45d-399-3399.7, 45d-399-3399.10, 45d-3400-6399.3, Apr-039.1, Apr-059.5, Apr-059.6, Apr-182.1, Apr-182.5, Apr-182.6, Apr-182.8, Apr-182.9, Apr-182.15, Apr-182.18, Apr-182.25, Apr-182.30, 15d1-011.1, 15d1-012.2, 15d1-101.2, 15d1-217.2, 15d1-217.11, 15d1-244.8, 15d1-244.10, BHT-103, BHT-104, BH-053.1)

**Agency Response:** Changes were made in response to these comments. Staff proposed changes to the eligibility of biomass-based diesel fuel pathways to act as guardrails against potential land conversion for crop-based biofuels. As discussed at the April 10, 2024 LCFS workshop and presented in the Initial Statement of Reasons, creating a volumetric cap on biomass-based diesel risks resulting in higher fossil diesel use in California, which in turn would result in higher GHG emissions and worse air pollution. Rather than establish a volumetric cap on biomass-based diesel, under the Proposed Amendments, as modified, CARB would stop accepting applications for new biomass-based diesel fuel pathway applications starting on January 1, 2031, contingent on successful implementation of California's medium- and heavy-duty (MHD) zero emission vehicle regulations. The modified amendments proposal also limits credits for biomass-based diesel produced from virgin soybean oil, canola oil, and sunflower oil for up to 20 percent of annual biomass-based diesel reported on a company-wide basis. Quantities of biomass-based diesel derived from these feedstocks in excess of 20 percent would not generate credits starting January 1, 2028. These proposals help ensure that other regions are able to access increasing volumes of low-carbon alternative fuels, while still allowing California to displace up to 100% of the State's

current fossil diesel demand with lower-carbon alternative diesel as the diesel pool shrinks with increasing ZEV populations. The proposed additions also avoid sending a long-term signal for prominent crop-based feedstocks such as virgin soy, canola, or sunflower oil to serve California demand, mitigating potential future land conversion or deforestation.

Together, these phaseout and credit limit conditions, along with the proposed sustainability requirements for third-party certification, and the empirical LUC mechanism to assign more conservative LUC values to feedstocks produced in higher-risk regions, represent a concerted policy package to address the concerns around crop-based fuels. As described in CEQA RTC Master Response 2, these proposed concepts are distinct from a volumetric cap on crop-based biofuels. The aggregate impact of these regulatory proposals is expected to send the market signals necessary to encourage growth of sustainable, low-carbon feedstocks to displace fossil fuels in California, while minimizing potential negative externalities such as land conversion, deforestation, and food security impacts of diverting virgin vegetable oils from food to fuel markets.

Staff do not view these measures, which will increase the supply of sustainable crop-based fuels, to be at odds with transportation electrification goals. The LCFS program provides significant support for the transition to new zero-emission transportation technologies like electrification and hydrogen, and this support will only increase under the Proposed Amendments. To date, the LCFS has provided approximately \$300 million in value to support public transit and close to a \$1 billion for light duty zero emission vehicles, including financial assistance for zero-emission vehicle purchases. Current rulemaking updates, including crediting for dispensed electricity and hydrogen, ZEV infrastructure crediting, and base crediting, will provide billions of additional dollars for zero-emission vehicle charging and hydrogen fueling infrastructure. Biofuel supply to California is also limited by total demand for liquid fuels, which will continue to decrease as combustion engine vehicles are replaced with ZEVs.

## **BB-2 Multiple Comments: *Oppose Volumetric Cap on Crop-Based Fuels***

**Summary:** These commenters recommend that CARB not place a cap on any crop-based fuels. The LCFS was designed to be a market-based, technology-neutral program for delivering the lowest carbon fuel alternatives at the lowest price to Californian consumers. Some commenters argue that a cap would increase costs of low carbon fuels, stifle investment in new low carbon feedstocks and technologies like sustainable aviation fuel, limit the diversification of energy sources, slow the adoption of climate-smart agricultural practices, and ultimately result in increased emissions. Some commenters argue that a cap is furthermore unnecessary because the LUC value for crop-based fuels and the Renewable Fuel Standard's sustainability guardrails are already sufficient measures to deter undesirable land use changes and environmental impacts. Commenters argue that biofuels have generated the most LCFS credits to date and their continued support is critical for reducing transportation emissions and generating immediate health benefits for environmental justice communities. Commenters argue that continued support for biofuels is critical because any mitigation action that can be implemented now is better than similar action taken in the future.

(45d-007.1, 45d-011.1, 45d-088.3, 45d-164.1, 45d-175.1, 45d-205.1, 45d-205.2, 45d-217.1, 45d-221.1, 45d-241.4, 45d-253.1, 45d-266.1, 45d-266.4, 45d-266.10, 45d-336.1, Apr-040.1, Apr-041.1, Apr-044.1, Apr-045.1, Apr-066.8, Apr-066.9, Apr-067.1, Apr-079.1, Apr-079.2, Apr-079.3, Apr-079.4, Apr-079.5, Apr-079.6, Apr-079.7, Apr-079.8, Apr-088.3, Apr-093.3, Apr-094.6, Apr-095.1, Apr-095.3, Apr-095.15, Apr-100.1, Apr-109.2, Apr-111.2, Apr-112.2, Apr-130.1, Apr-139.1, Apr-140.5, Apr-148.6, 15d1-118.2, 15d1-124.1, 15d1-124.2, 15d-138.6, 15d1-142.1, 15d1-148.1, 15d1-166.1, 15d1-171.1, 15d1-171.12, 15d1-171.17, 5d2-195.15, 15d2-255.17, 15d2-197.26, 15d2-208.26, 15d2-214.26, 15d2-239.26, 15d2-240.26, 15d2-243.26, 15d2-258.7, 15d2-268.26, 15d2-285.26, 15d2-293.26, , 15d2-296.1, 15d2-300.10, 15d2-304.6, BHT-62, BHT-87, BHT-200, BHT-207, 15d1-171.3, 45d-243.5, Apr-065.2, Apr-079.9, Apr-079.18, Apr-088.2, Apr-093.2, Apr-128.7, Apr-140.4 )

**Agency Response:** Changes were made in response to these comments. Staff have proposed a targeted limit on credits generated from soy, canola, and sunflower vegetable oils (see Response BB-1 above for more detail), rather than a total volume cap which would not allow for any additional growth of crop-based fuels in the program beyond a capped volume. See CEQA RTC Master Response 2 for a description of why this 20 percent soy, canola, and sunflower oil crediting limit is distinct from a volumetric cap on crop-based fuels, and why staff does not expect fossil diesel consumption to increase as a result of the proposed sustainability guardrails. The current proposal caps company contributions to the overall pool of crop-based fuel credits, but allows for future growth of the overall volume of crop-based fuels with the addition of new fuel producers until December 2030. This is expected to send the market signals necessary to encourage growth of sustainable, low-carbon feedstocks to displace fossil fuels in California, and accommodate the expected growth of sustainable aviation fuels, while minimizing potential negative externalities such as land conversion or deforestation. Staff anticipate that this will increase the diversification of energy sources in the program and reduce emissions. Staff do not expect this proposal to slow the adoption of climate-smart agricultural practices. Crop-based fuels will still have an economic incentive to reduce carbon intensity as much as possible, regardless of the overall volume permitted in the program, due to farm-specific incentives already available through federal tax incentives under the Inflation Reduction Act. Finally, the LUC value and Renewable Fuel Standard (RFS) safeguards have not been a sufficient deterrent to surging crop-based fuels in the program, so these additional credit limits are warranted. Ultimately consumer demand for these alternative fuels functions as a demand side limitation in the program.

### **BB-3 Multiple Comments: *Caps/Phaseouts Should be Extended to Crop-Based Feedstocks for SAF Production and/or Maritime Fuel***

**Comment:** These benefits must be taken in context with the fact that HEFA SAF draws from the same pool of feedstock, and therefore is subject to the same sustainability risks and challenges as RD. Unrestricted growth of HEFA SAF would likely result in the same negative environmental impacts as equivalent growth in RD. Policies that seek to limit these harms must apply to both SAF and RD(as well as biodiesel, which also is made from lipid feedstocks, though its aggregate volumes are now smaller than RD), which is why the proposals we

discuss above focus on limiting the quantities of feedstock used rather than finished fuels.” (45d-391.9)

**Comment:** Exclude all crop-based fuels from receiving any LCFS credits for aviation or maritime fuel. It is crucial that California follow Europe’s lead to ensure that intrastate and national flights receive no credits for crop-based fuels and that annual caps for UCO and tallow are in place to prevent fraud and iLUC effects. (Apr-182.27, Apr-182.5)

**Comment:** 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. (15d-148.2)

**Comment:** 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.

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. We can expect more of the same if ethanol companies ramp up production for SAF. (15d1-244.4)

**Comment:** Limit the use of crop-based feedstock used in Sustainable Aviation Fuel. (15d1-246.4)

**Comment:** It is unclear to us if the “cap” applies to biomass-based diesels used in aviation. If it does not, this lacks justification. The potential implications of CARB encouraging vegetable oils for aviation are highly significant. For example, if even just 25% of expected aviation fuel in 2050 were to derive from vegetable oils, that would require roughly 40% of global cropland. The cap should therefore apply to all liquid fuels for aviation. (15d2-284.1)

**Comment:** Also, while use of corn for ethanol has been stable in the last decade, without appropriate safeguards it could once again become a major problem in coming years. For the last decade, the E10 blend wall has constrained the amount of corn ethanol that is consumed in California. But a pending approval of E15 and scale up of ethanol-based jet fuel could lead to a harmful surge in the use of corn-based fuel. The poorly designed safeguard proposed in the case of bio-based diesel fuels would not transfer readily to concerns about corn, since ethanol producers generally do not have access to alternative feedstocks. Rather than waiting until a problem emerges and then taking years to design and implement a workable safeguard, it would be better for all market participants if California made it clear in advance that it will not allow damaging surges in diversion of food to fuel. Setting a ceiling on food used for fuels before a crisis occurs will send a clear market signal and allow fuel producers and obligated parties flexibility to adjust their strategies within the guardrails. A market-wide cap on the use



of corn for fuel would allow E15 and ethanol-based jet fuel to grow gradually and offset declining use of ethanol in E10. This transition could be guided by the market while still providing an assurance that a boom in the use of corn-based fuels does not become a disruptive crisis like the recent renewable diesel boom. (BH-025.13)

**Comment:** Do not adopt the reckless Sustainable Aviation Fuel Partnership with Airlines for America

The proposed Sustainable Aviation Fuel Partnership with Airlines for America is shockingly irresponsible. Currently, there are no actually sustainable aviation fuels available, except possibly used cooking oil and animal fat, but the supply of these is fixed and already receiving credits in the US and EU. In 2023, the EU introduced mandates for sustainable aviation fuel for intra-EU flights. It disallowed crop-based fuels from receiving any credits, but it did not cap used cooking oil or animal fat for SAF crediting. As a result UCO imports increased dramatically. Recent investigations discovered that most of the imports were actually palm oil. This is what California can expect, if it bothers to look closely enough. This is an irresponsible partnership that will destroy tropical forests, boreal forests and the few remaining natural grasslands in this country. It makes a mockery of the US pledge, along with 136 other countries, at COP 26 to end deforestation by 2030. This agreement alone is reason enough to vote against the proposed amendments. If CARB wants to give SAF credits, it should limit them to domestic supplies of animal fats and used cooking oils and discontinue eligibility of those residues for biomass-based diesel credits. In any case, credits for lipid-based SAF should be included in the 1.2 billion gallon cap proposed by the EJAC. (BH-051.3, BH-051.10)

**Agency Response:** No changes were made in response to these comments. The Proposed Amendments do not directly include aviation or maritime fuel in the crediting eligibility limits on crop-based fuels at this time. However, the mass-balance rules in the regulation and in the life cycle analysis tools use the same feedstock mix and proportions uniformly across renewable diesel (RD) and alternative jet fuel (AJF) when produced at the same facility. In effect, if the two are co-produced, the 20% crediting limit applies to the RD directly, but because the same feedstock proportion is used for the co-located AJF production, AJF is indirectly affected by the 20% crediting limit when produced at the same facility. Production facilities may exist with unique configurations, such that waste and virgin oil feedstocks are physically separated and not comingled. For such facilities, it could be appropriate for CARB to consider allowing that production facility to dedicate particular fuel pathways to particular feedstocks, consistent with regulatory requirements and the physical characteristics of the production process.

In October 2024, CARB and airlines represented by Airlines for America announced a Sustainable Aviation Fuel Partnership and associated goals and planned cooperation, including the goal to ensure at least 200 million gallons of cost-competitive and commercially viable sustainable aviation fuel is available for use by operations in California by 2035, prioritizing use of waste oils. Following Board direction in Resolution 24-14, CARB will explore developing a zero-emission airport ground operations regulation and consider for upcoming and relevant items going to the board including the next LCFS rulemaking, potential regulatory approaches to support emission reductions associated with conventional jet fuel. Resolution 24-14 also directs the

CARB Executive Officer to consider including ocean-going vessel fuels as LCFS-regulated fuels in a future rulemaking, prioritizing non-combustion and least carbon fuels, and any other relevant policies to decarbonize this sector. For comments related to sustainability concerns of waste oils, see Response DD-13.

**BB-4 Multiple Comments: *Prohibiting the Use of Palm Oil Feedstocks Will Have No Meaningful Impact on Avoiding Deforestation Due to Vegetable Oil Shuffling***

**Comment:** As explained in my earlier comments, the limited rate of growth in global market for soybean meal means that large increases in the use of soybean oil for fuel will be primarily backfilled with palm oil. However, because the palm oil will substitute for soybean oil diverted from food markets, prohibiting the use of palm oil for fuel production will have no meaningful impact on avoiding deforestation associated with expanded palm production. (Apr-086.17)

**Comment:** While well-intentioned, these guardrails are completely insufficient to prevent the risk of deforestation that CARB acknowledges because vegetable oils are largely interchangeable global commodities as demonstrated by the strong correlation between the price of palm oil and soybean oil. This means that the very large increase in demand for vegetable oil that the proposed amendments would cause is likely to drive deforestation and related carbon emissions regardless of whether the specific feedstocks used to generate LCFS credits can be traced to existing agricultural land. In short, there is no reasonable policy rationale for excluding the use of palm oil but placing no limits on the use of other virgin vegetable oils. (45d-281.2)

**Comment:** 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. Staff's previous efforts to constrain fuels that increase pressure on global deforestation are no longer effective. Cap the generation of credits from all lipid-based fuel pathways to no higher than 2022 levels. Staff does not propose any limits on lipid-based fuels, including virgin crop oils. The two newly proposed measures will not solve the problem. Staff's chain of custody certification proposal does nothing to stave off the glut of lipids in the program. Staff's proposed exclusion of palm-oil-derived fuels is also unhelpful because these oils have never generated credits under the LCFS. (45d-383.1)

**Comment:** Neither Third-Party Certification Nor a Prohibition on Palm Oil Will Mitigate the Climate, Ecosystem, and Societal Harms of the Surge of Soy-Based Diesel in the LCFS. The proposed feedstock sustainability certification fails to address the threats that surging demands for lipid biofuels pose to the climate, tropical forests, and food prices because oils that can meet the proposed requirements are fungible on the global market with oils from food crops grown on recently deforested land. As observed by researchers at the University of California Davis, feedstock sustainability certifications "are incapable of mitigating indirect risks like ILUC, which are driven by aggregate demand within a given market, which in the case of vegetable oils, is effectively global." Nor would the proposed certification requirement succeed in stabilizing the credit price because "[t]here is ample potential supply of crop-based vegetable oil that would meet proposed sustainability criteria." The proposed certification would merely direct that feedstock to biofuel production, forcing the current consumers of that oil to find other oil supplies, which have historically included unsustainable alternatives that require conversion of additional land into cultivated use. As the author of the UC Davis study summarizes it: "[t]he

problem isn't the oil we use, the problem is what comes into the market to replace the oil we use. (45d-383.14)

**Agency Response:** No changes were made in response to these comments. In addition to the 20% limit on biomass-based diesel from soy, canola, and sunflower oil feedstocks, the Proposed Amendments retain the fossil diesel carbon intensity score designation for any fuel derived from palm oil feedstock, to deter use of the highest risk vegetable oil feedstock. These provisions are part of a suite of amendment policy measures introduced by staff to address sustainability concerns around crop-based feedstocks. See CEQA RTC Master Response 2 for more detail.

**BB-5 Multiple Comments: *General Support for Proposed 20% Limit on Reported Biomass-Based Diesel Volumes from Soy, Canola, and Sunflower Oil Feedstocks, or Support for Specific Changes Made to the Proposal During Staff Development, such as the Grandfathering Provision, Extended Implementation Timeline, and Inclusion of Sunflower Oil***

**Comment:** We do appreciate the additional flexibility related to virgin vegetable oil feedstock limitations, by extending the compliance deadline to January 1, 2028, for all approved pathways at the date of adoption. (15d2-184.3, 15d2-197.3, 15d2-208.3, 15d2-214.3, 15d2-239.3, 15d2-240.3, 15d2-243.3, 15d2-268.3, 15d2-285.3, 15d2-293.3)

**Comment:** While [we] are steadfast in [our] opposition to the virgin vegetable oil feedstock cap and the rationale used to reach this conclusion, the Second 15-Day Changes added some additional flexibility to come into compliance with the feedstock cap. If this unnecessary cap were to move forward, we appreciate CARB's acknowledgement that biofuel production facilities cannot shift production overnight, and thank CARB for updating the grandfathering clause to provide a 2028 compliance date for all approved pathways in the LCFS program. (15d2-184.12, 15d2-197.12, 15d2-208.12, 15d2-214.12, 15d2-239.12, 15d2-240.12, 15d2-243.12, 15d2-268.12, 15d2-285.12, 15d2-293.12)

**Comment:** We also support pushing back the effective date of the credit limitation to 2028 which gives industry the time it needs to adjust to these provisions. (15d2-192.12)

**Comment:** While Bunge disagrees with the cap, Bunge appreciates that CARB has amended the proposal to give parties more time to prepare by proposing that the cap take effect January 1, 2028 for companies that have submitted biomass-based diesel pathway certification applications or have certified biomass-based diesel pathways prior to the effective date of the regulation. (15d2-262.4)

**Comment:** ABFC positively acknowledges the proposed updated approach which would apply the limits as of January 1, 2028 to fuels with a submitted pathway certification application under CA-GREET 3.0. (15d2-298.3)

**Comment:** We appreciate the changes to the vegetable oil cap language posed in this second set of 15-day changes. The updated grandfathering provision provides an even playing field for all biomass-based diesel producers, and the clarification on mechanics is very helpful for the industry. (15d2-228.1)

**Comment:** We support staff's modified language on the limitation to use crop-based feedstocks used to produce biomass-based diesel, which had contributed a very volatile LCFS market. With that said, we continue to express our view on the critical needs of LCFS market stabilization as soon as possible, by enacting this crop-based feedstock limitation at time of this amendments as originally proposed in the 1<sup>st</sup> 15 day comment package on August 12<sup>th</sup>, rather than waiting until 2028, which will impact the currently suffering low LCFS market situation. (15d2-235.3)

**Comment:** 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. (15d1-111.8)

**Comment:** These limitations are consistent with the rulemaking's objective to provide guardrails on crop-based biofuels to prevent potential adverse impacts. Further, adding sunflower oil is also responsive to public feedback that limiting this provision to soy and canola could lead to incentives to increase use of other oilseeds for biofuel production. The proposed modification also clarifies that this provision applies to the following transaction types: production in California, produced for import, and import. This clarifies that the provision applies to transactions for transportation fuels used by vehicles in California. Additionally, staff proposes to specify that the provision will not apply to any biomass-based diesel pathway certification applications submitted before the effective date of the regulation until January 1, 2028. This adjustment provides appropriate time for existing fuel producers to meet the twenty percent eligibility limitation and adjust their operations and/or feedstock supplies. (15d2-281.3)

**Comment:** The addition of sunflower oil aligns with the primary intent of this provision, which is to clearly signal the intent to limit the amount of crop-based feedstock that can be credited under California's LCFS. While sunflower oil is not a major source of biomass-based diesel feedstock at this time, it is a significant contributor to global vegetable oil supplies and there are no known technical reasons why it could not expand its footprint in the biofuel space, in which case the use of sunflower oil could have offered a loophole around the intent of this provision. Adding sunflower to the list of crop-based fuels would therefore close this potential loophole. (15d2-287.5)

**Comment:** SkyNRG supports CARB's proposal in the Second 15-Day Changes to add sunflower oil to the list of virgin crop-based feedstocks that are limited in credit generation potential in the production of biomass-based diesel. With this update in the Second 15-Day Changes, virgin sunflower oil joins virgin soybean oil and canola oil in the twenty percent crediting eligibility limitation on virgin crop-based feedstocks used to produce biomass-based diesel. (15d2-302.5)

**Comment:** 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*. (15d1-190.2).

**Agency Response:** No changes were made in response to these comments. Staff appreciates the support for the Proposed Amendments.

**BB-6 Multiple Comments: *Opposition to or Concern with 20% Crediting Limit on Reported Fuel Volumes from Soy, Canola, and Sunflower Oil Feedstocks Proposed in Section 95482(i)***

**Summary:** Multiple commenters stated opposition to the proposed 20% limit on reported fuel volumes for biomass-based diesel, emphasizing that feedstock eligibility should be based on performance (i.e., carbon intensity) and market signal, not arbitrary decision by CARB. They requested clarification on why 20% was chosen as the threshold and expressed concern that the concept was not adequately workshopped and will lead to unintended consequences. They argue that the proposal is in violation of AB 32, which requires CARB to pursue the most cost-effective GHG reductions. Some commenters contend that 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, and that this proposal may impede the flow of interstate commerce in violation of the Dormant Commerce Clause. Commenters argued that the proposal will lead to increased fossil diesel consumption, increased emissions and criteria pollutants, and increased associated health impacts overall. Some commenters expressed concern that the proposal will jeopardize progress in hard-to-decarbonize sectors like medium- and heavy-duty vehicle fleets and will deny the opportunity for emerging low-CI feedstocks that become commercially available in the future to further reduce the carbon intensity of diesel consumed in the state.

Commenters argue that the limit will disrupt interactions between California and federal fuel policies and could destabilize the carbon market in California by creating an uneven playing field and 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. They argue that the shift in feedstock requirements imposed by the provision could also 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.

Some commenters argue that it will not be feasible to simultaneously displace fossil fuel demand while replacing feedstock demand with non soy, canola, and sunflower sources. Commenters argue that the proposal will increase reliance on higher risk international feedstocks, and the requirements for procurement of more expensive low-CI feedstocks will increase fuel costs for California consumers, as well as the price of goods transported by trucking. Commenters expressed concern that it will raise fueling costs and limit alternatives for rural and off-road users in particular, where some equipment cannot be met through battery-electric alternatives. There are also concerns that the 20% limit will have unintended consequences of constraining production of sustainable aviation fuel (SAF), since refiners that

produce SAF also produce significant volumes of renewable diesel, as well as hindering the adoption of climate-smart agricultural practices for crop-based feedstocks. Finally, some commenters argue that the proposal could impact food security as pressed soybeans and canola are used as meal for animal protein cultivation, and limiting these sources will reduce availability of animal feed.

Some commenters argue that CARB's rationale for introducing the 20% limit is flawed, as the agency is not tasked with developing an LCFS that ensures the availability of low-carbon fuels to other markets and fuels programs. They argue that soybean and canola oil-based biofuels are already available in markets outside of California and that the LCFS is not hindering the availability of these products to other states. Furthermore, they argue that programs in 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 incentive for soy- and canola-based biomass-based diesel than California does. Finally, the proposal may not actually divert the intended feedstocks to other markets, as many producers will likely exceed the proposed cap and keep product in California, commenters argue. Some commenters also expressed concern that the proposal could result in increased LCFS credit prices in several ways. To avoid deficits under the proposed limit, renewable diesel producers will look to maintain profitability, resulting in higher credit prices, and the 20% limit may also put upward pressure on credit prices to narrow the incentive gap to induce SAF production at the levels contemplated by CARB staff.

Some commenters argue that the proposal is duplicative as the LUC value for crop-based fuels and sustainability requirements are already sufficient to limit biomass-based diesel in California, and CARB is not justified in pursuing all of these strategies. Some argue that the proposal, in effect, increases the LUC value for the applicable feedstocks used to produce biomass-based diesel in exceedance of the 20% limit, which has no scientific basis. Some commenters argue that the proposal will increase consumption of UCO and waste oils, which introduces considerable risk of fraud as virgin oils are blended with UCO feedstocks. Furthermore, commenters argue that the proposal will exacerbate the already limited supply of high-quality waste oils. Additional commenters point out that excluding corn and sugarcane ethanol producers from a limit increases the risk of a surge in alcohol to hydrocarbon production. Commenters argue that biofuels will become deficit-generating in the LCFS anyway, so an artificial limit is unnecessary and 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.

Other commenters expressed operational concerns with the proposal and requested clarification on implementation. They expressed concern that the 20% limit is unfair to fuel producers who exclusively make biofuels out of vegetable oils, and do not source non-crop based oils, like UCO and tallow. UCO, tallow, and corn oil make up a much larger share of biodiesel and renewable diesel credits but are exempt from this requirement. They argue that waste oils already receive additional financial incentives, such as the 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.

Some commenters made requests for clarification, such as how the mechanism will be implemented, which feedstocks will be subject to the 20% limit (e.g., winter canola, or intermediate crops like camelina and carinata), whether the application and amount of the limit will be reviewed with an established frequency, and who is responsible (“company” vs. “production reporting”) for implementation. They state that the language is problematic as most of the renewable fuel delivered to the California market is never reported as production. Clarity was also requested on how the limit will be applied to companies that operate joint ventures and subsidiaries, and how it will apply to imports and purchases from a third party. Details were requested on other aspects related to reporting and verification and how the requirement will be assessed at the producer level, e.g., whether the limit is based on the volume of biomass-based diesel imported into the LCFS program or the volume of production by a given producer. Some commenters also requested confirmation on whether a company with an existing certified biomass-based diesel pathway can apply for an updated or new pathway at the same facility without subjecting the updated or new pathway to the credit limit.

Several commenters requested modifications to allow for more flexibility under the proposal. Some commenters requested that North American feedstocks be exempt from the limit restrictions, arguing that these feedstocks have lower LUC risk. Some commenters requested that the compliance volume be based on an annual calendar year to align with other compliance requirements in the LCFS. Some commenters argue that CARB should consider facility-specific implications of the requirement, like capital investments to switch feedstocks that can be processed, and transportation routes of alternative feedstocks, particularly for landlocked producers that will be disproportionately affected since they do not have access to waterways where waste feedstocks are typically imported. They argue that the proposal will likely lead to stranded assets, as there is little remaining supply of waste feedstocks available. Some commenters also requested that fuel exports from California be excluded from the limit restriction. Some commenters stated that canola-based renewable diesel was not included in CARB’s calculation of the BBD market share in 2023 as the basis for the limit restriction threshold, and request that fuel volume from the “RD-Other” category in the quarterly summary be included in the calculation, which would increase the overall threshold limit.

Commenters also raised concerns with the implementation timeline, particularly the first 15-day version that fuel producers must have been reporting fuel in 2023 to be eligible for the 2028 phase in timeline, citing supply chain issues that have delayed project development and the slow scale up of intermediate crop feedstocks. Commenters provided recommendations for alternative phase-in mechanisms eliminating the grandfather clause and allowing all facilities until 2030 to comply, allowing that facilities currently registered under US EPA’s 40 CFR Part 80 be granted until 2030 to comply, adopting the avoided dairy methane mechanism that fuel producers should only be required to “break ground” in order to be eligible for the 2028 timeline, or that the 2028 phase-in should be clearly based on company fuel production, and imported product and purchases from third parties should be excluded from the 20% trigger. Overall, commenters support a longer implementation runway to mitigate some of the risks of disrupting the market and supply-demand balances.

Some commenters requested greater consideration of the administrative burden the 20% limit will create. Some commenters argued that the proposal was not covered in the SRIA or ISOR document and requires a 45-day notice. Several commenters called for not including this

provision in the current rulemaking, and instead convening an expert working group to better develop the concept before board adoption.

(15d1-006.1, 15d1-006.2, 15d1-009.1, 15d1-009.2, 15d1-009.3, 15d1-013.1, 15d1-021.1, 15d1-024.2, 15d1-024.3, 15d1-026.1, 15d1-026.3, 15d1-028.1, 15d1-028.2, 15d1-028.3, 15d1-028.4, 15d1-028.6, 15d1-032.1, 15d1-037.1, 15d1-042.5, 15d1-048.3, 15d1-053.2, 15d1-056.1, 15d1-056.3, 15d1-059.8, 15d1-073.1, 15d1-073.2, 15d1-073.4, 15d1-073.8, 15d1-077.1, 15d1-078.1, 15d1-079.2, 15d1-082.2, 15d1-085.1, 15d1-085.2, 15d1-085.3, 15d1-087.7, 15d1-090.3, 15d1-096.2, 15d1-096.3, 15d1-102.5, 15d1-110.2, 15d1-113.1, 15d1-113.2, 15d1-113.3, 15d1-113.6, 15d1-115.1, 15d1-115.4, 15d1-118.2, 15d1-118.4, 15d1-118.5, 15d1-181.7, 15d1-124.1, 15d1-130.5, 15d1-133.1, 15d1-138.1, 15d1-138.6, 15d1-139.5, 15d1-144.1, 15d1-144.2, 15d1-148.1, 15d1-149.1, 15d1-155.2, 15d1-156.2, 15d1-156.3, 15d1-166.1, 15d1-166.2, 15d1-166.7, 15d1-171.12, 15d1-181.1, 15d1-181.4, 15d1-181.5, 15d1-181.8, 15d1-181.19, 15d1-187.3, 15d1-187.4, 15d1-194.1, 15d1-194.6, 15d1-197.3, 15d1-210.2, 15d1-207.2, 15d1-207.6, 15d1-213.8, 15d1-214.2, 15d1-214.10, 15d1-214.12, 15d1-218.2, 15d1-218.8, 15d1-226.1, 15d1-226.5, 15d1-228.3, 15d1-228.4, 15d1-228.14, 15d1-228.40, 15d1-235.2, 15d1-235.4, 15d1-235.5, 15d1-235.6, 15d1-235.7, 15d1-235.8, 15d1-236.3, 15d1-236.4, 15d1-236.5, 15d1-236.6, 15d1-236.10, 15d1-238.2, 15d1-238.3, 15d1-238.4, 15d1-239.1, 15d1-242.1, 15d1-242.2, 15d1-242.3, 15d1-242.4, 15d1-242.5, 15d1-250.2, 15d1-250.3, 15d2-184.4, 15d2-184.5, 15d2-184.6, 15d2-184.7, 15d2-184.9, 15d2-184.24, 15d2-184.25, 15d2-192.5, 15d2-192.7, 15d2-194.3, 15d2-194.9, 15d2-194.13, 15d2-195.2, 15d2-255.2, 15d2-255.6, 15d2-255.7, 15d2-255.8, 15d2-255.18, 15d2-197.5, 15d2-208.5, 15d2-214.5, 15d2-239.5, 15d2-240.5, 15d2-243.5, 15d2-268.5, 15d2-285.5, 15d2-293.5, 15d2-197.6, 15d2-208.6, 15d2-214.6, 15d2-239.6, 15d2-240.6, 15d2-243.6, 15d2-268.6, 15d2-285.6, 15d2-293.6, 15d2-197.22, 15d2-208.22, 15d2-214.22, 15d2-239.22, 15d2-240.22, 15d2-243.22, 15d2-268.22, 15d2-285.22, 15d2-293.22, 15d2-197.28, 15d2-208.28, 15d2-214.28, 15d2-239.28, 15d2-240.28, 15d2-243.28, 15d2-268.28, 15d2-285.28, 15d2-293.28, 15d2-197.29, 15d2-208.29, 15d2-214.29, 15d2-239.29, 15d2-240.29, 15d2-243.29, 15d2-268.29, 15d2-285.29, 15d2-293.29, 15d2-200.1, 15d2-201.7, 15d2-207.9, 15d2-211.3, 15d2-211.6, 15d2-219.2, 15d2-228.2, 15d2-228.6, 15d2-228.9, 15d2-236.1, 15d2-241.1, 15d2-241.2, 15d2-241.7, 15d2-241.9, 15d2-257.3, 15d2-257.7, 15d2-258.1, 15d2-258.3, 15d2-259.8, 15d2-259.10, 15d2-262.2, 15d2-274.6, 15d2-286.2, 15d2-286.4, 15d2-286.5, 15d2-286.7, 15d2-291.3, 15d2-295.1, 15d2-298.1, 15d2-300.10, 15d2-300.11, 15d1-307.2, BHT-28, 15d2-171.1, 15d2-286.4, 15d2-192.8, 15d2-192.9, 15d2-194.6, 15d2-258.4, 15d2-258.5, 15d2-259.1, 15d2-286.3, 15d1-228.16, 15d1-197.1, 15d1-197.2, 15d1-197.3, 15d1-196.3, 15d2-184.19, 15d2-184.22, 15d2-192.10, 15d2-192.11, 15d2-192.15, 15d2-194.12, 15d2-259.6, 15d2-259.9, 15d2-274.9, 15d2-298.2, 15d2-194.1, 15d2-194.2, 15d2-194.4, 15d2-194.12, 15d2-236.3, 15d2-241.8, 15d2-258.18, 15d1-197.1, 15d2-194.7, 15d2-194.8, 15d2-228.7, 15d2-286.4, 15d2-195.5, 15d1-239.7, 15d2-167.2, 15d2-192.13, 15d2-192.14, 15d2-195.7, 15d2-184.8, 15d2-255.19, 15d2-197.8, 15d2-208.8, 15d2-214.8, 15d2-239.8, 15d2-240.8, 15d2-243.8, 15d2-268.8, 15d2-285.8, 15d2-293.8, 15d2-184.11, 15d2-255.3, 15d2-197.11, 15d2-208.11, 15d2-214.11, 15d2-239.11, 15d2-240.11, 15d2-243.11, 15d2-268.11, 15d2-285.11, 15d2-293.11, 15d2-197.4, 15d2-208.4, 15d2-214.4, 15d2-239.4, 15d2-240.4, 15d2-243.4, 15d2-268.4, 15d2-285.4, 15d2-293.4, 15d2-286.3, 15d2-197.7, 15d2-208.7, 15d2-214.7, 15d2-239.7, 15d2-240.7, 15d2-243.7, 15d2-268.7, 15d2-285.7, 15d2-293.7, 15d2-286.6, 15d2-197.9, 15d2-208.9, 15d2-214.9, 15d2-239.9, 15d2-240.9, 15d2-243.9, 15d2-



268.9, 15d2-285.9, 15d2-293.9, 15d2-207.13, 15d2-211.7, 15d2-219.3, 15d2-219.4, 15d2-236.3, 15d2-228.3, 15d2-228.5, 15d2-228.4, 15d2-228.8, 15d1-196.3, 15d2-258.6, 15d2-258.14, 15d2-307.2, 15d2-307.4, 15d1-042.11, 15d2-001.2, 15d1-078.5, BHT-52, BHT-50, 15d2-295.1, 15d2-296.1)

**Agency Response:** Changes were made in response to these comments with regard to the implementation requirements, allowing pathway applications submitted, but not yet certified, by the effective date of the Proposed Amendments to also have until 2028 prior to the twenty-percent crediting eligibility limitation applying. 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 California prioritizes the lowest carbon fuels for the transportation sector and 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 LCFS crediting eligibility limitation addition allows for California to displace up to 100% of the State's current fossil diesel demand, which is decreasing, with cleaner alternative diesel and to ultimately prioritize lower-CI waste-based feedstocks over higher CI virgin oils.

The 20% threshold is based on the amount of biomass-based diesel (BBD) in the program from soy, canola, and sunflower feedstocks at the time of rulemaking development, based on fuel reporting data from Q1-Q4 2023. Staff selected that specific data-based threshold in order to reduce the risk of future rapid increases of new soy, canola, and sunflower-based fuel production being incentivized by the LCFS.

This provision does not in any way restrict the fuels a facility may supply to California. Instead, it sends a reasonable limitation on LCFS crediting opportunities for 20% of a company's reported BBD produced from soy, canola, or sunflower oil. Companies producing BBD with a greater than 20% share of soy, canola, or sunflower oil may still sell those fuels into California or into any other jurisdiction, including those other jurisdictions with low carbon fuel programs. The federal Renewable Fuel Standard (RFS) provides crediting support for BBD from virgin oils used in any State. Indeed, one goal of this provision is to ensure that California does not impede access to these fuels in other markets, where zero emission vehicle (ZEV) adoption may be slower and where other markets may also benefit from the reduced GHG and criteria emissions that BBD provides over fossil fuels. Staff do not expect this provision to discernably influence the status-quo of credit generation from bio-based diesel, since the provision reflects recent market dynamics.

By limiting the crediting eligibility for soy, canola, and sunflower oil BBD in the LCFS program, staff expects that BBD will continue to play an important role for hard to decarbonize sectors in the near-term while simultaneously creating opportunities to expand the variety of fuels coming into the program in the long-term. Staff expect that the near-term effect of this provision will be to further encourage the use of waste-lipid feedstocks like used cooking oil and tallow for BBD, while longer-term benefits could be the development of more sustainable and low-CI biomass feedstocks. Staff expects that

waste oil supply is sufficient to support increased quantities of BBD, until increasing numbers of ZEVs have reduced the demand for combustion fuels. Concerns around the risk of increased waste oil consumption are addressed in Response DD-13. CARB staff will monitor concerns around increases in alcohol to hydrocarbon production for consideration in a future rulemaking, but currently there are no certified pathways for this feedstock/fuel combination in the program.

Biomass-based diesel is already incentivized under federal fuel policies, which has, in part, led to the recent surge in BBD entering the LCFS as fuel producers have been able to stack incentives from both programs. Rather than disrupting interactions between California and federal fuel programs, staff view this measure as helping to balance market incentives across programs to encourage more diverse sales of BBD across markets. Staff do not expect the provision to constrain the production of sustainable aviation fuel, as the aviation industry has indicated that they support use of waste oils for sustainable aviation fuel production, demonstrated by the historic partnership between CARB and Airlines 4 America.

The proposed amendment concept is complementary, not duplicative, of existing provisions (e.g., LUC values) and other proposed (e.g., sustainability requirements) guardrails for crop-based fuels. LUC values attempt to account for indirect, market-mediated land use impacts while sustainability requirements aim to address impacts from direct land conversions (see Response DD-2) and help ensure that biomass sourcing activity is conducted in ways that minimize GHG emissions and support carbon sequestration. The unique addition that the 20% limit, and the amendment outlined in section 95488(d) (see Response BB-9), provide is to begin sending the market signal to reduce the use of vegetable oils in biomass-based diesel crediting under the LCFS. CARB staff emphasize that this amendment in no way increases the LUC value for the applicable feedstocks used to produce biomass-based diesel in exceedance of the 20% limit—this mechanism has no interaction or basis in LUC values. Additionally, the concerns raised by commenters regarding potential food market impacts of reduced animal feed must be balanced with the direct food market impacts of diverting vegetable oils to fuel markets, which this proposal aims to address.

Under the proposed amendment concept, the 20% crediting eligibility limit is based on the volume of biomass-based diesel produced by a given fuel producer. It is narrowly designed to be implemented at the company level (i.e., across all operating facilities) and applies specifically to the following transaction types: production in California, produced for import, and import. The concept only applies to diesel fuel substitutes produced from soy, canola, and sunflower feedstocks. Novel feedstocks such as cover crops are not currently generating credits in the program and are not subject to the 20% limit. If fuel production from novel intermediate crops scales up, staff may consider their inclusion under this provision in a future rulemaking (see Response BB-7), if appropriate. As always staff will support stakeholders with implementation compliance regarding, for example, whether or not their crop feedstock is included by the specified 20% limit.

In response to public feedback, staff made changes to the implementation timeline. Under the proposed amendment concept, fuel producers that are currently participating

in the LCFS program with a certified or pending biomass-based diesel fuel pathway at the time the Proposed Amendments become effective have until 2028 to make any feedstock sourcing adjustments they may wish to in order to align their California fuel deliveries with the amendments, which staff views as sufficient time. Staff have not made changes in response to requests for consideration of facility-specific implications. As noted above, entities must comply with this provision at a company level, so it may be possible that a production facility that uses exclusively crop-based biofuels could receive credits consistent with amended eligibility requirements for all of the BBD reported to CARB, assuming that the facility's production is 20% or less of the reporting company's total reported BBD volumes. CARB will work with stakeholders to apply the amendments to different business organizational arrangements (e.g., joint ventures, subsidiaries), pathway renewals, fuel exports, as well as any other potential implementation complexities consistent with the specified regulatory requirements, and consider developing compliance support assistance documents if helpful.

Regarding these measures being within scope of the original proposal for this rulemaking, please see Response S-5 (Multiple Comments: Changes in 15-Day Package not Related to Original Proposal).

See also CEQA RTC Master Response 2.

**BB-7 Multiple Comments: *The 20% Limit on Reported Fuel Volumes from Soy, Canola, and Sunflower Oil Feedstocks Should not Apply to Winter Canola and Other Intermediate Crops***

**Comment:** 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. (15d1-042.5)

**Comment:** 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. (15d1-085.4)

**Comment:** 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. (15d1-090.3)

**Comment:** 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. (15d1-207.3)

**Comment:** 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.

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.”<sup>11</sup> 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.<sup>12</sup> 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.” 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.

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. (15d1-207.7)

**Comment:** 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. (15d1-207.8)

**Comment:** 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.

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. (15d1-207.9)

**Comment:** 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. (15d1-207.12)

**Comment:** 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. (15d1-228.40)

**Comment: Include winter canola as a key feedstock:** Winter canola is an emerging crop with a materially different emissions and land use profile. CARB should recognize that intermediate oilseed crop feedstock sources such as canola, grown as a second crop, provide multiple sustainability benefits to the environment in addition to its value as a low-carbon-intensity feedstock (source: Cover Crops for Climate Resilience | USDA Climate Hubs). Specifically, they:

Store carbon in the soil;

Reduce soil erosion and runoff;

Increase soil organic matter;

Reduce weeds, pests, and disease pressure;

Provide habitat for pollinators and wildlife;

Winter canola and other intermediate crops provide early forage resources for pollinators (source: Using pennycress, camelina, and canola cash cover crops to provision pollinators - ScienceDirect) (15d2-200.3)

**Comment:** CARB should recognize that the intermediate oilseed crop feedstock sources such as winter canola that is grown as a second crop are grown on land that would otherwise be fallow during the intermediate growing season. Production of biomass-based diesel feedstock in these systems is effectively adding “virtual acres” to the overall acreage pool without displacing other crops or changing land use in other parts of the globe. Therefore, the use of intermediate oilseed crop feedstock sources - such as canola grown as a second crop - reduces the potential for land use change. As these oilseed crops are crushed for oil feedstock, the meal produced as a co-product increases the available supply of vegetable protein meal, such as that used in California’s dairy and other livestock industries, thereby reducing the economic incentive for land use change.

As such, winter canola has the potential to be a key feedstock crop for renewable fuels; its adoption is just beginning to increase. Inclusion in CARB is a key step to support this low carbon- intensity crop as an alternative feedstock not subject to the 20% cap. It is important that CARB clarify inclusion of winter canola – and at the same time, ensure that no alternative feedstocks are included. As CARB is updated to add sunflower oil, we also recommend adding the following definition to § 95481(a):

“Primary-Crop Canola” means canola that is the crop produced during that geographical area’s main growing season. Primary-crop canola does not include canola that is grown as a second crop or as a cover crop. (15d2-200.4)

**Comment:** The term “**Primary-Crop Canola**” should then be incorporated into § 95482(i) as follows:

Biomass-based diesel produced from soybean oil and primary-crop 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 and primary-crop 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 and primary-crop 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.

Table 6 should be updated to indicate that the land use change value listed applies to Primary Crop Canola Biomass-based Diesel. (15d2-200.4a)

**Comment:** First, the proposed oilseed cap might be read to include winter canola. In the first 15-day package, CARB proposed a cap on LCFS crediting for canola oil and soybean oil. In the second 15-day package, CARB added sunflower oil to the cap and included other clarifications.<sup>2</sup> CARB has stated that the oilseed cap is intended to address the “potential adverse impacts” of these crops.<sup>3</sup> However, CARB did not clarify in the second 15-day package that the cap does not apply to winter canola. Because the cropping practices used to grow winter canola result in a low or zero ILUC risk, LCFS crediting for winter canola would not cause the “adverse impacts” CARB is trying to address in production of conventional canola, soybean, or sunflower feedstocks. If the cap is interpreted to include winter canola, that would prevent this innovative market from scaling. (15d2-201.1)

**Comment:** The proposed feedstock cap should explicitly exclude emerging cover crops which have a different emissions and land use profile than primary crops. (15d2-207.2)

**Comment:** As we mentioned in previous comments, winter canola is an emerging feedstock with a materially different emissions and land use profile that should not be covered by the 20 percent cap. We recommend adding the following definition to § 95481(a): “Primary-Crop Canola” means canola that is the crop produced during that geographical area’s main growing season. Primary-crop canola does not include canola that is grown as a second crop or as a cover crop. (15d2-207.10)

**Comment:** First, we recommend adding a new definition to “Definitions and Acronyms” in § 95481(a): “Primary-Crop Canola” means canola that is the crop produced during that geographical area’s main growing season. Primary-crop canola does not include canola that is grown as a second crop or as a cover crop. A second crop or cover crop would not displace a main crop and would not be detrimental to soil quality. Both “second crop” and “cover crop” in the above proposed definition are defined by Department of Agriculture regulations. (15d2-201.3)

**Comment:** Second, we recommend including “primary-crop” before “canola oil” in Section 95482(i) to clarify that the oilseed cap applies to conventional canola: Biomass-based diesel produced from soybean oil, primary-crop canola oil, and sunflower oil is eligible for LCFS credits for up to twenty percent combined of total biomass-based diesel annual production reporting, by company, based on the following transaction types: production in California, produced for import, and import. Any reported quantities of biomass-based diesel produced from soybean oil, primary-crop canola oil, and sunflower oil in excess of twenty percent on a companywide 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 which have submitted a biomass-based diesel pathway certification application under CA-GREET3.0 or which have a certified biomass-based diesel pathway prior to the effective date of this regulation, this provision takes effect beginning January 1, 2028. (15d2-201.4)

**Comment:** Biomass-based diesel produced from soybean oil and primary-crop 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 and primary-crop 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 and primary-crop 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. (15d2-207.11)

**Comment:** Our comments provide draft regulatory language that would clarify that winter canola, when it is grown in North America as a second crop or cover crop, should be considered a distinct feedstock from traditional canola for purposes of the proposed oilseed cap and the Table 6 canola value. (15d2-262.1)

**Comment:** The proposed cap is also arbitrary and provides no exceptions for crops that have zero land use change risk. Neste believes there should be exemptions for feedstocks that meet the definition of Intermediate Crop, and such feedstocks should remain out of this cap. The EU’s Annex IX definition for intermediate crops is: “Catch crops and cover crops that are grown in areas where due a to short vegetation period the production of food and feed crops is limited to one harvest and provided their use does not trigger demand for additional land, and

provided the soil organic matter content is maintained, where used for the production of biofuel for the aviation sector”. This cap could restrict the development of vegetable oil alternatives that have scalability and additionality potential, and California could become even more dependent on renewable energy technologies that are unproven and much more expensive. (15d2-300.10)

**Agency Response:** No changes were made in response to these comments. The Proposed Amendment only applies to diesel fuels produced from soy, canola, and sunflower feedstocks. Novel feedstocks such as cover crops are not subject to the 20% crediting eligibility limit at this time, as they are not currently generating credits in the program. As fuel production from novel intermediate crops scales up, staff may consider their inclusion under this provision in a future rulemaking, if necessary. Staff is open to discussing specific crops or feedstocks with stakeholders to make determinations on the applicability of the soy/canola/sunflower oil crediting provision. See Response AA-11 regarding applicability of the empirical LUC assessment provision in section 95488.3(d)(2) to novel feedstocks.

**BB-8 Multiple Comments: *The 20% Limit on Soy, Canola, and Sunflower Feedstocks Proposed in Section 95482(i) is Inadequate or too Vague to Reduce Impacts from Crop-Based Feedstocks***

**Summary:** Some commenters argue that the 20% limit on soy, canola, and sunflower feedstocks is insufficient to meaningfully address the risks from crop-based fuels. They argue that a volumetric cap is required. Under the 20% limit, significant levels of feedstock can still enter into the program resulting in increased food prices, global deforestation, and high farming emissions associated with industrial agriculture.

They argue that the provision will still result in prolonged and disproportionate health and environmental burdens from harmful emissions faced by fenceline EJ communities adjacent to 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. Some commenters argue that the twenty percent limit does not adequately limit the market for biofuels credits and will thus be used to enshrine oil companies’ impacts to local communities, despite a transition away from fossil fuels. They argue that there can still be an overall increase in statewide growth of BBD production at other refineries in California, leaving considerable room for growth permitted under the 20% limit.

Some commenters express concern that under this proposal crop-based biofuels are still being incentivized despite the known risks acknowledged by CARB. Some commenters argue that according to CARB’s own modeling in the 15-day changes, the projected volumes of renewable diesel are actually 50% higher than those modeled in the ISOR, which did not include the 20% credit limit. If California continues to provide an excess price signal for biomass-based diesel (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, they argue. Some commenters acknowledge that the proposed restriction on soybean and canola oil crediting is a first step in acknowledging these risks, but they are concerned it does not go far enough to mitigate them. CARB recognized that achieving carbon neutrality will require a massive shift towards electric vehicles, and that this transition is



technologically feasible. Some commenters argue that 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.

To avoid perverse incentives, some commenters argue that the 20% limit should be applied to all virgin vegetable oils (e.g., corn, carinata, camelina), and even waste oils (e.g., UCO, tallow), not just soy, canola, and sunflower. Furthermore, commenters requested clarification on whether the 20% limit applies only to *virgin* soy, canola, and sunflower oils, or *all* soy, canola, and sunflower oils. Some commenters argue that the exclusion of fuels produced from other crop-based feedstocks and non-virgin sources increases the risk of fuel shuffling and the likelihood that producers will simply switch to other problematic feedstocks, which risk driving up food prices and contributing to deforestation. There is already insufficient supply of high-quality waste oils, so 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 from regions where the threats to high carbon-stock forests are greatest, they argue. Some commenters also raised concerns that the limit does not apply to non-oilseeds, particularly corn, given the risk that alcohol-to-hydrocarbons will create for ethanol-based SAF.

Some commenters expressed doubt that the 20% limit would provide any significant protection against indirect LUC risk. They argue that ample waste and residue capacity exists for producers to comply with the 20% limit by shuffling their production across the multiple markets that exist for such fuels in North America. 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 lack of LUC risk mitigation, lead to it being a highly receptive market for crop-based feedstocks. The commenters argue that in this event, the aggregate demand for biomass-based diesel feedstocks in North America will remain unchanged. Since LUC is caused by aggregate demand for agricultural commodities, this would lead to the same amount of LUC risk as would have occurred had § 95482 (i) not been adopted. Ultimately, the 20% limit will only provide a significant degree of tangible, near-term protection against LUC or other sustainability risks if other jurisdictions in North America adopt similar provisions, the commenters argue.

Some commenters argue that the 20% limit should be extended to biomass-based jet fuel, gasoline, and propane sold in California, not just renewable diesel. They argue that many renewable diesel biorefineries produce more than one product and some produce all of these fuels, and producers can just divert biomass-based feedstocks to increase production of these fuels once the 20% threshold for diesel has been met. For example, optimizing SAF output could result in over 2 billion gallons of soy and canola-based fuel that is not subject to any crediting restrictions, far higher than the potential volume limit on credit generation. The commenters express concerns with how CARB will enforce this limit when refineries produce fuels from feedstocks that are both subject and not subject to this provision, such as RD and SAF producers that use both UCO and soy oil, as there is a high risk of arbitrary preferential allocation of feedstock to product. Some commenters also argued that the 20% limit does not account for LCA of virgin oils compared to waste oils, and that it should address fossil-fuel produced hydrogen used at refineries, as the availability of high-GHG natural gas hydrogen is more of a limiting factor for refineries than the availability of virgin oils.

Commenters also argued that any use of vegetable oil in excess of 20% should be assigned the carbon intensity of the fossil diesel baseline, not the CI benchmark value. They argue that the current amendment text is inconsistent with text for biomass that does not meet third party certification requirements in section 95488.9(g)(1), which states that biomass failing to meet minimum sustainability requirements will be assigned the CI of fossil diesel.

Some commenters argue that under the 20% limit, there is still a strong incentive to sell vegetable oil-based fuels in California. Fuels in excess of the 20% limit would avoid generating deficits, benefit from higher diesel prices in California, and potentially evade Cap-and-Trade obligations, they argue. 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. 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 cost 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. 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. Commenters argue that the higher selling price may be sufficient to justify participating in the California market even if the biofuel does not generate credit.

Some commenters expressed concern that the proposal fails CARB's stated goal of sending a long-term signal for reduced virgin soy or canola oil to serve California demand. They argue that staff's proposal effectively self-sunsets in less than ten years 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 and there will no longer be less incentive for volumes above 20%.

Commenters also raised concern about the implementation timeline, arguing that the grandfathering-in clause for existing fuel producers to delay compliance until 2028 will allow for significant refinery expansion and increase in vegetable oils volumes over present-day consumption. The delayed enforcement will prolong the subsidization of biomass-based diesel, leaving credit prices low and do nothing to relieve the credit glut, they argue. Some commenters recommended that the proposal could be strengthened by requiring the allowable fraction of crop-based fuels to decline over time, or by setting more stringent restrictions such as a 10% limit beginning in 2028 and a complete phaseout by 2030. Finally, some commenters requested clarity on the details of implementation, including whether the limit applies to individual refineries, how the limit will be applied to "annual production reporting" of each "company" for new applications, and delayed enforcement under the grandfather clause. Some commenters suggested that if the limit is applied company-wide, this could allow companies with multiple refineries in California to effectively double their use of virgin food oils and so they requested the inclusion of entity definitions to facilitate/clarify implementation. Some commenters also requested that staff report back to the Board if the absolute volumes of vegetable oils subject to the limit exceed the staff-derived value used as the basis of the 20%

limit, and that additional measures or adjustments are taken to limit or mitigate those exceedances.

(15d1-010.2, 15d1-010a.2, 15d1-010b.2, 15d1-014.1, 15d1-023.5, 15d1-023.6, 15d1-038.5, 15d1-065.5, 15d1-065.6, 15d1-070.1, 15d1-070.2, 15d1-101.1, 15d1-177.2, 15d1-190.7, 15d1-201.4, 15d1-203.12, 15d1-217.7, 15d1-219.3, 15d1-219.4, 15d1-219.10, 15d1-219.11, 15d1-219.12, 15d1-219.13, 15d1-219.14, 15d1-219.15, 15d1-219.16, 15d1-219.17, 15d1-219.18, 15d1-219.19, 15d1-221.6, 15d1-222.2, 15d1-222.12, 15d1-222.13, 15d1-222.15, 15d1-222.16, 15d1-240.1, 15d1-240.7, 15d1-240.12, 15d1-240.13, 15d1-240.19, 15d1-240.21, 15d1-240.24, 15d1-240.26, 15d1-240.31, 15d1-240.32, 15d1-244.1, 15d1-244.2, 15d1-251.12, 15d1-251.13, 15d2-168.2, 15d2-168.4, 15d2-168.5, 15d2-173.1, 15d2-183.1, 15d2-237.2, 15d2-237.5, 15d2-275.5, 15d2-281.3, 15d2-284.1, 15d2-287.5, 15d2-287.6, 15d2-292.3, BH-023.2, BH-025.2, BH-025.8, BH-025.10, BH-030.4, BH-034.2, BH-040.4, BH-093.2, BHT-7, BHT-72, BHT-91, BHT-141, BHT-143, BHT-162, BHT-178, BHT-179, BHT-189, BHT-239, BHT-252, 15d2-302.5, BH-025.4, BH-025.9, 15d1-190.4, 15d1-190.6, 15d1-190.10, 15d1-172.3, 15d1-240.17, 15d1-239.9, 15d1-172.2, 15d1-172.1, 15d1-190.10, 15d2-187.6, 15d2-168.2, 15d2-168.4, 15d2-168.5, 15d2-173.1, BHT-155, 15d1-239.2, 15d1-239.3, 15d1-239.4, 15d1-239.5, 15d1-239.6, 15d1-239.8, BH-034.17, 15d1-172.4, 15d-284.1, 15d1-190.11, BH-093.2)

**Agency Response:** No changes were made in response to these comments. The Proposed Amendment is part of a suite of introduced guardrails for crop-based fuels that are intended to help reduce the risk of deforestation and land use conversions, and send important short and long-term market signals to prioritize the lowest CI fuels, as California's diesel demand becomes almost entirely replaced by non-fossil fuels. See Response BB-6 for a description of the 20% crediting eligibility limitation proposal, and response to objections to the proposed 20% soy/canola/sunflower oil crediting limit. See also CEQA RTC Master Response 2 for additional CARB response on this provision and other associated measures.

In response to objections that the 20% crediting eligibility limitation provision is inadequate and hinders ZEV deployment: the LCFS provides significant support for electrification of the transportation sector, which will increase considerably under the proposed amendments (see Responses D-3 and U-1). LCFS credits generated based on electricity supplied as transportation fuel are expected to continue to increase, and will not be diminished by credit generation from other fuels, as suggested by some stakeholders.

Because aviation is a relatively difficult to decarbonize sector, staff did not explicitly include sustainable aviation fuel (SAF, known as alternative jet fuel (AJF) in the LCFS regulation) in the 20% crediting eligibility limitation provision because significant increases in SAF production are needed to decarbonize this sector. However, see Response BB-3 with regard to the practical effect of this provision on SAF that is produced at the same facility as renewable diesel. With regard to pollution concerns for fenceline communities near refineries and biofuel production plants, see Response R-6, as well as CEQA RTC Master Response 4 and CEQA RTC 15.1-240-5.

Staff acknowledges the commenters' point that the proposed 20% limit mechanism is not intended to directly address market-mediated, indirect land use change risks.

Rather, it begins sending the market signal to reduce the use of vegetable oils in biomass-based diesel crediting under the LCFS. As explained in Response BB-6, staff expect the overall effect of this and other complementary amendment provisions will be to help reduce LUC concerns around crop-based fuels being credited under the LCFS.

In response to requests for clarification, the 20% limit explicitly applies to BBD produced from all soy, canola, and sunflower oil feedstocks, not only virgin sources. The 20% limit does not apply to other vegetable oils or waste oils, but CARB staff will continue to monitor the sustainability risk of market impacts from other feedstocks and may consider proposing to include other feedstocks under these guardrail provisions in a future rulemaking (see Response BB-6).

For companies which have submitted a biomass-based diesel pathway certification application under CA-GREET3.0 or which have a certified biomass-based diesel pathway prior to the effective date of this regulation, the crediting eligibility limitation provision takes effect beginning January 1, 2028. Staff understands that existing fuel producers who have already made significant multi-year decisions in fuel production and feedstock sourcing will need some time to displace soy, canola, and sunflower feedstocks in their supply chains and establish contracts for alternative feedstocks. Staff disagree, based on the regulatory text, with the comment suggestion that applying the limit at the company level may encourage companies to double their use of virgin oils. Staff did not propose to assign the fossil diesel carbon intensity (CI) to volumes of BBD that exceed the 20% soy/canola/sunflower oil crediting limit, as suggested by some stakeholders. The proposed provision eliminates crediting for these volumes in the near-term, until the fuel becomes deficit-generating after its CI exceeds the annual CI benchmark. Staff cannot predict how fuel producers will respond to the proposed amendment and whether or not the market forces will exist in the future to incentivize continued use of these fuels above the 20% crediting eligibility limit; regardless, the 20% crediting limit sends a clear signal to the market to prioritize waste feedstocks and is expected to reduce the risk of future rapid increases of new soy, canola, and sunflower-based fuel production being incentivized by the LCFS.

Concerns around the risk of increased waste oil consumption are addressed in Response DD-13.

**BB-9 Multiple Comments: *Opposition to or Concern with Conditional Sunset of Consideration of New Fuel Pathway Applications for Biomass-Based Diesel Starting in 2031 if Heavy-Duty ZEV Milestones Are Reached - Section 95488(d)***

**Summary:** Some commenters expressed opposition or concern toward the proposal granting the Executive Officer discretion to stop accepting new pathways for biomass-based diesel if zero-emission vehicle (ZEV) milestones are reached by 2031. Some argue that the provision endows the Executive Officer with too much authority without proper rulemaking. Some contend that 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, and that the market should dictate the demand for biomass-based fuels, which would follow the actual progress of ZEV adoption rather than setting arbitrary dates around hopeful ambition. This reduces competition that

would otherwise benefit consumers through lower prices and greater choice, they argue, and unreasonably favors ZEV technologies over other emission reduction technologies.

Some commenters argue that the provision violates AB 32 by restricting the diversity of fuel options. They argue that it would effectively freeze markets to benefit incumbents at the expense of innovative new entrants and lock in biofuel CI's to legacy feedstocks potentially depriving California of lower CI alternatives in the future. They argue that this provision, in combination with the 20% limit on biomass-based diesel credit generation, sets a dangerous precedent for the use of all GHG reducing feedstocks and technologies, violating the LCFS' commitment to technology neutrality. No similar provisions exist in other jurisdictions with clean fuel standards.

Some commenters argue that further restrictions are unwarranted because the LCFS program already requires the use of a lifecycle model and assesses penalties for land use change. Some commenters express concern that using the full range of Class 3-8 trucks allows for the possibility that this threshold can be met with smaller and lighter vehicles (Class 3-4), leaving the larger, heavier vehicles (Class 7-8) reliant on liquid fuel that may only be available from fossil fuels if new biofuels pathways are not allowed. Some commenters argue that this could be especially true after an update to CA-GREET where legacy pathways are termed out. They express concern that this situation would result in environmental backsliding and loss of GHG benefits.

Some commenters expressed concern that tying targets and administrative functioning of the LCFS on outcomes under the Advanced Clean Trucks and Advanced Clean Fleets regulations is problematic since CARB has not received the necessary Clean Air Act waiver from US EPA for the ACF and ZEV regulations are facing implementation challenges that may require amendments or extensions with implications for this LCFS provision.

Concerns were also raised around other impacts such as increased emissions, stifled investment in the agricultural sector, unintended impacts on non-lipid pathways, and potentially limited use of UCO for RD and SAF production in the future. Some argue that the uncertainty around future pathway approval will stifle further development of cover/intermediate crops as biomass-based feedstock and limit new farming practice technologies that reduce carbon intensity. Some argue that this provision could significantly disadvantage other biofuel production processes that may produce biomass-based diesel as a co-product (e.g., SAF production). Other concerns were raised about the provision only applying to lipid feedstocks, resulting in unfair advantages for corn and other grains.

Some commenters requested more clarity on terminology and implementation, including what would be considered under "new pathway applications" in section 95488(d) and whether pathway renewals would fall under this category of pathways subject to the provision. Requests were made for more clarification that the cut-off does not apply to SAF, even if produced by a biomass-based diesel producer, and that the provision does not prevent routine modifications of existing biomass-based diesel pathways (e.g., new inputs or process changes; 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). Some commenters requested that the triggering mechanism be limited to the number of ZEV or near-

ZEV classes 7 & 8 vehicles, as these are the heavy-duty trucking categories most difficult to electrify.

Finally, some commenters argue that this change was not part of the original proposal under this rulemaking and is an inappropriate inclusion in a 15-day package. They argue that more thorough stakeholder engagement must be conducted prior to adoption or implementation, and that this provision should require a 45-day comment period.

(15d1-021.3, 15d1-030.1, 15d1-032.3, 15d1-037.4, 15d1-078.5, 15d1-085.5, 15d1-115.2, 15d1-124.2, 15d1-133.3, 15d1-138.4, 15d1-139.5, 15d1-142.1, 15d1-144.5, 15d1-146.4a, 15d1-155.3, 15d1-166.1, 15d1-166.6, 15d1-171.6, 15d1-181.6, 15d1-187.6, 15d1-196.5, 15d1-214.11, 15d1-214.12, 15d1-228.9, 15d1-228.20, 15d1-228.22, 15d1-228.24, 15d1-235.14, 15d1-236.8, 15d1-236.10, 15d1-249.10, 15d2-255.4, 15d2-255.15, 15d2-197.20, 15d2-208.20, 15d2-214.20, 15d2-239.20, 15d2-240.20, 15d2-243.20, 15d2-268.20, 15d2-285.20, 15d2-293.20, 15d2-241.3, 15d2-241.10, 15d2-244.6, 15d2-300.6, 15d1-171.14, 15d1-171.16, 15d1-171.22, 15d1-171.23)

**Agency Response:** No changes were made in response to these comments. This proposal was included as an additional guardrail in the suite of regulatory proposals for crop-based fuels that is expected to send the market signals necessary to encourage growth of sustainable, low-carbon feedstocks to displace fossil fuels in California, while minimizing potential negative externalities such as land conversion or deforestation and their associated environmental impacts. See CEQA RTC Master Response 2 for more detail. This proposal, along with the 20% crediting limit on biomass-based diesel produced from soy, canola, and sunflower oil, are guardrails included specifically to address risks from biomass-based diesel, where growth has been most rapid in the program compared to other biofuels (see also Response DD-8).

Climate policies implemented by CARB are designed to work in tandem to maximize GHG emissions reductions. Successful implementation of CARB's ZEV regulations relies, in part, on the incentives for battery electricity technologies and construction of charging infrastructure provided by the LCFS program. Similarly, achieving emissions reductions through the LCFS program relies on scaled up deployment of zero-emission vehicles and infrastructure. In fact, California is seeing increased deployment of ZEVs. For example, according to the latest data published by the California Energy Commission, the population of Class 3-8 ZEVs increased by 63% between 2022 and 2023, reaching nearly 4,000 vehicles ([Medium- and Heavy-Duty Zero-Emission Vehicles in California](#)). The threshold and timeline reflected in the Proposed Amendments for the provision to no longer accept new BBD pathway applications are designated to strategically connect to existing targets built into existing ZEV regulations and respect the premise that increasing ZEV deployment decreases demand for alternative fuels. The 132,000 vehicle threshold was derived from the CARB Strategy for the State Implementation Plan and reflects full implementation of the State's MHD ZEV regulations. The amendment proposal does not phase out or otherwise affect existing biomass-based diesel fuel pathways, which may still report under their previously-certified CIs, and thus would maintain a variety of low-carbon liquid fuel options for the legacy diesel fleet. If the MHD ZEV target is reached by the 2030

deadline, the expectation is that there will be reduced demand for BBD which could likely be met by existing BBD pathways in the LCFS at that time. Staff disagree that the provision will stifle innovation, as some commenters suggested. The timing of the provision would encourage at least several years (if the conditions for the trigger are met) for further innovation in lowering carbon intensities for new biomass-based diesel production pathways.

The conditional sunset on new fuel pathway consideration only applies to biomass-based diesel pathways. Fuel producers will still be incentivized to lower the carbon intensity of fuels for the aviation sector through next generation feedstocks and other approaches that reduce the lifecycle greenhouse gas emissions of a given fuel. As always, staff will provide implementation and compliance support to stakeholders as needed.

Regarding these measures being within scope of the original proposal for this rulemaking, please see Response S-5 (Multiple Comments: Changes in 15-Day Package not Related to Original Proposal).

**BB-10 Multiple Comments: *The Proposal in Section 95488(d) to Sunset of Consideration of New Pathways for Biomass-Based Diesel Starting in 2031 if Heavy-duty ZEV Milestones are Reached is Insufficient***

**Comment:** 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. 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. (15d1-240.15)

**Comment:** 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 while new pathways may not be accepted, existing pathways are unaffected and may not expire until the late 2030's.

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. (15d1-251.11)

**Agency Response:** No changes were made in response to these comments. The conditional sunset on new fuel pathway consideration only applies to biomass-based diesel pathways. Fuel producers will still be incentivized to reduce the carbon intensity of fuels for the aviation sector through next-generation feedstocks and other approaches that reduce the lifecycle greenhouse gas emissions of a given fuel, as raised by commenters. Staff will respond to specific implementation requests regarding these provisions on a case-by-case basis, and may develop compliance support materials if it could be helpful for stakeholders. See also Response BB-9.

#### **BB-11 Multiple Comments: *Impact of CARB's Regulatory Measures on Biomass-Based Diesel Fuel and Feedstock Markets***

**Comment:** 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. (15d1-218.6)

**Comment:** 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. (15d1-218.11)

**Agency Response:** No changes were made in response to these comments. CARB designs its low carbon fuel programs and other climate policies to support exportability and alignment with the implementation of similar or complementary policies in other jurisdictions consistent with legislative direction.

#### **BB-12 CARB Should Provide More Information on Feedstocks Used for Table 6 iLUC Modeling**

**Comment:** 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. (15d1-053.2, 15d1-082.2)

**Agency Response:** No changes were made in response to this comment. The proposed crediting limitation on soy/canola/sunflower oil feedstocks is based on soy, canola, and sunflower oil quantities reported in the public LCFS quarterly data summary spreadsheet, which informs Figure 6 on the LCFS data dashboard. Some feedstock information is aggregated within the “Other” category to protect the confidentiality of particular fuel pathway holders and reporting entities. This occurs when there is a small number of reporting entities using these feedstocks. However, the small amount of canola oil fuel contained within the “Other” category would have made an insignificant addition to the data used to calculate the soy/canola/sunflower oil crediting limitation.

### **CC. Definitions Under Sustainability Requirements**

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#### **CC-1 Multiple Comments: *Provide Definitions of Crop- and Forestry-Based Feedstocks***

**Summary:** CARB should provide clear definitions of which feedstocks are considered crop- and forestry-based to clarify which feedstocks are subject to sustainability criteria.

(45d-171.1, 45d-173.2, 45d-174.2, 45d-241.6, 45d-241.31, 45d-333.8, Apr-060.1, Apr-139.2)

**Agency Response:** Changes were made in response to these comments. In section 95488.9(g), staff have applied the term “biomass” to refer to the materials subject to sustainability criteria, which includes biomass material used as feedstocks that is converted to biofuel, as well as biomass material that is used to generate process energy used in the production of biofuels.

#### **CC-2 Justify Forest Definition**

**Comment:** “Forest”- The attempt to specify concrete quantitative criteria for the definition of ‘forest’ is helpful, however different state or federal authorities in the United States may have different definitions for ‘forest’. For example, the Natural Resources Conservation Service under USDA characterizes forest land use as land with at least 10 percent cover by trees that will be at least 13 feet (4 meters) tall at maturity, and the land also shows evidence of natural

tree regeneration. The LCFS definition should generally align with prevailing definitions in regulatory or scientific literature, unless there is a reason to pick an alternative. (45d-391.22)

**Agency Response:** No changes were made in response to this comment. Staff's forest definition aligns with the international definition used by the United Nations' Food and Agricultural Organization (FAO), which is used by EU RED and other programs.

### **CC-3 Clarify Lipid or Crop-Based in Definition**

**Comment:** On page 116 during the discussion of the EJ alternative, a statement referring to the proposal to "Cap the use of lipid biofuels (commonly known as crop-based biofuels)," was made. In the context of biofuels and the feedstocks used for them, crop-based biofuels and lipid biofuels share a subset, namely crop-based vegetable oil biofuels, but they are not synonyms. Some crop-based biofuels are not made from lipids and some lipid biofuels are not crop-based. References to various lipid-based fuels in the proposed amendments suggest that this sentence in the ISOR is simply an imprecise choice of words, rather than evidence of any fundamental misunderstanding or conflict with other provisions, but this should be clarified. (45d-391.82)

**Agency Response:** No changes were made in response to this comment. Staff acknowledge the distinction between lipid biofuels and crop-based fuels and were referring to lipid-based fuels in this section of the ISOR. Staff only intended to draw attention to the fact that these terms are often used interchangeably, to the point of the commenter.

### **CC-4 Clarify Sustainability Requirement**

**Comment:** §95488.9 (g) specifies the requirements apply to "land that was forested after January 1, 2008," however it is unclear whether "forested" is being used as a verb or adjective in this sentence, which determines whether the scope is any land that had forest cover after the specified date, or land that was afforested or transitioned from some other land cover to forest after that time. Given the context, the adjective use appears more likely, but additional clarification could resolve any ambiguity. (45d-391.58)

**Agency Response:** Changes were made in response to this comment. Staff have changed the wording of this requirement to reduce ambiguity and better match the federal RFS requirements on no-land conversion. This requirement is now included in 95488.9(g)(2), which reads:

*"With the exception of specified source feedstocks listed in section 95488.8(g)(1)(A), 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. Biomass must be cultivated and harvested in accordance with all local, State, and federal rules and permits."*

### **CC-5 Multiple Comments: Support Inclusion of Forest or Agricultural Residues under Waste Definition and Exemption from Sustainability Requirements**

**Comment:** The proposed regulation is missing critical definitions that will make implementation challenging for CARB and regulated entities. This includes a definition for crop-

and forest-based feedstocks as well as palm derivatives. For example, CARB is proposing to prohibit transportation fuels produced from palm oil or palm derivatives, based on deforestation concerns identified by the European Commission.<sup>31</sup> However, without a clear definition of “palm derivatives,” this action may exclude fuels that can contribute to the objectives of the LCFS program, such as fuels derived from palm oil mill effluent (POME) oil, waste oil extracted from spent bleaching earth from palm oil refining (SBEO) or empty palm fruit bunches oil. These fuels are different from palm oil and are not considered high-risk feedstock. The European Union’s REDII Annex IX Part A<sup>32</sup> considers waste generated by palm oil mills, such as POME oil, SBEO<sup>33</sup> and empty palm fruit bunches oil, as “advanced” raw materials. The European Union has also distinguished between the types of palm derivatives, including POME oil, SBEO, empty palm fruit bunches oil, and palm fatty acid distillates (PFAD). PFAD are excluded from the residue definition in European jurisdictions (e.g., Germany, Sweden, Norway), while POME oil and empty palm fruit bunches oil are included in the REDII as waste streams within either energy intensity or GHG reductions. These alternative fuels can significantly reduce GHG emissions – the International Council on Clean Transportation (ICCT) has indicated that renewable diesel derived from POME oil has a net GHG emission reduction of 71%.<sup>34</sup> CARB should narrowly define any restrictions for “palm derivatives” to facilitate feedstocks such as POME oil, SBEO and empty palm fruit bunches that can contribute to the stringent carbon intensity reductions contemplated in the proposed rule. CARB should also ensure that the scope of the certification requirements are clearly defined – the proposed amendments do not define “point-of-origin,” which creates significant uncertainty on the point of certification requirement. (45d-241.31)

**Comment:** Section 95482. Fuels Subject to Regulation. In (f), CARB should confirm that this section does not apply to fuels such as used cooking oil from palm oil, and therefore used cooking oil from palm oil is eligible for LCFS credits. Please refer to comments above on palm derivatives definitions. (45d-241.50)

**Comment:** We strongly support the proposed inclusion of additional waste biomass under §95488.8.g. Additionally, we urge for the explicit definition and inclusion of agricultural residues such as crop residues including corn stover, wheat straw, sugarcane trash and bagasse, orchard prunings, and vineyard prunings, and orchard trees. (45d-333.3)

**Comment:** 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. (15d1-075.4)

**Comment:** 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. (15d1-139.4)

**Comment:** POET also urges CARB to reevaluate 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. (15d1-153.1)

**Comment:** 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. (15d1-159.3)

**Comment:** 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. (15d1-176.4)

**Comment:** We support the exclusion of specified source feedstocks from the sustainability requirements. (15d2-185.8)

**Comment:** 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 appreciate the recognition and inclusion of corn stover in the list of specified source feedstocks, and encourage the Board to also recognize corn kernel fiber. (15d2-244.5)

**Comment:** Although we appreciate CARB’s revised proposed treatment of corn stover as a “Specified Source Feedstock,”<sup>2</sup> the proposed rule continues to impose unnecessary and costly sustainability requirements on biomass waste feedstocks like corn kernel fiber, which do not threaten any of the alleged environmental impacts that underlie CARB’s rulemaking. Here as elsewhere in the proposed rule, requiring certifications and audits around the harvesting of otherwise unused agricultural wastes simply makes it more expensive for POET and other biofuels producers to supply California with low carbon liquid fuel, and serves no discernible public purpose. (15d2-253.1a)

**Comment:** POET appreciates CARB’s responsiveness to our prior comments regarding the treatment of corn stover under the proposed sustainability certification system. Designating corn stover as a “Specified Source Feedstock” under § 95488.8(g), and exempting stover from the more onerous and unnecessary “Sustainability Requirements” of § 95488.9(g), recognizes

that corn stover is a low-risk biomass-based waste generated during harvests and can be removed from the field at scale and repurposed as a low-carbon heat source for biofuel production. (15d2-253.6)

**Comment:** Unfortunately, CARB's Second Revised Proposed Amendments continue to assign unwarranted risks to the sustainability of other biomass-based wastes and agricultural residues. In particular, CARB's proposed rule subjects corn kernel fiber to the "Sustainability Requirements" of § 95488.9 — notwithstanding that fiber has long been recognized as a low-carbon waste feedstock under the LCFS. Nothing in CARB's rulemaking documents supports assigning "sustainability"-related risks to corn kernel fiber, which offers no nutritional value in food supply chains, and supplies the lowest carbon component of corn ethanol produced at dry milling facilities. Indeed, the latest proposed version of the CA-GREET model features a simplified CI calculator that models corn kernel fiber as a waste feedstock with no upstream feedstock or indirect emissions. By requiring that the fiber component of corn feedstocks satisfy sustainability requirements, CARB is effectively prohibiting any beneficial use of wastes generated by non-conforming grain, which will be grown and sold regardless of the market signals embodied in CARB's regulations. This approach abandons carbon reductions, places a premium on the purchase of biofuel waste feedstocks, and will exacerbate the negative impacts of the proposed sustainability requirements by excluding cheaper lower carbon fuel from the California market.

For these reasons, POET urges CARB to remove corn kernel fiber from the "Sustainability Requirements" of § 95488.9(g) and thereby maintain incentives to produce low carbon liquid fuel from proven low-risk waste feedstocks. (15d2-253.7)

**Comment:** In particular, the corn fiber pathway is an industrial by-product. Corn fiber does not receive a land use charge under LCFS today. It is therefore inconsistent to apply traceability requirements to corn fiber. Corn fiber ethanol should be exempt from traceability compliance based on this alone. However, if it is included, traceability must be on mass balance only. (BHT-233)

**Comment:** Fidelis supports the inclusion of forest-derived biomass as an eligible feedstock under the California LCFS. This inclusion enables novel low carbon fuel pathways necessary to support the continued reduction in transportation emissions and supports healthier US Forests that are less susceptible to forest fires. (BH-037.3)

**Agency Response:** Changes were made in response to these comments. The sustainability requirements outlined in section 95488.9(g) do not apply to biomass from wastes or residues listed as specified source feedstocks in section 95488.8(g). With regard to corn stover, see Response CC-6 below ("Multiple Comments: Corn Stover should be subject to sustainability requirements"). Corn stover was added to the list of specified-source feedstocks under section 95488.8(g) based on corn stover being generally accepted as a waste by-product produced from corn harvesting. No fuel pathways utilizing agricultural waste or residues, aside from sugarcane bagasse, have been approved, and therefore whether these materials should be classified as specified source feedstocks has not been determined through the fuel pathway evaluation regulatory process. Bagasse is used for process energy and has been assessed for GHG impacts including LUC, and at this time has not been determined to be a specified

source feedstock. The list of specified-source feedstocks in section 95488.8(g) can be currently defined as wastes or residues, and staff will continue to revisit the latest science for consideration of future potential additions to this list. A determination for these materials including the materials' point of origin would be made if and when such a pathway application is submitted to CARB.

#### **CC-6 Multiple Comments: *Corn Stover Should Be Subject to Sustainability Requirements***

**Comment:** The 2nd 15 day package proposes adding corn stover to the list of specified source feedstocks that must supply chain of custody documentation, but are not required to complete a feedstock sustainability certification. Specified source feedstocks are generally those based on wastes and residues, for which there is limited alternative use and are not thought to entail a significant upstream source of GHG emissions. Corn stover, however, has some non-fuel uses and removing stover from fields to use it as a feedstock can have significant GHG impacts. As such, corn stover does not share enough characteristics with actual waste and residue feedstocks to justify inclusion on this specified-source feedstock list.

Corn stover is generally classified as an agricultural residue under most applicable classification systems, however this does not necessarily mean it is free from emissions impacts that should be considered under the LCFS. Corn stover may be used as an animal feed or bedding material, in which case shifting to become biofuel feedstock would cause additional feed or bedding material to be procured to back-fill what is lost. More importantly, however, corn stover is customarily left on most corn fields after the grain is harvested, where it is subsequently re-incorporated into the soil, either via tillage, or in the case of no-till fields, by compaction and other natural processes. The solid carbon embodied in corn stover helps maintain soil organic carbon (SOC) stocks, which would otherwise decline over time as SOC is decomposed by soil microbes. Removing stover to use for biofuel feedstock reduces the rate of SOC accumulation, and can result in long-term reductions in total SOC levels in corn fields. While studies have demonstrated that small amounts of stover can be removed without significantly impacting SOC levels, the amount of stover that can be removed varies widely from field to field due to soil, climate, agronomic, and other factors. A meta-analysis of U.S. field trials in which varying amounts of stover were removed showed this variability, and also found that even relatively low rates of stover removal, <25% of total stover mass, can lead to significant declines in SOC in some fields.

Given that the LCFS is intended to reduce GHG emissions over the full life cycle of a fuel, this loss needs to be carefully considered during the pathway certification process, higher rates of SOC loss due to stover removal can significantly increase carbon intensity of cellulosic biofuels, or even render the resulting fuel more carbon intensive than the petroleum it displaces.<sup>6</sup> SOC impacts of stover removal must be evaluated on a case-by-case basis, accounting for local conditions. Effective sustainability certification, especially when backed by soil carbon measurements, could mitigate this risk. The categorical exemption of corn stover from the proposed certification requirements means that CI certification of stover-based pathways may lack the necessary evidence to effectively evaluate GHG impacts from its use, thereby undermining the LCFS' ability to achieve long-term life cycle GHG reduction. (15d2-287.7)

**Comment:** However, the most recent iterations of proposed amendments to section 95488.9(g), in the current 15-day package and the August package, carve out an exemption from third-party sustainability certification for all specified source feedstocks.

Where pathway applications concern true wastes, residues, and byproducts, we agree that in theory, the risk of overlooking adverse features is lower than for purpose-grown and -harvested energy feedstocks. That said, the question remains of ascertaining whether a feedstock truly is a waste, residue, or byproduct. The documentation elements listed in section 95488.8(g)(1)(B)-(C) of existing regulation would cover the essentials if all applicants and signatories always wrote the truth. Per the indicated process, however, chain-of-custody records, feedstock transfer documents, and the proposed attestation letters are to be maintained but not submitted until CARB Executive Officer or other verifier requests the information. As such, the existing documentation protocol relies largely on an honor system.

The reduced CI favors specified source feedstocks, and suppliers and/or fuel pathway applicants now have an even more incentive than before to designate their inputs as specified source feedstocks with inaccurate sustainability features. If CARB is to successfully preempt fraud in the LCFS program, then such a broad category of materials should not receive an automatic waiver from third-party verification. (15d2-289.7b)

**Agency Response:** No changes were made in response to these comments. In the Second 15-day changes to the Proposed Amendments, staff specified that corn stover is not subject to the sustainability requirements of section 95488.9(g) and is instead subject to the specified source feedstock requirements of section 95488.8(g). The Proposed Amendments do not propose to change the LCFS treatment of corn stover as a waste feedstock for purposes of lifecycle analysis. See response to CC-5. Please refer to CEQA RTC Master Response 2 with regard to the proposed sustainability provisions, and Master Response 5 with regard to emissions quantification for biofuels under the LCFS. Staff does not expect a change in ethanol consumption as a compliance response under the proposed amendments. To date, very few specific materials have been considered eligible to be called a specified source feedstock. Staff evaluate any new feedstocks for specified source designation on a case-by-case basis.

#### **CC-7 Clarify Definition of “Farm”**

**Comment:** In addition, CARB has not provided a clear definition of a farm, which raises significant implementation questions as farmers often farm disconnected parcels of land. Furthermore, farmers often store much of their crop to sell at a later date. Depending on how a farm is defined, it raises a further question of how on-farm storage will be handled. (15d2-258.12)

**Agency Response:** No changes were made in response to this comment. Under the sustainability requirements, fuel producers must establish supply chain traceability to the land(s) where biomass is sourced, in order to demonstrate that biomass for feedstocks was sourced on land that was cleared or cultivated prior to January 1, 2008, and actively managed or fallow since January 1, 2008. With respect to the specific requirements listed under section 95488.9(g)(5), the commenter’s question about the definition of a farm is answered by the phrase “*plot boundaries (farm, plantation or*

*forest) that are managed to produce the biomass*". As specified in that regulatory language, farms or parcels, whether as a single contiguous plot or multiple disconnected plots, would all be subject to supply chain traceability requirements if those lands are used to produce biomass feedstocks for fuel pathways for the California LCFS.

#### **CC-8 *Support Exclusion of Specified Source Feedstocks from Sustainability Requirements***

**Comment:** Oberon appreciates CARB's amendments to the Sustainability Requirements for Biomass in the Second 15-Day package which clarify the exception of "specified source feedstocks" listed in section 95488.8(g)(1)(A), previously referred to as "biomass" in the First 15-Day package. This proposed amendment provides additional clarity that is beneficial to identifying the proper requirements for different pathways and feedstock types. (15d2-278.6)

**Agency Response:** No changes were made in response to this comment. Staff acknowledges the commenter's support.

#### **DD. *Sustainability Requirements***

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##### **DD-1 *Multiple Comments: General Support of Sustainability Requirements for Crop-Based Fuels***

**Summary:** Support the sustainability requirements of crop-based fuels, and/or support sustainability requirements over a cap on crop-based feedstocks. These comments also include support for subsequent changes to the sustainability proposal made during 15-day periods, including the extended implementation timeline, additional basis for adjusting certifications, clarifications on biomass, and the exclusion of specified-source feedstocks from sustainability requirements.

(45d-015.2, 45d-225.6, 45d-266.9, 45d-295.4, 45d-336.1, 45d-374.5, Apr-079.9, Apr-079.13, Apr-152.4, Apr-183.1, 15d1-041.4, 15d1-228.30, 15d1-236.13, 15d1-251.7, 15d1-251.8, 15d1-251.9, 15d2-185.8, 15d2-257.4, 15d2-274.3, 15d2-278.6, 15d2-289.7a, 15d2-236.2, 15d2-258.8, BHT-118)

**Agency Response:** No changes were made in response to these comments.

##### **DD-2 *Multiple Comments: Oppose Sustainability Requirements***

**Summary:** Some commenters expressed general opposition to the sustainability requirements, or opposition to specific crop feedstocks being subject to the requirements. Some commenters argued that the proposed sustainability requirements lack critical details and have not been workshopped to allow adequate stakeholder input. There were concerns that LUC and environmental impacts from crop-based feedstocks are unwarranted and no clear evidence has been presented that crop-based feedstocks are causing deforestation, particularly in North America. The requirements would disadvantage North American grown crop-based feedstocks from expanding global competition. Some commenters also requested clarity on why CARB is only subjecting crop and forestry-based feedstocks to sustainability requirements, and not other fuel pathways participating in the program.



Some commenters expressed concern that CARB has only provided vague details about relying on certification of environmental, social, and economic criteria by third-party certification systems approved by the Executive Officer, without specifying which criteria will be included or which certification systems will be accepted. They argue that this approach delegates definition of sustainability to third parties, rather than the appropriate California state agencies or legislature. Some commenters contend that environmental and socio-economic criteria are beyond the scope of AB 32 and CARB's authority to regulate GHG reductions, and this proposal would conflict with CARB's mandate to adopt measures that *achieve the maximum technologically feasible and cost-effective GHG emission reductions*. They argue that the sustainability requirements will create supply shortages in California, jeopardizing reductions in carbon intensity for liquid fuels.

Some commenters argue that feedstocks produced in California, or even the US and Canada more broadly, do not present a deforestation risk and should thus be exempted from these proposed sustainability requirements through a risk-based approach. They contend that CARB staff essentially acknowledge this fact with the new proposal for empirical LUC analysis of high-risk feedstocks that does not apply to US soy and North American canola. Appropriate safeguards are already in place to ensure sustainability of feedstocks, including the LUC value, and requirements under the US EPA's Renewable Fuel Standard and Canada's Clean Fuel Regulation, which include aggregate compliance mechanisms that ensure total crop acreage in North America cannot expand for biofuels. From an aggregate or net land conversion standpoint, simply shifting eligibility among domestic acreage only adds costs without a program benefit or carbon reduction benefit, they argue. Growing soy demand in the US has been met through increased yields, not acreage expansion.

Some commenters also argued that the federal Inflation Reduction Act's (IRA) 40B tax credit guidance already mandates climate-smart agriculture standards for crop-based feedstocks to qualify for federal tax incentives, and that the federal government has recognized the existing CARB LCFS program process as sufficient to meet the value chain sustainability requirements of the U.S. government. The commenters interpret this as an endorsement of the existing CARB approach to ensure the sustainability of fuels used in the LCFS program, and evidence that further requirements are unwarranted. Some commenters also argue that farmers already submit field boundary data to the federal government for eligibility in USDA programs, and that CARB should utilize this existing data rather than create a new costly and burdensome verification system.

Commenters express concern that the sustainability provisions are redundant and will increase costs and add unnecessary complexity. Some commenters argue that this will be exacerbated by the 20% limit on soy, canola, and sunflower oil feedstocks introduced in the first 15-day period. Taken together, the proposed 20% limit and sustainability requirements, in addition to the LUC value, are duplicative and will increase the cost of feedstocks and discourage the use of biomass-based fuels, resulting in less adoption and increased overall GHG emissions, argue some commenters.

(Apr-090.5, 45d-092.1, 45d-092.2, 45d- 164.1, 45d- 171.1, 45d- 173.3, 45d-187.19a, 45d-187.20, 45d-187.22, 45d-191.1, 45d-196.1, 45d-196.245d-203.1, 45d-203.2, 45d-203.4, 45d-205.1, 45d-217.2, 45d-217.3, 45d-241.2, 45d-241.5, 45d-243.1, 45d-243.2, 45d- 243.3, 45d-

243.6, 45d-243.8, 45d-253.2, 45d- 253.3, 45d- 253.4, 45d- 255.7, 45d- 255.8, 45d-265.1, 45d-265.2, 45d-266.2, 45d-269.4, 45d-269.5, 45d- 299.5, 45d-336.2, 45d-336.4, 45d- 340.3, 45d-354.7, 45d-354.8, 45d-354.9, 45d-354.10, 45d-369.2, 45d-369.3, 45d-369.4, 45d-369.8, 45d-893.3, 45d-3022.3, 45d- 5809.3, Apr-033.3, Apr-, Apr-034.1, Apr-035.4, Apr-35.8, Apr-035.9, Apr-036.1, Apr-036.2, Apr-036.3, Apr-036.4, Apr-036.6, Apr-038.2, Apr-038.3, Apr-038.4, Apr-040.2, Apr-041.2, Apr-046.2, Apr-046.3, Apr-046.4, Apr-048.1, Apr-048.2, Apr-048.3, Apr-048.4, Apr-048.6, Apr-049.1, Apr-049.2, Apr-049.3, Apr-049.4, Apr-063.1, Apr-063.4, Apr-063.6, Apr-063.7, Apr-063.8, Apr-063.9, Apr-063.10, Apr-065.2, Apr-066.12, Apr-067.8, Apr-067.9, Apr-078.10, Apr-080.2, Apr-080.3, Apr-085.3, Apr-085.5, Apr-085.6, Apr-085.7, Apr-085.10, Apr-088.5, Apr-088.6, Apr-088.7, Apr-088.8, Apr-088.9, Apr-088.11, Apr-088.12, Apr-088.13, Apr-090.1, Apr-090.2, Apr-090.3, Apr-093.5, Apr-093.6, Apr-093.7, Apr-093.8, Apr-093.9, Apr-093.10, Apr-093.11, Apr-093.13, Apr-093.14, Apr-093.15, Apr-094.7, Apr-094.8, Apr-094.9, Apr-094.27, Apr-095.4, Apr-095.5, Apr-095.6, Apr-096.3, Apr-111.1, Apr-111.3, Apr-111.4, Apr-111.5, Apr-111.6, Apr-111.7, Apr-111.8, Apr-111.9, Apr-111.10, Apr-111.11, Apr-112.4, Apr-112.5, Apr-112.6, Apr-112.7, Apr-112.8, Apr-112.9, Apr-120.2, Apr-120.4, Apr-121.3, Apr-121.4, Apr-124.5, Apr-124.7, Apr-128.8, Apr-138.6, Apr-140.7, Apr-140.8, Apr-140.9, Apr-140.10, Apr-140.11, Apr-140.13, Apr-140.15, Apr-146.1, Apr-146.2, Apr-168.3, Apr-168.4, Apr-168.5, Apr-183.1, 15d1-021.5, 15d1-032.1, 15d1-032.5, 15d1-037.2, 15d1-042.2, 15d1-042.3, 15d1-049.1, 15d1-064.8, 15d1-073.6, 15d1-077.2, 15d1-078.2, 15d1-085.6, 15d1-085.8, 15d1-085.9, 15d1-102.1, 15d1-110.3, 15d1-110.4, 15d1-115.4, 15d1-130.1, 15d1-130.6, 15d1-139.1, 15d1-144.4, 15d1-166.3, 15d1-153.1, 15d1-159.1, 15d1-159.2, 15d1-171.17, 15d1-194.3, 15d1-197.4, 15d1-228.12, 15d1-228.29, 15d1-228.31, 15d2-171.2, 15d2-184.2, 15d2-184.10, 15d2-194.5, 15d2-195.10, 15d2-197.2, 15d2-208.2, 15d2-214.2, 15d2-239.2, 15d2-240.2, 15d2-243.2, 15d2-268.2, 15d2-285.2, 15d2-293.2, 15d2-197.16, 15d2-208.16, 15d2-214.16, 15d2-239.16, 15d2-240.16, 15d2-243.16, 15d2-268.16, 15d2-285.16, 15d2-293.16, 15d2-201.9, 15d2-.7, 15d2-207.8, 15d2-244.1, 15d2-253.1, 15d2-253.4, 15d2-253.10, 15d2-254.4, 15d2-197.10, 15d2-208.10, 15d2-214.10, 15d2-239.10, 15d2-240.10, 15d2-243.10, 15d2-268.10, 15d2-285.10, 15d2-293.10, 15d2-241.13, 15d2-259.3, 15d2-286.4, 15d2-307.5, 15d2-253.1, 15d2-253.3, 15d2-254.1, BHT-28, BHT-063, BHT-190, BHT-232, 15d2-297.1, 15d2-195.9, 15d1-171.13, 15d1-171.2, 15d1-197.5, 15d1-181.12, 15d-171.18)

**Agency Response:** Changes were made in response to these comments. To ensure that low-carbon fuels used in California and rewarded by the LCFS deliver climate benefits, greater assurances are needed around the production practices of 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 and could lead to greater GHG emissions from intensive agricultural practices. The inclusion in LCFS lifecycle analysis of LUC values alone may not be sufficient to diffuse this pressure. Crop-based feedstocks are not tracked to their points of origin in the LCFS program, and so additional safeguards are needed. Given the higher penetration of biofuels in the program compared to other fuel types, and the large amount of fuel volumes and credits generated, additional guardrails are needed now for crop-based fuels that may also be applied to other fuel categories in the future (see Response DD-8).

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 working/agricultural lands and forests. Because palm oil has been demonstrated to have the highest risk of being sourced from deforested areas, the Proposed Amendments remove palm-derived fuels from eligibility for credit generation. Palm-derived fuel transactions have not been reported under the program or received any credits to date (See CEQA RTC Master Response 2).

Staff solicited suggestions for regulatory mechanisms to prevent any potential adverse effects of deforestation due to biofuel production during a February 22, 2023 Public Workshop to Discuss Potential Changes to the Low Carbon Fuel Standard. At the September 2023 Joint EJAC and Board meeting, as well as at the September 2023 informational CARB Board hearing on the LCFS, the Board discussed concerns about impacts of crop-based biofuels and directed staff to consider additional guardrails for crop-based biofuels. Proposed amendments were released for public review on December 19, 2023. Following the initial 45-day public comment period on the proposed amendments, staff organized a public workshop on April 10, 2024, to provide additional public discussion on the proposed sustainability requirements, and to allow further opportunity for feedback. Two subsequent 15-day public comment periods on modifications to the amendment proposal have provided additional public stakeholder feedback and input on the proposed sustainability requirements. With those 15-day modifications, staff provided more specificity on the sustainability certification criteria in section 95488.9(g)(3). Staff also met with numerous stakeholders throughout the rulemaking process to talk through concerns regarding the sustainability requirements.

The proposed sustainability requirements are additional to, not duplicative of, other safeguards for fuels in the California market, including CARB's LUC values and the provisions in place under the US EPA's Renewable Fuel Standard (RFS) program to limit land conversion. These existing safeguards only address indirect or aggregate/net LUC, respectively. Staff's proposal requires clear documentation that individual fuel production pathways for crop-based fuels generating credits in the LCFS program have not caused direct LUC impacts, a key distinction. While feedstocks produced in the US and Canada may be at lower direct risk for deforestation compared to international feedstocks, there is still a risk of conversion of other carbon-rich ecosystems like native prairie and wetlands that third-party certification can protect against.

Reducing the deforestation and other GHG emission risks from biofuel feedstock production is critical to the integrity of the LCFS program and critical to helping support the expansion of programs in other jurisdictions modeled on or otherwise similar to California's LCFS. Staff estimate that the provisions may cost all regulated entities a cumulative average of \$4.7 million dollars per year, representing approximately 1 percent of estimated average annual LCFS credit revenues. The introduction of sustainability criteria requirements is justified and will not appreciably or unreasonably burden the industry. Similar low carbon fuels programs, such as the EU Renewable Energy Directive, have had sustainability criteria in place for over a decade with success. As some commenters have stated, farmers are already providing field

boundary data under requirements for other fuels and agricultural programs or to third-party data aggregators. Potentially, this data could feasibly and efficiently also be provided to CARB and leveraged with other supply chain traceability data to provide greater assurance around biofuels. Additionally, the current amendment proposal extends the initial implementation deadline to provide fuel producers with reasonable transition phase-in time to ensure smooth compliance with supply chain traceability and third-party certification requirements (see Response DD-3).

Other concerns about the specific costs and challenges of implementation, as well as the specific criteria included under the requirements, are addressed in Response DD-3 below. See Response BB-2 for further justification of sustainability guardrails in addition to and in combination with LUC values, and Response DD-8 for concerns regarding the requirements for crop-based biofuels compared to other fuel sources.

### **DD-3 Multiple Comments: *Concerns or Clarifications regarding Implementation, Timeline, Costs, and Challenges***

**Comment Summary:** Some comments were not in explicit opposition to the concept of sustainability requirements for crop-based feedstocks but expressed concerns about certain details or impacts. These include concerns that the proposed sustainability requirements lack detail and should be better developed and implemented through a more extensive stakeholder engagement process like an expert working group that includes farmers.

Some commenters requested CARB to clarify the specific environmental, social, and economic criteria that certifications are meant to address and to seek further stakeholder feedback on development of these criteria after the rulemaking. Some commenters expressed concern about the inclusion of social criteria that do not directly contribute to GHG reductions. Some commenters also expressed concern about the proposed mandate that biomass-based feedstocks be “cultivated and harvested in accordance with all local, State, and federal rules and permits.” They argue that these rules and permits are not limited to climate-related environmental and sustainability criteria and that CARB does not have authority or resources to investigate violations and enforce requirements applicable in other jurisdictions.

Furthermore, some commenters suggested that there are outstanding questions on quantification and demonstrating how producers can satisfy requirements, such as best environmental management practices in section 95488.9(g)(3). Some commenters recommend that CARB should make explicit reference in this section to climate smart agricultural practices like no-till and cover-cropping. Some commenters argue that CARB has left the definition of what qualifies as best environmental management practices up to the verification bodies, which will lead to less stringent verifiers and a lack of standardization across the program. Moreover, some commenters object that the inclusive language “*including but not limited to*” in this section does not provide a process by which other practices can be identified. Concerns were raised about the onus placed on verification bodies to enforce the sustainability requirements only for crop-based biofuels, thereby imposing an uneven regulatory burden across the industry.

Some commenters expressed concern that the proposed sustainability requirements will increase costs and administrative complexity, and CARB’s economic analysis of the proposal

does not discuss the sustainability requirement's financial burden of implementation. Some commenters expressed concern that CARB did not account for the complexity of commodity supply chains in the development of the sustainability requirements, which may include hundreds of growers that shift from year to year based on economic (e.g., land sales, rentals) and environmental (e.g., drought, reduced yields) factors. Commenters expressed concern that farmers may not be willing to share shapefiles of field boundaries with fuel producers and may not be willing to incur additional costs of collecting chain of custody information that is not associated with additional revenues or a price premium. Commenters also argued that grain elevators would incur increased costs by undertaking additional recordkeeping to ensure that their suppliers are in compliance with sustainability requirements, and may not choose to sell grains at a lower profit with a higher administrative burden. Some commenters expressed concern that the increased costs associated with maintaining third-party certification could limit the availability of low-risk, sustainable domestic feedstocks at the expense of higher-risk imported feedstocks, which could increase costs of low carbon fuels and stifle investment in new low carbon feedstocks and technologies. Some commenters requested staff to provide more detail on how these provisions will be efficiently implemented, and which certification bodies will be permitted.

Some commenters argue that CARB should establish comprehensive rules that allow multiple certification programs without being too restrictive, promote competition, and expand options for qualified material. Some commenters requested that certification be focused on meeting the requirements of the LCFS without interfering with other sectors of the local economy and respecting national sovereignty. Some commenters requested that CARB allow fuel producers to select the certification that best fits their feedstock, agricultural practices, and operation, and that interchangeability should be permitted with existing certification bodies that are equally or more rigorous, such as the International Sustainability and Carbon Certification (ISCC) and the Roundtable on Sustainable Biomaterials (RSB). Some commenters also argued that CARB should 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. Some commenters also requested that certification scheme approval include a public review process and ask for clarity if there will be CARB-based certification systems (e.g., ISCC-CARB) or whether CARB will accept existing certification systems. Another commenter suggested that CARB directly recognize certification schemes to create cohesion between the certification bodies, economic operators and certification schemes.

Some commenters contend that most certification bodies were designed for the EU and do not readily apply to US feedstocks. They argue that the low level of US certifiers could lead to an implementation bottleneck as fuel producers seek certification under the new regulation. This, along with the supply chain complexity commented above, make the proposed implementation timeline impractical, some commenters argue. Even with the extended implementation timeline introduced in the first 15-day version, there was concern that existing pathway holders will have less than a year to identify and create documentation for the physical locations of farms where biomass-based feedstocks are grown. They argue that implementation time will already be constrained due to activities like purchasing seed and inputs and making planting decisions that precede the 2025 crop season and the availability of finished feedstocks supplied to biofuel producers in 2026. These commenters argue that CARB should allow more time for adoption to provide time for communication, outreach and engagement with stakeholders of

complex feedstock supply chains, and for CARB to review feedback and clarify ambiguous requirements. Some commenters also request that CARB simplify chain of custody requirements by allowing a mass balance approach to traceability.

Some commenters raised concerns about the first phase of sustainability requirements outlined in section 95488.9(g)(5), specifically, the collection and submission of geographic data on field boundaries and the attestation that biomass was sourced from land that was cleared or cultivated prior to January 1, 2008. Commenters raised questions and concerns about the burden and usefulness of collecting farm boundary information, the challenge of collecting this information from all upstream feedstock suppliers in complex supply chains, and the practical limitations of defining plot boundaries for feedstocks from forests. Some commenters suggested that CARB allow for existing field data from the USDA's Cropland Data Layer (CropScape) to be used for these purposes, rather than submitting new geographic information. Regarding attestations in section 95488.9(g), some commenters requested more details on the required frequency of attestation submission(s) by fuel producers. Some commenters argued that the attestation language was overly broad and exposed the fuel supplier to excessive liability that is best placed with the biomass feedstock provider.

Some commenters expressed concern about the addition of process energy biomass under sustainability requirements. They requested greater clarity on how this requirement would be tracked and certified, and raised concern that it would lead to further complications during pathway review that could restrict the supply of renewable fuels into California.

Some comments suggest that CARB staff should take a more targeted, risk-based approach to sustainability guardrails by exempting specific low deforestation risk feedstocks or production regions or relying on existing definitions under similar programs. To reduce the burden on fuel producers, the sustainability provisions should be aligned with requirements under existing schemes and include the option of aggregate compliance. Examples of programs that the sustainability requirements should be aligned with, or accepted in lieu of sustainability requirements, include the US EPA's Renewable Fuel Standard, federal conservation compliance (e.g., USDA's Farm Service Agency-FSA, Risk Management Agency-RMA, Natural Resources Conservation Service-NRCS, Conservation Stewardship Program-CSP), Canada's Land Use and Biodiversity protocol under the Canadian Clean Fuel Regulation (CFR), Brazil's Renovabio program, the Climate Action Reserve's Soil Enhancement Protocol (CAR SEP), and the Soy Sustainability Assurance Protocol (SSAP). Some commenters requested clarification on how land designated under the USDA's Conservation Reserve Program (CRP) will be treated under the sustainability requirements, specifically, whether it can be converted as permitted under the RFS. Some commenters argued that if CARB insists on agricultural traceability, then it should reward sustainable practices beyond what is already assumed in the life cycle analysis, or drop LUC values from CI scoring to avoid double penalizing feedstock growers.

Some commenters requested more clarification on implementation, such as the definition and application of new terminology introduced (e.g., "New Pathway Applications").

(45d- 074.1, 45d- 074.2, 45d- 074.3, 45d-164.3, 45d-173.3, 45d-176.7, 45d-187.21, 45d-187.23, 45d-187.25, 45d- 210.3, 45d- 217.4, 45d- 220.1, 45d- 234.1, 45d-241.8, 45d-243.7, 45d- 255.6, 45d-266.5, 45d-266.7, 45d-299.5, 45d- 336.3, 45d-336.4, 45d-346.8, 45d- 354.11,

45d-357.3, 45d- 367.1, 45d- 367.2, 45d-369.5, 45d-369.6, 45d-383.17, Apr-002.2, Apr-002.3, Apr-034.2, Apr-034.3, Apr-034.4, Apr-035.7, Apr-044.2, Apr-045.2, Apr-060.3, Apr-060.4, Apr-060.5, Apr-060.6, Apr-060.7, Apr-060.8, Apr-063.2, Apr-063.4, Apr-063.5, Apr-066.11, Apr-067.2, Apr-067.3, Apr-067.4, Apr-067.5, Apr-067.6, Apr-067.7, Apr-067.10, Apr-067.11, Apr-067.12, Apr-067.14, Apr-078.10, Apr-078.11, Apr-079.12, Apr-079.14, Apr-079.17, Apr-084.4, Apr-084.5, Apr-085.4, Apr-085.5, Apr-085.10, Apr-088.1, Apr-088.10, Apr-088.13, Apr-088.16, Apr-90.3, Apr-090.4, Apr-093.1, Apr-093.12, Apr-093.18, Apr-094.4, Apr-094.10, Apr-095.2, Apr-095.7, Apr-095.8, Apr-095.9, Apr-095.10, Apr-095.11, Apr-095.13, Apr-095.15, Apr-100.2, Apr-100.3, Apr-105.3, Apr-109.1, Apr-109.3, Apr-111.12, Apr-111.13, Apr-111.15, Apr-111.16, Apr-112.1, Apr-112.10, Apr-112.13, Apr-112.15, Apr-120.3, Apr-121.5, Apr-122.3, Apr-124.8, Apr-124.9, Apr-127.5, Apr-130.1, Apr-140.1, Apr-140.3, Apr-140.12, Apr-140.15, Apr-140.17, Apr-143.3, Apr-146.1, Apr-146.5, Apr-148.2, Apr-148.3, Apr-148.4, Apr-148.5, Apr-168.6, Apr-168.9, Apr-169.multiple, Apr-170.3, Apr-183.1, 15d1-019.1, 15d1-036.4, 15d1-36.5, 15d1-36.5, 15d1-042.4, 15d1-048.2, 15d1-049.1, 15d1-049.2, 15d1-058.1, 15d1-058.2, 15d1-058.4, 15d1-059.7, 15d1-064.7, 15d1-064.8, 15d1-064.9, 15d1-073.5, 15d1-079.6, 15d1-085.7, 15d1-087.1, 15d1-087.6, 15d1-096.5, 15d1-096.6, 15d1-102.2, 15d1-109.2, 15d1-110.4, 15d1-113.7, 15d1-118.6, 15d1-124.3, 15d1-124.4, 15d1-130.3, 15d1-133.2, 15d1-139.1, 15d1-139.3, 15d1-144.3, 15d1-153.1, 15d1-166.4, 15d1-171.15, 15d1-181.2, 15d1-181.9, 15d1-181.11, 15d1-181.13, 15d1-181.14, 15d1-181.15, 15d1-20, 15d1-194.2, 15d1-194.3, 15d1-194.6, 15d1-196.10, 15d1-207.4, 15d1-207.10, 15d1-207.11, 15d1-207.13, 15d1-226.3, 15d1-228.31, 15d1-228.34, 15d1-228.35, 15d1-228.36, 15d1-228.37, 15d1-228.38, 15d1-235.13, 15d1-236.14, 15d1-236.15, 15d1-236.17, 15d2-34.4, 15d2-167.1, 15d2-184.15, 15d2-184.20, 15d2-195.8, 15d2-195.14, 15d2-255.10, 15d2-197.18, 15d2-208.18, 15d2-214.18, 15d2-239.18, 15d2-240.18, 15d2-243.18, 15d2-268.18, 15d2-285.18, 15d2-293.18, 15d2-197.23, 15d2-208.23, 15d2-214.23, 15d2-239.23, 15d2-240.23, 15d2-243.23, 15d2-268.23, 15d2-285.23, 15d2-293.23, 15d2-201.8, 15d2-211.3, 15d2-211.4, 15d2-244.4, 15d2-253.8, 15d2-258.2, 15d2-258.9, 15d2-258.10, 15d2-258.17, 15d2-258.19, 15d2-259.2, 15d2-259.11, 15d2-262.3, 15d2-274.8, 15d2-274.9, 15d2-298.2, BHT-119, 15d2-201.10, 15d2-207.6, 15d2-219.8, 15d2-258.11, 15d2-258.13, 15d2-259.4, 15d2-262.5, 15d2-298.5, 15d2-298.6, 15d2-307.5, BHT-53, BHT-88, BHT-208, BHT-215, BHT-234, 15d2-219.9, 15d2-241.6, BHT-209, 15d2-241.4, 15d2-241.11, 15d2-244.3, 15d2-254.3, 15d2-307.5, BH-002.1, BH-059.2, BHT-80, 15d2-195.12, 15d2-207.7, 15d2-241.5, 15d2-241.12, BHT-28, 15d2-241.11, 15d2-258.10, 15d2-259.5, 15d2-298.4, 15d2-300.9, 15d2-195.13, 15d2-244.3, 15d2-254.2, 15d2-184.16, 15d2-255.11, 15d2-197.17, 15d2-208.17, 15d2-214.17, 15d2-239.17, 15d2-240.17, 15d2-243.17, 15d2-268.17, 15d2-285.17, 15d2-293.17, 15d1-171.13, 15d1-171.2, 15d1-171.16, 15d1-196.9, 15d1-196.11, 15d1-196.14, 15d1-196.12, 15d1-196.13)

**Agency Response:** Changes were made in response to these comments. The modified Proposed Amendments include specific criteria for best environmental management practices that reduce GHG emissions or increase GHG sequestration at subsection 95488.9(g)(3). Although the Executive Officer may approve certification systems that consider environmental, social and economic criteria under 95488.9(g)(8), such consideration is one of many applicable criteria specified among the regulatory bases for CARB approval. During the September 2023 public CARB informational hearing on updates to the LCFS, several Board Members directed CARB staff to develop sustainability guardrails around biomass-based fuels to address a variety of

concerns about land conversions and impacts on ecosystems and communities. The Proposed Amendments are designed to ensure that only adequate, high quality certification systems will meet the requirements for CARB approval. Many of the certification systems available, including on the EU-approved list, have been developed through multi-stakeholder working groups with input from government, industry, farm groups, academia, and NGOs and include social, economic, and environmental criteria in their standards. The Executive Officer approval of certification systems based on specified criteria identified by the Proposed Amendments is not a delegation of CARB authority. Instead, the certification system is designed for compatibility and consistency with the current regulatory structure for implementation of CARB verifier accreditations and other oversight of independent third-party verification requirements. As always, CARB staff will provide compliance support to fuel producers or other participating stakeholders as needed.

Similarly, the requirement that biomass-based feedstocks be “cultivated and harvested in accordance with all local, State, and federal rules and permits,” does not create a new requirement, but is instead reasonably designed to provide greater assurance of the rigor and integrity of sustainability claims behind feedstocks and fuels supplied to California. Compatibility and compliance with other applicable local, state, and federal requirements has been an explicit feature of the LCFS regulation for many years (see subsection 95482(e)). In the current LCFS regulation, credit or deficit generation or transfer in violation of any provision of the LCFS “or in violation of other laws, statutes or regulations” (subsection 95495(b)(1)(E)) is listed among the specific potential bases for a CARB determination supporting administrative corrective action including credit or pathway invalidation or other adjustment.

As many commenters have expressed, the main cost to fuel producers of implementing sustainability requirements will be establishing supply chain traceability. In response to concerns around costs and timeline with respect to the complexity of supply chains, staff have added an implementation timeline to section 95488.9(g) that specifies a period of more than 5 years for fuel producers to become fully compliant with the gradually phased-in sustainability requirements. The first milestone is that beginning with 2026 data year (as compiled in the Annual Fuel Pathway Report submitted to CARB in 2027) fuel producers will be required to provide geographic data on farm boundaries (shapefiles, coordinates) where feedstocks are being sourced. Submission of this spatial data must also be accompanied by an attestation that feedstocks were produced on land that was not cleared or cultivated prior to January 1, 2008. Beginning with the 2028 data year (submitted to CARB in 2029), feedstocks must be certified by a third-party to meet the no-deforestation/land conversion requirement. To facilitate implementation of the sustainability certifications, the Executive Officer will initially approve certification standards that have been recognized by the European Commission for the European Union Renewable Energy Directive (EU RED), as these standards include the no-deforestation/land conversion criteria specified by the Proposed Amendments. Beginning with the 2031 data year (submitted to CARB in 2032), feedstocks must meet the full sustainability requirements for biomass under section 95488.9(g)(1)(2) and (3), and maintain continuous third-party sustainability certification, by an Executive Officer-approved certification system.



This extended timeline of implementation provides fuel producers ample time to obtain certifications and is designed to address concerns regarding potential implementation bottlenecks and costs. Some commenters have described how they are already collecting/maintaining certain types of farm-level data for reporting under USDA and other programs. This information can be leveraged with additional supply chain traceability efforts to meet the attestation and field boundary submission requirements set for 2026. Moreover, to facilitate compliance feasibility, the amendments require third party certification beginning at the first gathering point. CARB may consider mass balance traceability if consistent with regulatory requirements. Staff estimates that annual implementation costs for the full sustainability requirements will be \$4.7 million per year for the industry, an average of roughly \$39,000 per company based on the number of biofuel producers in 2023. CARB staff do not expect the addition of sustainability requirements to reduce or limit the availability of biomass-based feedstocks in the program to a level that would significantly increase the costs of low carbon fuels and stifle investment in new low carbon feedstocks and technologies. On the contrary, by raising the bar for fuel sustainability assurance through enhanced traceability, CARB expects the provisions to support further investment in more sustainable feedstocks and traceability systems that will help ensure the future supply of high-quality fuels for California drivers.

To the extent possible, CARB may align the implementation of sustainability requirements with similar requirements in other jurisdictions (e.g., European Union) to support complementarities across programs. However, many of the programs listed by commenters, such as those relying on aggregate compliance approaches, do not include the guardrails against direct land conversions included in the Proposed Amendments. The production of any biomass-based feedstock used in fuel pathways, including process energy, may carry some form of sustainability risk with respect to land conversions, regardless of production region. Farm-level boundary data is therefore necessary to verify attestations and ensure fuels meet these program goals. These supply chain requirements help ensure collective effort toward the production and procurement of sustainable biomass-based feedstocks. CARB staff maintain that this responsibility should not only rest with biomass suppliers, as some commenters have suggested, but should also extend to fuel producers that source that biomass. CARB staff will continue to work with stakeholders to address implementation questions related to the sustainability certification requirements as they arise.

The sustainability requirements are not duplicative of biomass-based feedstock production that are already subject to LUC values, because these provisions account for different types of risk. Existing LUC values intend to reduce incentives that could lead to direct and indirect GHG emissions associated with the production of biomass-based feedstocks. Sustainability criteria use supply chain traceability to provide evidence that individual fuel production pathways are not causing direct deforestation and GHG impacts from biomass production, by specifying a set of production requirements rather than a CI score change. Together, these provisions help ensure that risks are more comprehensively accounted for by the LCFS program. For staff response to comments related to farm-specific GHG accounting, see Response KK-12. See Response DD-2 for staff's response to requests for a more extensive stakeholder engagement process.

#### **DD-4 Clarification of Terms in Section 95488.9(g)**

**Comment:** 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. (15d1-133.2)

**Agency Response:** No changes were made in response to this comment. The terms “existing certified pathway” and “new fuel pathway application” are applicable to section 95488.9(g) because the terms are used to describe the status of an LCFS fuel pathway, including provisional and temporary pathways, as described in section 95488.9. Existing certified pathways are those pathways that have been previously certified by CARB and are eligible to generate credits.

The subsection 95488.9(g)(5) requirements added by the Proposed Amendments begin in the 2026 data year. Before 2026, the hundreds of existing certified fuel pathways are expected to transition to use the updated CA-GREET4.0 models following the process identified in subsection 95488(c) of the Proposed Amendments. Starting the effective date of the Proposed Amendments, the requirements of subsection 95488.9(g)(5)(B) will apply to new pathway applications, which include provisional and temporary fuel pathway applications. For those new fuel pathway applications, those requirements will only be applicable to the portion of feedstocks included in the application sourced after the effective date of the amendments (e.g., if the regulation is effective March 1, 2025, the amended regulatory requirements would apply only to feedstocks sourced on that date or later). Similarly, the requirements under section 95488.9(g) scheduled to apply beginning in 2028 and 2031 will not apply before the specified regulatory dates. CARB staff plan to provide notice and compliance support as needed to fuel producers following a determination on the effective date of the amendments.

Please see Response DD-3 above for more discussion regarding accommodations to the Proposed Amendments on transition timing for the subsection 95488.9(g) sustainability requirements.

#### **DD-5 Request for Regional Approach to Sustainability Criteria**

**Comment:** To better accommodate the local nuances that may vary across different countries, we encourage the amendments to consider treatment of local legislation preempting new certifications provided that certain sustainability criteria, such as those outlined above are met. Each region has its distinctive local production dynamics and legal nuances, and international certification schemes frequently overlook the complexities of Brazilian law, as well as those of other biofuel-producing countries. The intricacies of local environmental and labor regulations

should be considered if they do not conflict with CARB's stated goals. We encourage a regional approach to standards and certification. The Brazilian biofuels sector is extremely heterogeneous, thus productivity indicators vary greatly when comparing different producing regions of Brazil. Consequently, agricultural management in each region is vastly different, and efficiency in the use of inputs, harvesting, and planting practices differ. (Apr-183.3)

**Agency Response:** No changes were made in response to this comment. Given the diversity of regions where biomass-based feedstocks and fuels supplied to California may be sourced, adjustments to sustainability criteria through a determination of equivalency with local laws and regulations is not feasible. Such comparisons would require significant staff resources given the local nuances described above, and challenges and complexities regarding interpretation of local rules, many of which could be in languages other than those with which current CARB staff have professional capacity. Moreover, unfortunately the existence of requirements on the books does not guarantee compliance.

The Proposed Amendments include a provision in section 95488.9(g)(2) that requires that biomass be cultivated and harvested in accordance with all local, State and federal rules and permits. Additionally, the amendments include a mechanism to conduct empirical LUC assessments for feedstock/fuel/region combinations not listed in Table 6, which will be based on regional LUC data and provide more granularity when regulatory conditions are met (please see Response AA-1 above for more detail). Some certification systems CARB may consider for approval may also take into account local conditions in their design and implementation.

#### **DD-6 *Sustainability Certifications should Include Quantification of NOx Emissions and Soil Carbon Changes***

**Comment:** 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. (15d1-057.1)

**Agency Response:** No changes were made in response to this comment. The Proposed Amendments list specified criteria for "environmental best management practices" in section 95488.9(g)(3) that address soil carbon. ISCC is on the list of certifications recognized by EU-RED, and thus will be approved by the CARB Executive Officer as indicated by section 95488.9(g)(6)(C). The LCFS sustainability criteria are not emission accounting criteria and do not include or require accounting for any emissions. For further response to commenters' request for farm-specific GHG accounting, see Response KK-12.

#### **DD-7 *Multiple Comments: Sustainability Criteria Should Only Apply to Oilseeds***

**Summary:** Oilseeds pose higher risk of deforestation and thus sustainability requirements should only apply to lipid-based fuels.

(45d-241.2, 45d-369.2, 45d-369.3, Apr-063.3, Apr-094.28)

**Agency Response:** No changes were made in response to these comments. All crop-and forestry-based feedstocks and biomass have potential to present a sustainability risk and cause land conversion or degradation. By targeting or singling out specific biomass types, the risk increases for biomass not subject to sustainability requirements, as fuel producers shift to less stringent sources. All biomass-based fuels, with the exception of specified-source feedstocks, are subject to the same sustainability criteria to minimize any incentive to shift to biomass sources with less stringent requirements.

**DD-8 Multiple Comments: *Biofuels are Being Held to an Unfair Standard with Sustainability Requirements and other Penalties (i.e., LUC) that other Fuels are not Subject to***

**Summary:** Several commenters expressed concern that biofuels are being held to an unfair standard. They argue that no similar guardrails—i.e., sustainability requirements, LUC values, or limits on credit generation—exist for other liquid fuel feedstocks like waste oils (e.g., UCO, tallow), petroleum, or renewable electricity that can have sizable land requirements (e.g., solar arrays) and supply chain sustainability concerns (e.g., battery-electric mineral mining). These commenters call for more equitable treatment of direct and indirect effects based on a fuel-neutral approach.

(15d2-184.14, 15d2-197.15, 15d2-208.15, 15d2-214.15, 15d2-239.15, 15d2-240.15, 15d2-243.15, 15d2-268.15, 15d2-285.15, 15d2-293.15, 15d2-244.3, 15d2-258.17, 15d2-286.5, 15d2-194.11, 15d2-244.7, 15d1-087.3, 15d1-197.6)

**Agency Response:** No changes were made in response to these comments. According to the LCFS data dashboard ([LCFS Data Dashboard | California Air Resources Board](#)), renewable diesel, biodiesel, and ethanol account for approximately 88% of total fuel volume reported in the program, and generate over half of LCFS credits. While the amount of RD and biodiesel produced from crop-based fuels is still a minority, their contribution grew rapidly between 2020 and 2022. Prolonged rapid expansion of biofuels in the program carries risks of land conversion impacts and sustainability concerns. Crop and forestry-based feedstocks present a greater sustainability and LUC risk than other liquid fuel feedstocks like waste oils, or sources of renewable electricity. See Response DD-13 for staff's response to comments regarding waste oil sustainability.

**DD-9 Multiple Comments: *The Scope and Mechanism of Sustainability Certification Is Inadequate to Protect Against Deforestation and Other Environmental Risks***

**Comment Summary:** Some commenters are concerned that the proposal does not sufficiently address the scale of the problem created by the rapidly growing use of vegetable oil-based fuels, which poses unacceptable risk to food markets, climate, and other environmental impacts. They express concern that the proposed sustainability requirements, based on third-party certification, may provide safeguards against direct land use change but are unable to account for commodity substitution and indirect land use changes. They argue that sustainability guardrails will not solve the problem of these market-driven LUC and

deforestation emissions. Some commenters argue that 15-day changes to sustainability requirements still do not address fundamental shortcomings that can only be responded to with volumetric limits on fuels. Concern was also raised that sustainability requirements and implementation could be subject to manipulation by the fuels industry.

Some commenters raise concern about staff's assumption that certification will be an effective mechanism when implemented to meet sustainability goals, given the mixed evidence on the effectiveness of certification, including failure to deliver on their own goals in some cases. Furthermore, some commenters argue that the reliance on third-party certification bodies is also problematic, as they are not independent of the companies that they are working for, resulting in conflicts of interest and increased violations. Commenters argue that, taken together, these shortcomings risk GHG emissions being significantly higher than pathway CI scores would indicate.

Some commenters argue that the only way that certification could effectively limit ILUC risk is by ensuring that there was no prior use of feedstock that came from the source in question, which may require extensive documentation that is not routinely collected. Furthermore, certification bodies would have to provide certainty that the feedstock would not otherwise have gone to some productive use that would demand an alternative if they lost access to their status quo feedstocks, which is currently beyond the scope of most certifications. The commenters further argued that using certification to limit feedstocks to biomass sourced from historically cultivated land (i.e., prior to 2008) means it necessarily must be redirected from a previous use to biofuels, which initiates the causal chain that results in indirect land use changes.

Some commenters argue that the impacts of the proposed sustainability certifications have not been modeled by CARB and there is no evidence that it will demonstrably mitigate growth in unsustainable feedstocks. They argue that the higher incentives for waste-based fuels in the program did not prevent the doubling of crop biomass-based diesel since 2021, and suggest that a similar policy preference for only certified sustainable biomass feedstocks will not prevent further expansion either. They argue that comments from US biofuel producers and agricultural companies suggest that standard industry practices already meet or exceed the environmental criteria under the proposed sustainability requirements.

(45d-213.13, 45d-213.15, 45d-226.3, 45d-276.4, 45d-276.6, 45d-281.2, 45d-340.4, 45d-340.5, 45d-383.13, 45d-383.14, 45d-391.1, 45d-391.3, 45d-391.56, Apr-073.1, Apr-086.9, Apr-108.1, Apr-117.2, Apr-117.5, Apr-136.5, Apr-136.18, Apr-163.9, Apr-163.11, Apr-163.12, Apr-163.13, Apr-163.15, Apr-163.16, Apr-182.7, Apr-182.17, 15d1-217.3, 15d1-217.4, 15d1-217.5, 15d1-222.19, 15d1-251.10, 15d2-287.9, BHT-102, BHT-130, 15d2-281.8)

**Agency Response:** Changes were made in response to these comments. Staff acknowledge that sustainability certification primarily addresses direct land use conversions, and do not intend certification to be a replacement for LUC values. For this reason, existing LUC values for crop-based feedstocks are still in effect. Staff have also added an empirical LUC mechanism to the Proposed Amendments creating a regulatory path to assign more conservative LUC values in higher-risk regions (see Response AA-1) when appropriate. Additionally, staff have introduced other guardrails to help address risk of continued growth in crop-based fuels, which, taken together with

the sustainability requirements and empirical LUC approach, expand protections/safeguards for crop-based fuels (see also CEQA RTC Master Response 2).

The CARB Executive Officer may suspend or revoke sustainability certification systems that fail to meet the requirements of the regulation. On potential conflicts of interests for certification systems: staff will evaluate risk of conflict of interest between certification bodies and companies, just as it currently does for the verification bodies that validate fuel pathways.

**DD-10 Multiple Comments: *CARB Should Use Program Data to Track the Market Impact of Diverting Bio-Based Feedstocks to Biofuel Production and the Impact of Sustainability Requirements***

**Comment:** “For the purpose of recordkeeping and auditing (§ 95491.1.), all Fuel Pathway Holders and Applicants are required to retain records on “the quantity of feedstocks purchased to produce the fuel” sold in California “under the certified pathway.” As this data is already tracked and reported in quarterly detail, CARB should be able to track and enforce this new provision within existing protocols. CARB should also assess and report annually the market impacts on crop prices, acreage, and exports that result from diverting bio-based feedstocks to biofuel production and imports obligated under the proposed Sustainability Requirements.” (Apr-117.15)

**Comment:** CARB should assess on an annual basis the direct and indirect market impacts from fuels obligated under the proposed sustainability requirements. (45d-206.7)

**Agency Response:** No changes were made in response to these comments. As the commenters note, CARB makes detailed program data publicly available, enabling academics or other interested stakeholders to transparently assess benefits and impacts of the program, supplemental to the analyses performed and communicated by staff to the Board and the public. Board Resolution 24-14 directs the Executive Officer to make publicly available a variety of information to support public transparency on the performance of the LCFS program, including carbon intensity reduction progress and future targets, historical alternative fuel volumes and credit generation, and feedstock details for biomass-based diesel (See Board [Resolution 24-14](#)). As a result of the sustainability criteria CARB will have access to data on crop-feedstock sourcing locations. This data may be useful in evaluating appropriate potential future adjustments to LUC values, and other benefits and impacts of the program.

**DD-11 Multiple Comments: *Sustainability Guardrails Should Provide Protections to Other Ecosystems Beyond Forests***

**Comment:** The prohibition on converting forested land into agricultural production should extend to also protect wetlands and grasslands. (45d-327.15)

**Comment:** Biodiverse land areas as well as peat and wetlands should be protected as those areas are crucial for preserving biodiversity. They should be “fully” protected if not used for agricultural production in the last years, or at least restrictions on their use should be defined to preserve them. (45d-374.3)

**Agency Response:** Changes were made in response to these comments. In section 95488.9(g), the Proposed Amendments have expanded the scope of deforestation guardrails to include protection of all ecosystems by specifying that biomass cannot be sourced from land converted after January 1, 2008.

**DD-12 Multiple Comments: *Biofuels Cause Other (non-GHG) Environmental Impacts***

**Comment:** Identify and measure negative environmental effects of LCFS credits for crop-based biofuels. Consider the negative environmental effects not taken into account by models used to estimate a fuel pathway's CI when deciding whether a pathway should receive LCFS credits. Many negative environmental impacts of crop-based alternative fuels are not considered when carbon intensity scores are calculated by CARB. These effects should be identified, monitored, and measured. This exercise could help to clarify which pathways need to be removed from the LCFS. Corn and soybeans grown to produce biofuels are major contributors to the worsening biodiversity crisis in rural areas in the US. Corn and soybeans grown to produce biofuels are major contributors to the pollution of ground and surface water in the US. Corn and soy have traditionally been the greatest users of pesticides per acre (including insecticides and fungicides as well as herbicides). Corn and soybeans grown to produce biofuels are major contributors to the unsustainable withdrawal of water from US aquifers. (45d-389.9)

**Comment:** CARB should not include woody biomass, including forest and agricultural residues, as feedstocks in the LCFS program due to the harms to the climate, public health, and forest ecosystems. (45d-210.19)

**Comment:** We believe the program is currently exacerbating California's greenhouse gas emissions footprint by misallocating credits, giving half to crop-based biofuels. Evidence shows that these fuels produce at least as many carbon emissions as the fossil fuels they replace. In addition, the LCFS program fails to take into account crop-based biofuels' many harmful effects on food prices, biodiversity, water quality and availability, soil quality, and air quality. These large negative externalities alone justify excluding crop-based fuels from the LCFS program. (Apr-182.1)

**Comment:** Corn and soybeans' heavy use of synthetic fertilizers, toxic pesticides, and herbicides is greatly increasing ground and surface water pollution. In addition, the unsustainable withdrawal of water from US aquifers is increased by growing crops for biofuels. Recent growth in US renewable diesel (RD) consumption, primarily for California's market, has reached unsustainable levels. The rapid growth in renewable diesel consumption in California from 2021-2023 resulted in global vegetable oil prices almost doubling from 2020-2022. This was especially devastating for people in developing countries who spend half their income on food. The 4/10/24 CARB workshop presentation of a chart showing global vegetable oil prices dropping in 2023 is not encouraging when one considers that the price drop resulted from the global production of soybean, rapeseed, sunflower seed, palm kernel and palm oils increasing almost 9% over the three year period. Global Forest Watch satellite data show tropical primary forest loss increased 10% from 2021-2022.<sup>33</sup> Also, the same United Nations Food and Agriculture Organization (FAO) food price Index shows global food prices increased annually by 3.8% from 2000 to 2023, but cooking oil prices increased annually by 4.8%, more than any other category. The US CPI Index for Food increased by 21% during the 3 year period 2021-

2023, but the US CPI Index for Fats and Oils Consumed at Home increased 35%. (Apr-182.15)

**Agency Response:** Changes were made in response to this comment. In addition to proposed requirements to prevent land conversion, sustainability criteria were added to the proposal in section 95488.9(g)(3), which, depending on the certification system, may also include certification of protections for biodiversity, soil health, and water conservation. See also CEQA RTC Master Responses 2 and 4.

#### **DD-13 Multiple Comments: *Concerns About Waste-Lipid Feedstock Sustainability***

**Comment:** 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. (15d1-181.15)

**Comment:** CARB should extend the sustainability requirements beyond crop oils to used cooking oil and waste oils. (45d-206.8)

**Comment:** NOPA notes that imports of Used Cooking Oil (UCO) and other low carbon feedstocks have significantly increased since 2022 for LCFS compliance. While we recognize and support the need for low carbon and waste-based feedstocks, NOPA encourages CARB to undergo additional scrutiny and monitoring of imported feedstocks. Such actions will ensure continued program confidence and compliance. (45d-266.8)

**Comment:** The scope of sustainability certification excludes used cooking oil and other waste lipid feedstocks. These feedstocks present very high risk of mislabeling or other fraudulent activities due to the higher value of the biofuels produced from them. While such feedstocks do have chain-of-custody requirements per §95488.8 (g) these are limited to chain-of-custody and record retention requirements meant to aid in audits of feedstock flow. Integrating these particularly risky feedstocks into certification requirements provides additional structure and empowers third-party certification bodies to more effectively identify and respond to examples of mislabeling, feedstock adulteration, or other fraud. (45d-391.57).

**Comment:** In addition, the ISOR's proposed certification system would create a powerful incentive to pass off conventional biofuels as waste- and residue-based fuels. Skyrocketing



global imports of used cooking oil (including recent pathways approved by the LCFS for California to import Used Cooking Oil from Southeast Asia and Oceania) have been beleaguered by widespread incidence of fraud. Several EU member states have launched national and criminal investigations into fraudulently labeled used cooking oil in their biofuel markets. Germany and Ireland launched such investigations in 2023, and the Netherlands' ongoing criminal investigation has identified that a third of the biodiesel reported as used cooking oil could be virgin oils.<sup>29</sup> Ironically, CARB has only proposed to add certification criteria to virgin crop oils and not to used cooking oil or other waste fuels, the one segment where certification could be a helpful transparency tool. (45d-383.18)

**Comment:** ASA was encouraged to see CARB propose a prohibition on palm-derived feedstocks. For clarification, ASA is interested in whether this prohibition is strictly for virgin palm oil, or all palm-derived feedstocks, including palm-based used cooking oil (UCO).<sup>3</sup> Looking more broadly at UCO, U.S. imports have become substantial and continually sets new records. While ASA sees UCO as an important component of the biomass-based diesel feedstock portfolio, concerns throughout our value chain have been rising about the integrity of UCO imports. These increased imports are coming from palm-producing parts of the world. ASA encourages CARB to look at the exporting countries' ability to generate the UCO being exported from them. Furthermore, if collection rates in foreign countries are utilizing nearly all available used cooking oil for purposes of exports, CARB should consider whether UCO from these sources is incentivizing cooking oil consumption and thereby palm oil production. Additionally, we encourage CARB to verify the integrity of UCO used in the LCFS program and will be engaging at a federal level to explore this issue in more detail. (45d-269.6)

**Comment:** CARB should cap the volumes of used cooking oil (UCO) and tallow eligible for LCFS credits, starting in 2025 when caps on crop-based fuels are introduced. The low CI scores of UCO encourage fraud, such as the mislabeling of either pure vegetable oil or UCO-vegetable oil mixtures as UCO. Capping crop-based diesel volumes without capping UCO volumes increases the likelihood of this happening. UCO, often referred to as yellow grease, and category 3 tallow, the largest and cleanest category of tallow, are used for animal feed, pet food, cooking oil, cosmetics, soaps and lubricants. Category 2 tallow is clean enough to be used for some of these purposes. Because global tallow and UCO supplies are not easily increased, when they are used for biofuels the demand for vegetable oils, especially palm oil which is often the cheapest substitute, increases. The UCO content share in the renewable diesel consumed in California has grown rapidly over the last few years, raising questions about its authenticity. A certification requirement, similar to the one used in the EU, regarding the origin of the tallow and UCO might be helpful.<sup>40</sup> However, substantial fraud in UCO imports to the EU despite such a certification scheme suggests that this alone will not solve the fraud problem.<sup>41</sup> Caps are needed to curb fraud. The EU has capped the amount of UCO and tallow that can count toward its transportation mandates in 2030 at about 12%.<sup>42</sup> Both Germany and France have already introduced similar caps. LCFS caps should probably be at least this stringent since importing UCO and category 3 tallow should not be encouraged. They are already sought after to meet local needs. There has been some concern about the recent decline in LCFS credit prices. Since the oil refiners who must buy credits to balance their deficits are now receiving substantial credits for the renewable diesel they are producing overall credit demand is decreasing. Without guardrails in place any decrease in the carbon intensity benchmark will just further depress credit prices by encouraging even greater

renewable diesel production. Declining caps on crop-based renewable diesel and fixed caps on UCO and tallow should help to increase credit prices. (45d-389.5, 45d-389.6)

**Comment:** Consider eliminating tallow pathways from the LCFS Tallow provides another example of the danger of giving very different CI scores to different commodities that resemble each other. Under EU transportation regulations (RED III) Category 3 tallow receives a carbon intensity score similar to that of seed oils. Category 1 and 2 tallow, on the other hand, because they carry some health risk are eligible for double credits, essentially halving their CI scores. But any increase in the demand for category 1 and 2 tallow may result in the downgrading of category 3 tallow. If a small amount of category 1 comes in contact with category 3 the entire batch of category 3 tallow must be downgraded to category 1. Germany has excluded tallow-based diesel from meeting its transportation mandates even though EU regulations allow it. Germany decided that “using these materials for biofuels displaces them from uses in industry and leads to indirect GHG emissions”. So categories 1 and 2 tallow continue to be burned for energy at rendering plants and category 3 tallow continues to be used for other needs. (45d-389.7)

**Comment:** Further to the point of protecting North American feedstocks, the rise of international used cooking oil (UCO) feedstock imported into the U.S. market has skyrocketed in recent years, after the establishment of more incentives for their use in producing lower-carbon fuel. Much of this UCO also is leveraged for LCFS compliance in the California market, and on a level playing field, this is appropriate. Still, this influx of UCO from overseas raises questions about its sourcing and, at a minimum, calls for greater scrutiny to ensure integrity of the LCFS program and the fuels consumed in the state. (45d-203.3)

**Comment:** Feedstocks that are either high risk or come from high-risk regions should be required to comply with “additional detailed traceability, verification, and/or enforcement of waste feedstocks to avoid fraud” as noted in the April 10 workshop. Doing so would create a level-playing field with U.S. feedstocks, particularly when sustainability requirements are added, and protect the integrity of the LCFS and the RFS. As we noted in our February letter, the rise of international used cooking oil (UCO) feedstocks imported into the U.S. market has skyrocketed from 300 million pounds in 2021 to 3 billion pounds in 2023 after the establishment of more incentives for their use in producing lower-carbon fuel. Much of this UCO is leveraged for LCFS compliance in the California market, which could be appropriate if imported UCO feedstock was competing with alternatives on a level playing field. However, the significant influx of UCO from overseas raises questions about its sourcing and, at a minimum, calls for greater scrutiny to ensure integrity of the LCFS program and the fuels consumed in the state. Thus, we recommend that the principles reflected in the proposed sustainability criteria also be established for all higher risk waste-based feedstocks such as imported UCO. (Apr-067.13)

**Comment:** Further to the point of protecting North American feedstocks, the rise of international used cooking oil (UCO) feedstock imported into the U.S. market has skyrocketed in recent years, after the establishment of more incentives for their use in producing lower-carbon fuel. Much of this UCO also is leveraged for LCFS compliance in the California market, and on a level playing field, this is appropriate. Still, this influx of UCO from overseas raises

questions about its sourcing and, at a minimum, calls for greater scrutiny to ensure integrity of the LCFS program and the fuels consumed in the state. (45d-203.3)

**Comment:** However, the efforts should be practical, and “prioritizing” waste oils over crop-based oils is riddled with its own set of well-publicized challenges concerning traceability and verification. (Apr-079.10)

**Comment:** The Ohio Soybean Association also appreciates CARB’s additional attention on waste feedstock integrity. Imports of these feedstocks, especially used cooking oil, have exploded in the past couple of years due to incentives in California’s LCFS. During much of this period, used cooking oil (UCO) was worth more than virgin palm oil. The increase in U.S. imports of UCO occurred after the EU started investigating fraud allegations as much of the trade was rerouted to the North American market. Ohio Soybean Association encourages CARB to verify the integrity of imported UCO used in the LCFS. (Apr-085.2)

**Comment:** If California’s bio-based diesel consumption remains at current levels, the differentiated support for fuels made from secondary fats and oils provides a clear incentive to secure feedstocks that enjoy preferential treatment. This is clearly happening now with the remarkably fast increase in imports of used cooking oil, especially from Asia. The scaleup has been so dramatic as to raise considerable skepticism about whether the feedstock is legitimate, and CARB should certainly move forward with detailed traceability, verification and/or enforcement of waste feedstocks to avoid fraud.

Market analysts across the spectrum agree that supplies of secondary fats and oils are effectively tapped out, and substantial increases in production will inevitably draw from soybean and other first use vegetable oils. This is partly why the large increases in imports of UCO create suspicions of fraud.

In the absence of a volume-based cap, the renewable diesel boom is likely to continue. Saturating the California diesel market would imply 4.5 billion gallons of bio-based diesel with feedstock requirements for reaching 12 million metric tons by 2028, a 50% increase over current usage. It is exceedingly unlikely that there is an adequate supply of legitimate secondary fats and oils to meet this level of supply, so it is almost inevitable that this supply will be met with soybean oil (or fraudulent UCO). (Apr-086.16)

**Comment:** KSA also appreciates CARB’s additional attention on waste feedstock integrity. Imports of these feedstocks, especially used cooking oil, have exploded in the past couple of years due to incentives in California’s LCFS. During much of this period, used cooking oil (UCO) was worth more than virgin palm oil. The increase in U.S. imports of UCO occurred after the EU started investigating fraud allegations as much of the trade was rerouted to the North American market. KSA encourages CARB to verify the integrity of imported UCO used in the LCFS to protect the integrity of the program for all participants. (Apr-088.4, Apr-093.4, Apr-112.3, Apr-140.6)

**Comment:** This could include, as CARB noted at the April workshop, “additional detailed traceability, verification and/or enforcement of waste feedstocks to avoid fraud.” NOPA noted in its prior comments that imports of Used Cooking Oil (UCO) have significantly increased since 2022 for LCFS compliance. NOPA appreciates CARB’s recognition of these changing trade flows and continues to support CARB’s proposed enhancement of traceability and

enforcement of UCO imports to ensure the program is not being undermined by bad actors seeking to capitalize in the name of green energy. Such actions will ensure continued confidence and integrity in the LCFS program. (Apr-095.12)

**Comment:** CATF supports CARB's consideration that was included in its April 10th workshop slides of extending the sustainability criteria to used cooking and waste bio-oils, given potential substitution impacts (particularly food oil markets) when these waste oils are diverted to fuel markets, and urges their adoption in the final rulemaking package. (Apr-117.7)

**Comment:** We support CARB's consideration of extending the sustainability tracking requirement to UCO and waste oils. While these feedstocks are preferable to and have lower carbon intensities than crop oils, there are existing markets for these oils that will otherwise turn to crop-based oils when UCO and waste oils are used to produce biofuels for use in California, which also results in land-use change impacts. Furthermore, instances of fraud of crop oils, such as palm oil, being passed off as waste oil have been reported and investigated.<sup>1415</sup> Given the number of pathways that CARB has approved for imported waste oils, CARB should require 3rd party certification for these feedstocks. (Apr-117.16)

**Comment:** Staff mentioned in their presentation the desire to evaluate new, regionally specific land use change scores for feedstocks grown in regions that were not previously considered. Iowa Soybean understood that to mean South American oilseeds. We view this as a positive development as South America is likely to continue to expand acreage as part of a large geopolitically driven shift in global soybean sourcing. While we are encouraged to see CARB considering more regionally specific iLUCs, failure to reevaluate North America at the same time would be a lost opportunity and could disadvantage a less risky and more sustainable supply of feedstock oil were not a waste, but a highly valuable co-product. As such CARB expanded the system boundary of this feedstock. Given the increased and sustained value of feedstocks like used cooking oil and animal fats we encourage CARB to consider an expansion of the system boundary of these feedstocks, just as staff is considering for manure-based renewable natural gas. (Apr-146.3)

**Comment:** Iowa Soybean Association and the farmers we represent are highly concerned with recent large increases in the importation of so-called 'used cooking oil' of Asian origin. Following the very high-profile fraud in Europe surrounding cooking oil of the same origin, we strongly encourage CARB to continue on their path of increasing audit stringency and oversight for feedstocks at high-risk of adulterity or misclassifications. The value of maintaining market integrity cannot be understated.

Finally, we encourage CARB to take a fresh look at their LCA methodology for these so-called 'waste' based feedstocks. While these oils may have at one time been a waste under the ISO 14001 definition, it is hard to argue they remain a waste given their elevated value. CARB recognized in previous rulemakings that feedstocks like corn oil were not a waste, but a highly valuable co-product. As such CARB expanded the system boundary of this feedstock. Given the increased and sustained value of feedstocks like used cooking oil and animal fats we encourage CARB to consider an expansion of the system boundary of these feedstocks, just as staff is considering for manure-based renewable natural gas. (Apr-146.4)

**Comment:** Staff discussed the important role that waste-based feedstocks (mainly used cooking oil, or UCO) have played (and will continue to play) in growing the renewable diesel consumption numbers across the state. However, other than a mention of classifying waste-based feedstocks as specified source material and that those feedstocks must provide chain-of-custody documentation, there was no significant discussion of improving enforcement of audit and verification standards in this area. As demand for biofuel has grown in California so has the demand of waste-based material UCO from Asia. However, a cursory look at volumes shipped over the last 3 years shows a rapid increase in material shipped to the US with insufficient control or oversight, raising the real prospects of material like virgin palm making its way into the UCO supply destined for the US. Simply banning palm as ARB staff have proposed in the proposed amendments [§ 95482 (f), page 34 of Appendix A-1] is not enough. The same rigor in audit and verification applied to crop-based feedstocks must be applied to the audit and verification process for UCO. Given the majority of UCO is aggregated after collection at restaurants by a variety of companies in the supply chain, audits of attestations alone are completely inadequate; verification of all entities and transaction across the supply chain must extend upstream to the point of original collection in order to instill market confidence that underpins the LCFS program. Auditors must be required to implement random spot audits of collection facilities domestic and abroad. All biofuel feedstocks and end products should be subject to the same stringent requirements if the market itself is to deliver its intended outcomes. (Apr-170.1)

**Comment:** ARB's same ISOR states that "waste-and-residue-based feedstocks ... are not associated with land use change impacts," but recent research disputes this.<sup>15</sup> Used cooking oil, tallow and distiller's corn oil, the major residues used to produce biomass-based diesel in the US, have been collected in the US for use in other industries long before they were used in the biofuels industry. Domestically produced UCO and distiller's corn oil are still used for animal feed, and some tallow is still being used in the oleochemical industry. Since the supply of these residues tends to be fixed, newly produced vegetable oils are substituted for them when they are instead used in the biofuel industry. As a result, residues have ILUC effects unless they were discarded waste before being used to produce biofuels. (Apr-182.11)

**Comment:** A recent International Council on Clean Transportation (ICCT) study estimated these ILUC values and noted that soybean oil is probably the most frequently used substitute in the US. The study's estimate of the CI of soybean oil is based on the EPA's carbon intensity value, which is similar to ARB's GTAP value, and so underestimates ILUC. (Apr-182.12)

**Comment:** The study's assumption that 50% of additional UCO feedstocks will come from previously uncollected sources also seems optimistic. If instead one assumed that only existing sources of UCO were used as feedstocks and if GLOBIOM CI values for soybean oil feedstock were used instead of EPA/CARB values, then UCO's CI would likely be similar to fossil diesel's. For these sustainability reasons and concerns over food price increases, several organizations have recommended that ARB cap credits for these residues.<sup>18</sup> The EU capped UCO and tallow credits for road transport at 2020 levels, but has not yet capped them for aviation and maritime use. The European Federation for Transport and Environment (T&E), the large coalition of non-governmental groups researching sustainability in transportation, is recommending that the EU cap UCO and tallow use in the aviation and maritime industries at the same percentage level as road transport.<sup>19</sup> UCO imports have dramatically increased in

both the US and EU, reaching unsustainable levels.<sup>20</sup> Many of the imports from Asia appear to be fraudulent. The EU is currently investigating allegations that Chinese UCO imports are largely mislabeled palm oil. As a result, EU imports of Chinese UCO decreased by about 600 million tons in 2023.<sup>21</sup> US imports of UCO from China, on the other hand, increased by over 700 million tons in 2023, because “the U.S. is not looking at those imports with much scrutiny at this point.”<sup>22</sup> Clearly, ARB needs to put in place a system for tracing the origin of UCO imports including verifying the accuracy of the paper trail. We want to know why CARB has not proposed a cap on LCFS credits for residue-based biofuels? Why has CARB not proposed requiring a certificate of origin for UCO pathways? (Apr-182.13)

**Comment:** CARB’s proposed certification of origin requirement is more appropriate for used cooking oil than for crop-based fuels. Incentives for road transport should concentrate on electrification, reserving limited UCO and tallow supplies for aviation. (Apr-182.17)

**Comment:** Cap LCFS credits for residues: used cooking oil (UCO)-, tallow- and distiller’s corn oil-based diesel at 2021 levels immediately. Introduce a system to certify the origin of UCO feedstocks. Because lipid inputs for biomass-based diesel, such as pure vegetable oils and residue oils and fats, are interchangeable for many uses, they all need to be capped to prevent food price increases and the conversion of natural land to agriculture. ARB’s carbon intensity (CI) scores for UCO, tallow and distiller’s corn oil are underestimated because they do not include indirect land use change (ILUC) effects. UCO from commercial sources (restaurants and food processing companies) in both the US and EU is already being collected. Much household UCO is not collected, but to date efforts to increase collection in the EU and US have resulted in little success. In other countries UCO is often reused as cooking oil, making it difficult to determine if its collection for biofuel production is displacing some other use or not.<sup>45</sup> Sources of tallow are determined primarily by the production of meat so supplies are not affected by higher tallow prices. It appears that oleochemical producers in the US have been substituting palm-based fatty acids for tallow as tallow prices have risen, encouraging greater production of palm oil, which is the most unsustainable vegetable oil being produced today. (Apr-182.26)

**Comment:** 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.<sup>9</sup> 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.<sup>10</sup> When South American tallow is shipped to the 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. (15d1-026.3)

**Comment:** 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. (15d1-028.5)

**Comment:** South Dakota farmers 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. (15d1-032.2)

**Comment:** 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. (15d1-053.4, 15d1-082.4)

**Comment:** 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. (15d1-070.3)

**Comment:** 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.

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. (15d1-073.3, 15d1-073.7)

**Comment:** Further, CARB fails to consider the potential indirect emission impacts of their expanding preference for waste fuels. (15d1-138.3)

**Comment:** 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. (15d1-168.1)

**Comment:** 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.<sup>6</sup> 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.<sup>7</sup>

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.<sup>8</sup> In 2020, the Dutch company Sunoil forged sustainability certification scheme (SCS) certificates that credited crop-based biofuels as waste-based biofuels.<sup>9</sup> 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.<sup>10</sup> 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.<sup>11</sup> 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.<sup>12</sup> 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.<sup>13</sup> (15d-172.5)

**Comment:** 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. (15d1-181.10)

**Comment:** 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. (15d1-187.5)

**Comment:** 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. (15d1-190.8)

**Comment:** *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)*

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). (15d1-190.12)

**Comment:** 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.

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. (15d1-196.4)

**Comment:** 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.

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. (15d1-197.4)

**Comment:** 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”<sup>9</sup> 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. (15d1-217.8, 15d1-217.9, 15d1-217.10)

**Comment:** Implement third-party sustainability requirements for waste and residue biomass. (15d1-219.6)

**Comment:** Though waste oils do not present the same LUC risk, traceability and fraud risk remain a significant concern. 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.<sup>23</sup> 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. (15d1-219.21, 15d1-219.22)

**Comment:** 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.<sup>25</sup> In 2020, the Dutch company

Sunoco forged sustainability certification scheme (SCS) certificates that credited crop-based biofuels as waste-based biofuels.<sup>26</sup> 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.<sup>27</sup> 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.<sup>28</sup> 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.<sup>29</sup> 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. (15d1-219.23, 15d1-172.5)

**Comment:** 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. (15d1-244.9)

**Comment:** While diversion of vegetable oil from food to fuel is the most pressing concern today, the rapidly increasing diversion of tallow and used cooking oil from existing markets around the world to California is also a concern. These resources are not wastes and will be backfilled in other markets with vegetable oil or other resources. Brazil and China are currently exporting a lot of these feedstocks to supply California but will need these resources over time to supply their own markets with low carbon fuels. California's climate policies are most impactful when they are transferable, which is not the case with the current rapid scaleup of tallow and used cooking oil imports to make fuels in California. (15d2-168.7)

**Comment:** At CARB's April workshop, staff noted additional measures 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, both 15-Day Packages inexplicably failed to include any of those additional measures. (15d2-258.15)

**Comment:** In addition, as previously noted, the proposal requires at least an additional 10% of waste feedstocks to offset the reduction in crop-based feedstocks, which, according to CARB's Recirculated Draft Environmental Impact Analysis (EIA), would "create an even stronger incentive to utilize waste feedstocks." Yet, the 2nd 15-Day Package was published 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. (15d2-258.16)

**Comment:** ... 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.... (15d2-286.6)

**Comment:** In contrast, we recommend that the handling of specified source feedstock be included in section 95488.9(g) requiring third-party sustainability certification and attestation documents like for any other feedstock. Under such an LCFS regulation, the credentials of true wastes, residues, and byproducts would be obtained at the beginning of the process, thoroughly checked using purpose-built auditing infrastructure, and all in all, minimize the number of administrative steps on the desks of CARB staff.

Sustainability certification bodies like the Roundtable for Sustainable Biomaterials (RSB) already have standardized, consensus-built protocols and trained field specialists for auditing and verifying wastes and residues. CARB's proposed phase-in approach to sustainability requirements per section 95488.9(g)(5)-(7) allows for more than ample time to adapt to new requirements: from 2026 onward, pathway holders and applicants submit geospatial data of plot boundaries; from 2028 onwards no eligible feedstocks are sourced on lands converted after 2008; and mandatory third-party certification begins in 2028. Our recommendation would fit into this proposed phase-in timeline; section 95488.9(g) should ensure that wastes, residues, and byproduct designations are also third-party certified starting with the 2028 data year. (15d2-289.8)

**Comment:** While diversion of vegetable oil from food to fuel is the most pressing concern today, the rapidly increasing diversion of tallow and used cooking oil from existing markets around the world to California is also a concern. These resources are not wastes and will be backfilled in other markets with vegetable oil or other resources. Brazil and China are currently exporting a lot of these feedstocks to supply California but will need these resources over time to supply their own markets with low carbon fuels. California's climate policies are most impactful when they are transferable, which is not the case with the current rapid scaleup of tallow and used cooking oil imports to make fuels in California. (BH-025.12)

**Comment:** The proposed guardrails for crop-based biomass-based diesel are insufficient and would encourage fraud and deforestation. It is easy to mislabel vegetable oil as used cooking oil and difficult to detect. Guard rails for biomass-based diesel only work if they apply to all lipid feedstocks. (BH-051.9)

**Comment:** As with the arbitrary cap, these provisions apply only to crop-based feedstocks, not feedstocks derived from waste or animal fats. We previously called to your attention the European Union's emerging Union Database, which will trace all feedstocks, including used cooking and waste oils and crop-based products 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. (15d2-307.5)

**Comment:** 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. (15d1-181.16)

**Agency Response:** No changes were made in response to these comments. CARB staff continuously monitor and evaluate the risk of waste oil fraud entering the program, as well as the classification of these feedstocks as waste oils going forward. Future updates to land use change emission quantification, which might include assessment of waste/residue-based fuels produced from used cooking oil, tallow, and distillers corn oil, were not included within the scope of the Proposed Amendments (see CEQA RTC Master Response 2 for more detail on potential land use change and deforestation impacts). Following Board direction in Resolution 24-14, CARB staff will convene a public forum in 2025 on the latest LUC science, including the most commonly used models, for consideration in a future LCFS update (see Response AA-1 for more on land use change updates). This will be an opportunity to evaluate the LUC-risk of increased virgin oils and waste oil consumption in a public, multi-stakeholder setting. In addition, in October 2024, CARB staff released a Request for Information (RFI) soliciting input on analytical and other methods for detecting UCO adulteration (fraud) in feedstocks and in finished fuels. Within the scope of existing regulatory enforcement authority, CARB staff may use the input from the RFI to potentially expand feedstock and fuel oversight for the LCFS.

Through oversight of its verification program to prevent fraud and maintain the integrity of the LCFS program, CARB strives to continuously improve the training and work thoroughness of its third-party verifiers, especially with regards to potentially high-risk feedstocks such as used cooking oil, tallow, and distillers corn oil. The new specified source feedstock (SSF) attestation requirements included in the Proposed Amendments require that all SSF suppliers from the point of origin along the feedstock supply chain to the fuel production facility must maintain an attestation with respect to the SSF volume and characterization. Third party verifiers and CARB may obtain and audit the attestations, among other things covered in the third-party verification scope, to ensure reasonable assurance of the integrity of the LCFS program.

#### ***DD-14 Impact of Sustainability Requirements on Use of UCO Feedstocks***

**Comment:** 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. (15d1-030.1)

**Agency response:** No changes were made in response to this comment. The sustainability requirements in section 95488.9(g) do not apply to UCO, which is a specified-source feedstock listed in 95488.8(g). Documentation on specified source feedstocks is required back to the point-of-origin to ensure that CARB staff and CARB-accredited verifiers can ascertain the validity of waste-based feedstocks.

## **DD-15 Sustainability Requirements Should Not Apply to RNG Feedstocks**

**Comment:** 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. (15d1-237.14)

**Agency Response:** No changes were made in response to this comment. With the exception of specified-source feedstocks listed in section 95488.8(g), the sustainability requirements outlined in section 95488.9(g) apply to any source of biomass used for fuel production, regardless of finished fuel type.

## **DD-16 Multiple Comments: *Clarification on Sustainability Language***

**Comment:** We request clarification regarding §95488.9.g.1.A. As written, it is unclear whether projects initiated after January 1st 2028 can use crop or forestry feedstocks without being assigned the ULSD carbon intensity as the timing limitation could be interpreted to apply to future projects. We recommend changing the rule language to specifically outline the requirements for currently-certified pathways, pathways certified between 2025-2027, and pathways certified after January 1, 2028. (Apr-084.3)

**Comment:** We support CARB's reference to the European Commission-recognized list of certification systems for the European Union Renewable Energy Directive (EU RED). In fact, Directive 2018/2001 has been updated with the amending Directive 2023/2413, which will be implemented by May of 2025. As such, CARB might consider a slight modification to 95488.9(g)(6)(C)(1), generalizing the working to: "The Executive Officer will approve certification systems that ~~have been recognized by the European Commission~~ are eligible for the European Union Renewable Energy Directive (EU RED) 2018/2001 as of December 31, 2025 per the European Commission's latest evaluation leading up to that date. Approved certification systems will be subject to the reapproval requirements of section 95488.89(g)58)(G); or.." (15d2-289.10)

**Agency Response:** No changes were made in response to these comments. Pathways certified after January 1, 2028, may use biomass feedstocks without incurring ULSD carbon intensity provided that the applications meet the sustainability requirements in section 95488.9.(g). The Proposed Amendments do signal that certification systems on the extant or updated European Commission-recognized list may be approved by the Executive Officer under section 95488.9(g)(6), as the commenter has recommended. As specified by subsection 95488.9(g)(7) of the Proposed Amendments, prior to 2031, the CARB Executive Officer will evaluate and approve certification systems, including those on the EU-recognized list if applicable, to ensure that they meet the full sustainability requirements for biomass under subsections 95488.9(g)(2) and (3).

## **DD-17 Multiple Comments: *Request Further Guidance on Sustainability Requirements***

**Comment:** 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. (15d1-097.2)

**Comment:** CARB should clarify procedures for entities to submit certifications under the proposed requirements. Section 95488.9(g) focuses on requirements for entities seeking to become approved certification systems, but gives little direction to entities complying with the sustainability standards. WSPA requests clarification on the following issues:

How and when will certifications be submitted?

Which party is responsible for submitting the certification – the feedstock supplier, the fuel pathway holder, or the fuel reporting entity?

Can this obligation transfer? The proposed regulation states that fuel quantities reported under fuel pathways utilizing feedstocks not certified by the deadline will be assigned the ULSD CI. However, this does not account for co-processed feedstocks, some of which may have certification and others that do not. (45d-241.7)

**Comment:** Prior to finalizing the Proposed Amendments and EIA, CARB must further define the sustainability criteria, allow regulated parties and the public to comment on the requirements' potential details and potential implications, and address any such comments regarding adverse environmental impacts that may follow from finalization of the requirements. (45d-243.9)

**Comment:** We think it would be helpful to set out more detailed guidelines for social and environmental criteria for the cultivation of sustainable feedstocks on farm level, e.g. to describe "good agricultural practices" or "best practices" for plant protection product application, working security, social standards, etc. Further, it would be important to have criteria for the long-term maintenance of soil fertility, as this is an essential factor for the long-term maintenance of production capacity and sustainability. (45d-374.1)

**Comment:** Clearer guidance on the verification process for farms would be beneficial, especially the option for group sampling on farm level to prove compliance with the set out requirements would help farmers to minimize audit efforts. (45d-374.2)

**Agency Response:** No changes were made in response to these comments. See Responses DD-2 and DD-3 above for discussion of clarifications to the initial proposal and associated implications for implementation. Staff organized a public workshop on April 10, 2024, to provide more details on the sustainability proposal and allow opportunity for feedback. In addition, two subsequent 15-day change public comment periods have allowed opportunity for stakeholder feedback and input on the proposed



sustainability requirements, as reflected in the public comments and CARB responses in this document.

#### **DD-18 Multiple Comments: *Corrections to Section 95488.9(g)***

**Comment:** 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. (15d1-064.10)

**Comment:** 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.<sup>19</sup> 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 ☐<sup>20</sup> 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.<sup>21</sup> 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. (15d1-064.11)

**Agency Response:** Staff made changes in response to these correction recommendations in the Second 15-day modifications to the Proposed Amendments.

#### **EE. Woody Biomass**

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##### **EE-1 Multiple Comments: *Improve Specified-Source Feedstock Criteria and/or the Definition of Forest Biomass Waste***

**Comment:** The current language presents three challenges:

Ambiguity: Vague terms like “small-diameter, non-merchantable” hinder feedstock evaluation and create uncertainty for developers.

Inconsistency: Lack of alignment with established federal and international standards (RFS, RSB) represent a challenge for securing eligible feedstocks under multiple regulatory frameworks.

Rigidity: Failure to recognize that California is experiencing a wildfire crisis that the State and Federal Governments have recognized requires massive fuel reduction activities that will result in increasing quantities of forest biomass that must be open burned if the material cannot be utilized in a beneficial manner. (45d-333.1)

**Comment:** “To address the challenges and encourage necessary biomass utilization in California we propose:

Expand eligible feedstocks: Include all forestry residues from forest management practices approved by the authorized tribal, federal, state or local agency.

Adopt clear, consistent definitions: Align with established standards for terms like "thinnings" and "residues" where possible, while still allowing flexibility for site specific forest management practices.

Stakeholder Engagement: Gather input from diverse groups to refine definitions and implementation procedures that will maximize forest health.

Additional Considerations:

Clearcut materials: We propose revising the total exclusion of clearcut-derived biomass wastes and residues. Tightly regulated clearcutting practices ensure sustainability, and utilizing these residues offers environmental benefits without encouraging further clearcutting. Furthermore, the rationale for this exclusion has not been supported by stakeholder interaction at CARB workshops.

Pre-2008 plantations: Similar to the 2015 Compliance Offset Protocol, consider including materials from pre-2008 plantations meeting California's Forest Practice Rules.” (45d-333.2)

**Comment:** We strongly urge CARB to support the inclusion of lumber mill waste as a waste feedstock. This prevents landfiling and aligns with the broader environmental goals of the LCFS program.” (45d-333.4)

**Comment:** However, we raise concerns regarding the potential impact of mandatory third-party certification on forestry residues essential for wildfire prevention, particularly those originating from unmanaged lands. While we agree with the principle of ensuring sustainable sourcing, applying a uniform certification requirement might pose undue challenges for wildfire abatement efforts. Unlike residues from managed forests, those obtained from unmanaged lands often lack established management practices and readily available certification pathways. The prohibitive expense of acquiring individual certifications for each instance of wildfire fuel reduction could hinder critical activities essential for forest health and wildfire abatement. Therefore, we urge CARB to consider a nuanced approach that acknowledges the unique circumstances surrounding wildfire abatement residues. (45d-333.7)

**Comment:** Our concern is that the 45-day language restricts use of forest biomass resulting from sustainable forest management within California. We believe the Air Board, therefore,

should revise the amendments to promote use of forest fiber from all forest management consistent with California's Forest Practice Act. We are concerned with the language in the proposed LCFS amendments that makes biomass derived from legal and silviculturally justified clearcuts ineligible. Even aged management is an important tool, particularly where shade intolerant species are being restored. The language proposed would result in the elimination of an important potential source of feedstock from private landowners that would be a credible long term feedstock supply.

The practice of clearcutting is tightly restricted by State regulations, which are set forth in the California Forest Practice Rules in Title 14 of the California Code of Regulations (CCR) at Chapters 4, 4.5 & 10. Specifically, 14 CCR Section 921.3(c) establishes circumstances under which clearcutting may be employed, as well as detailed rules regarding the extent and way it may be used. Once proposed, it is reviewed by state agencies and found in conformance with the Forest Practice Act by the Director. It is also reviewed in the context of the California Environmental Quality Act (CEQA) which further means that any adverse effect is less than significant. (45d-271.1)

**Comment:** We suggest that the language in § 95488.8. Fuel Pathway Application Requirements Applying to All Classifications. section (g) Specified Source Feedstocks (1) (A) subsection 3 be amended to read as follows:

“Small-diameter, non-merchantable forestry residues removed for the purpose of forest fire fuel reduction or forest stand improvement and from a treatment where no-clear cutting occurred, unless from forest lands where timber operations comply with California's Forest Practice Act; Municipal solid waste that is diverted from landfill disposal;”.

As such, we respectfully submit that the focus should be on landscape-scale improvements to forestlands and that compliant clear-cutting practices on individual small stands of pre-existing plantations should be seen within that larger context. We recommend that the Board revise 45-day language to promote use of forest fiber from all forest management consistent with California's Forest Practice Rules. (45d-271.2)

**Comment:** §95488.8 (g)(1)(A)(3) - The proposed amendments intend to protect against the risk that use of forest residue for biofuel production could lead to expanded clear-cutting or other unsustainable forest management methods. This intent reflects an important consideration when leveraging forest resources for this purpose. Referencing existing code or statute related to sustainable forest management, such as the California Forest Practice Rules, or applicable US Forest Service guidance, could improve the clarity and transparency of this section. In particular, the proposed amendments require ascertaining the intent of management interventions in order to ensure only residue biomass subsequent to activities for the “purpose of forest fire fuel reduction or forest stand improvement” can be used. Providing an objective criteria by which to ascertain this intent could be helpful, provided it does not open new loopholes leading to unsustainable practices. (45d-391.50)

**Comment:** It is critical for CARB to adopt a broader biomass definition in not only the most recent LCFS legislative proposal, but all future policy rulings by the Agency. The proposed utilization of arbitrary terms such as “unmerchantable” and certain “diameter sizes” for secondary material unnecessarily limits the potential feedstock pool, in potentially

counterfactual ways, ultimately limiting the adoption of carbon neutral and negative technologies. (45d-045.1)

**Comment:** It is unreasonable to qualify material based upon diameter. This is out of alignment with existing federal programs and would be a departure from industry norms. Tracking and classifying material eligibility based on material diameter is not practical for companies to pursue from an effort, in-field feasibility, and cost perspective. Anything that is deemed as incidental material should be permissible as biomass feedstock, regardless of size. This would be inclusive of larger diameter residues, sawmill residues, and other to-be-defined materials. (45d-045.2)

**Comment:** A common point of concern amongst stakeholders is the availability and longevity of biomass supply. Focusing narrowly on specific forestry residuals, such as fire mitigation clearings, will restrict the longevity and sustainability of biomass management industries, and pits various regions of the US against one another, rather than focusing on the scientific benefits of biomass management in general. For the bioeconomy to flourish, all available biomass opportunities must be accessible to producers for credit generation including management actions necessary to maintain a healthy ecosystem, such as thinning. It is vital that the legislation considers the economic and environmental benefits of utilizing biomass uniquely to all regions and not through a narrow consideration of biomass impacts specific to certain regions, such as fire management areas. This is important because fire management and mitigation only applies as a main driver for biomass in a few western states while it is not directly applicable for most of the available biomass in the United States. (45d-045.3)

**Comment:** CARB's proposed specifications for forest residues are that they are "[s]mall-diameter, nonmerchantable forestry residues removed for the purpose of forest fire fuel reduction or forest stand improvement and from a treatment where no-clear cutting occurred." However well intentioned, these specifications are too vague to limit forest degradation nor will they meaningfully reduce the significant 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 in the forest to maintain soil organic carbon, retain vital nutrients in the ecosystem, and support wildlife habitat. (45d-210.20)

**Comment:** § 95488.8. Fuel Pathway Application Requirements Applying to All Classifications. section (g) Specified Source Feedstocks (1) (A) subsection 3 be amended to read as follows: Small-diameter, non-merchantable Any forestry residues and byproducts removed as part of a forest fire fuel reduction, last stand improvement or slash/tops from a treatment (including harvests) where no-clear cutting occurred; from forest lands that meet applicable federal, state or local regulations; Municipal solid waste that is diverted from landfill disposal; (45d-360.6)

**Comment:** § 95488.8. Fuel Pathway Application Requirements Applying to All Classifications. It is recommended to amend as: (4) Areas at risk of wildfire include: thinnings to increase

surrounding tree growth, agriculture residues, lumber mill and sugar mill waste, waste should have zero ILUC – similar to UCO, and counterfactuals are consistent with carbon neutrality. Carbon neutrality aligns with federal definition. (45d-360.7)

**Comment:** CARB could consider options that prioritize biomass waste feedstocks sourced from within California. 286.2 286.3 286.4 Prioritizing in-state biomass waste pathways under the LCFS Program would maximize the climate, air quality and local economic benefits of converting waste sourced from state lands.<sup>7</sup> For example, CARB could feasibly offer targeted incentives for fuel pathways that specifically use residues from fire management or forest restoration activities on California’s forested lands. (45d-286.2)

**Comment:** Finally, the regulation should accommodate the use of woody biomass from forest fire abatement residues, as it aligns with the scoping plan and broader state goals, such as the Roadmap to a Million Acres, which call for the State of California to treat a minimum of 1 million acres of forested land annually by 2025. This material, not from managed forests, may be too complex for producers to certify under the verification schemes proposed on April 10. If this material will qualify as a waste, and thus not subject to sustainability requirements, that should be clearly stated. (Apr-084.6)

**Comment:** It is critical for CARB to adopt a broader biomass definition in not only the most recent LCFS legislative proposal, but all future policy rulings by the Agency. The proposed utilization of arbitrary terms such as “unmerchantable” and certain “diameter sizes” for secondary material unnecessarily limits the potential feedstock pool, in potentially counterfactual ways, ultimately limiting the adoption of carbon neutral and negative technologies. Furthermore, it is unreasonable to qualify material based upon diameter. This is out of alignment with existing federal programs and would be a departure from industry norms. Tracking and classifying material eligibility based on material diameter is not practical for companies to pursue from an effort, in-field feasibility, and cost perspective. Anything that is deemed as incidental material should be permissible as biomass feedstock, regardless of size. This would be inclusive of larger diameter residues, sawmill residues, and other to-be-defined materials. (Apr-122.4)

**Comment:** As a leader in renewable fuel feedstocks and sustainable practices, Bunge is concerned about aspects of CARB’s proposed requirement that crop- and forestry-based feedstocks “maintain continuous third-party sustainability certification” to demonstrate they were not “sourced on land that was forested after January 1, 2008.” See Proposed Regulation Order at § 95488.9(g). (Apr-148.7)

**Comment:** CARB should establish the following clear and detailed minimum requirements on forest biomass:

- 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.” (15d1-018.3)

**Comment:** We are eager to see sustainable solutions that allow for the long-term utilization of additional material and we urge CARB (and other state entities) to support continued funding for CalFrame and to support proposed avoided emissions credit programs to help create the appropriate economic structures that support more forest management work and additional residue utilization. We also see opportunity to work with federal authorities to lift the ban on biomass from federal lands. While such longer-term forest management enhancements are developed, we believe that working with existing operations to use waste streams presently left in the woods provides significant value to the forest ecosystem and supports the transition to broader forest management activities.

It's important to note that in California clearcutting is tightly restricted by State regulations in the California Forest Practice Rules, which are set forth in Title 14 of the California Code of Regulations (CCR) at Chapters 4, 4.5 & 10. Specifically, 14 CCR Section 921.3(c) establishes narrow circumstances under which clearcutting may be employed, as well as detailed rules regarding the extent and manner in which it may be used. And it can only “be used when justified and explained in the plan and found in conformance by the Director” with the requirements of the rule. Given the tightly regulated permitting of clearcutting, there is no chance that allowing the forest residual materials that remain after a clearcut to be utilized as biomass feedstock will create any incentive for additional clearcutting. Instead, it will deliver the many environmental and climate benefits noted above, and thereby improve the overall environmental impact of the limited usage of clearcutting that is allowed today in the State. (45d-194.1)

**Comment:** We therefore propose that the language in § 95488.8. Fuel Pathway Application Requirements Applying to All Classifications. section (g) Specified Source Feedstocks (1) (A) subsection 3 be amended to read as follows:

“Small-diameter, non-merchantable Any forestry residues and byproducts removed as part of a forest fire fuel reduction, last stand improvement or slash/tops from a treatment (including harvests) where no-clear cutting occurred; from forest lands that meet applicable federal, state or local regulations; Municipal solid waste that is diverted from landfill disposal;”.

(45d-194.2)

**Comment:** We respectfully submit that in California any residue from pre-2008 plantations<sup>8</sup> that meets the current California Forest Practice Rules requirements should be eligible for the LCFS program. We note that CARB took a similar approach when it aligned the 2015 Compliance Offset Protocol for U.S. Forest Projects with the requirements of the California Forest Practice Rules.<sup>9</sup> California’s Forest Practice Act regulations are the most stringent in the United States<sup>10</sup> and set a standard that assures sustainability, a long term increase in the

carbon balance of forests and assures that these forests will not be converted to plantations for energy crops as there are minimum stand age and minimum diameter requirements in place. While other jurisdictions may not be as stringent as California, by aligning its climate and forest management regulations it will strengthen the State's leadership role in both areas.<sup>11</sup>

As we seek long term feedstock agreements with forest landowners in the region, we recognize that, while all landowners in California adhere to California Forest Practice Act (CFPA) standards, their forest management practices do vary in practice. When analyzed at a landscape scale, over the longer time frames appropriate for forest and carbon management, CFPA standards assure a growing carbon stock in these regions as well as a healthier and more fire resilient ecosystem. As such, we respectfully submit that the focus should be on landscape scale improvements to forestlands and that compliant clear-cutting practices on individual small stands of pre-existing plantations should be seen within that larger context and not result in the elimination of an important source of feedstock for the biofuels industry in California. (45d-194.3)

**Comment:** 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 nonindustrial 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. 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. (15d1-040.1)

**Comment:** 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. 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 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. (15d1-057.1, 15d1-057.2, 15d1-057.3)

**Comment:** 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.” (15d1-063.1)*

**Comment:** 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? (15d1-063.2)

**Comment:** 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.<sup>3</sup> 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.<sup>4</sup> As a result, this prohibition could significantly restrict the amount of available qualified material in the area.

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 forestlands. 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. (15d1-063.3)

**Comment:** 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. (15d1-063.4)

**Comment:** 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. (15d1-063.5)

**Comment:** 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. (15d1-091.1)

**Comment:** 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. (15d1-091.2)

**Comment:** Beyond the challenge of simply allowing participation to an undefined cohort of “nonindustrial” 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. (15d1-091.3)

**Comment:** 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.

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.

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.

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. (15d1-091.4)

**Comment:** The Initial Statement of Reasons, along with the proposed amendments provided in the 15Day 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. (15d1-091.5)

**Comment:** 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. (15d1-105.4)

**Comment:** 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 longterm 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. (15d1-105.8)

**Comment:** 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. 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.<sup>2</sup> 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 combined one million acres with the USFS annually. 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.

Fidelis recommends CARB clarify when forest biomass waste is considered a specified feedstock. (15d1-132.4, 15d1-132.5, 15d1-132.6)

**Comment:** 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.

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.

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. (15d1-136.1)

**Comment:** 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.” (15d1-158.1)*

**Comment:** 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.

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 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. (15d1-158.3)*

**Comment:** 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. (15d1-160.1)

**Comment:** 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. (15d1-160.2)

**Comment:** 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.”* (15d1-160.3)

**Comment:** 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: ...* (15d1-160.4)

**Comment:** 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)(l)(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. (15d1-175.2)

**Comment:** While the Initial Statement of Reasons suggests that these standards are intended to reduce wildfire risk, the definition in section 95488.8(g)(l)(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)(l)(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." (15d1-175.3)

**Comment:** 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. (15d1-175.4)

**Comment:** 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. (15d1-175.5)

**Comment:** 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 trees 1. Forest thinnings and slash are a key resource for

sustainable fuel production. These materials participate in sustainability certifications such as Forest Stewardship Council (FSC). (15d1-176.1)

**Comment:** 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. (15d1-176.2)

**Comment:** 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 without any discussion or public comment. We believe that CARB could address appropriate biomass resources as part of the review of certification schemes. (15d1-176.3)

**Comment:** 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. (15d1-188.1)

**Comment:** 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. (15d1-188.2)*

**Comment:** 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. As such, Yosemite proposes that this section focus solely on purpose grown crops, reading:

*(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... (15d1-188.3)*

**Comment:** 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” from the LCFS rulemaking package and that a separate focused rulemaking that involves producers/developers, foresters, and other stakeholders in California are included. (15d1-213.1)

**Comment:** 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 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. (15d1-213.2)

**Comment:** 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 CO<sub>2</sub> 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 CO<sub>2</sub> and methane in the atmosphere. (15d1-213.3)

**Comment:** 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. 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). (15d1-213.4)

**Comment:** 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. (15d1-213.6)

**Comment:** 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. 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. (15d1-213.10)

**Comment:** 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. (15d1-214.7, 15d1-214.17).

**Comment:** 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. (15d1-220.21)

**Comment:** Restricting qualified forest biomass feedstock to “non-industrial forestlands” could hinder development of biofuels projects that support wildfire risk mitigation.” (15d1-224.7, 15d1-224.29)

**Comment:** 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. (15d1-230.1)

**Comment:** Request staff to substitute *biomass* with *purpose grown crops* in section 95488.9(g). (15d1-230.3)

**Comment:** However, **Section 95488.8(g)**, which describes “**Specified Source Feedstocks**,” changes the requirements for forest biomass waste in **subsection A3** to a definition too restrictive to generate the necessary support for biofuels investment that will incentivise the reduction of hazardous forest fuels.

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, or slash and non-merchantable timber from forest harvest 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. (15d2-213.1)

**Comment:** **Section 95488.9(g)**, is a further concern. While initially only applying to crop-based biomass, these restrictions have been proposed to extended to cover all biomass. This is unworkable for companies 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, if using almond shells as a feedstock, fuel producers have 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, we propose that this section focus solely on purpose grown crops, reading:

(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: (15d2-213.3)

**Comment:** ACDC is concerned about what appears to be contradictions between the definition of “Forest Biomass Waste” in section 95481(a) and the definition of “Specified source feedstock” in section 95488.8(g)(1)(A)(3). The definition of Forest Biomass Waste is:

*““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.”*

Meanwhile the specified source feedstock definition is:

*“3. Forest biomass waste from non-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; 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.”*

This definition of a specified source feedstock as a subset of forest biomass waste creates challenges. For instance, Forest Biomass Waste, as defined, is only non-merchantable material, but, as described in our earlier letter, material generated from wildfire fuel reduction activities in California often includes a percentage of merchantable material. In situations where, for instance, a smaller private land owner is removing material, only a portion of the material is merchantable and it can be too costly to treat the merchantable material separately and more efficient to treat all the material as Forest Biomass Waste. That cost/benefit decision is best made on a case-by-case, site-specific basis by those doing the work. By defining forestry related specified source feedstock as only non-merchantable material, certain, quite common fire mitigation activities — ones that produce some amount of merchantable material but not enough to make it cost effective to extract — will be precluded, thus discouraging rather than promoting more fire mitigation activities.

In addition, excluding “treatment[s] in which no clear cutting occurred” — another term that is not defined in the LCFS Regulation and is thus ambiguous — creates challenges. Fire breaks are essential parts of many proven fire mitigation programs, but fire breaks may well be considered clear cuts. This would further hinder additional fire mitigation activities from qualifying.

Furthermore, as discussed in our earlier letter, 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. While we strongly support the apparent intention to promote material from smaller landowners, we fear that the inconsistencies in this definition will make it difficult for smaller landowners to take advantage of the specified source feedstock channel. We therefore respectfully request that in the Final Statement of Reasons (the FSOR) for this rulemaking the Board clarify the meaning of the term “non-merchantable” as it is used

in Section 95481(a) as well as the meaning of the terms “non-industrial forestland” and “clear cutting” as they are used in section 95488.8(g)(1)(A)(3). (15d2-263.1)

**Comment:** We respectfully request the LCFS program rules be amended to support sustainable forest management that helps avoid megafires and associated climate and health impacts. (15d2-263.3)

**Comment:** We support the addition of 95488.9(g)(1)(B), which ensures that biomass sourced from forest land that meets CARB’s Compliance Offset Protocol for U.S. Forest Projects General Eligibility Requirements also will meet LCFS eligibility requirements. We are concerned that while most larger forest operators in California will qualify, there may be non-conformances such as requirements around salvage harvesting that could create challenges. We are hopeful that such issues can be addressed as part of the pathway development process, but respectfully request that the Board clarify the intent of this language in the FSOR for this rulemaking.

We believe that meeting those eligibility requirements or another “continuous third-party sustainability certification” will be a viable option for many large forest landowners that have the resources to meet such standards. But we are concerned that this approach will be difficult for smaller landowners that do not have the resources to maintain such certifications. Combined with our concerns regarding the forest biomass definition of Specified Source Feedstocks listed above, we fear that biomass from smaller forest landowners may be difficult to utilize in a manner that assures that it can qualify for LCFS credits.

A significant portion of the forest land in the “Wilderness Urban Interface” (WUI) in California is held by smaller forest landowners or as housing lots that desperately need regular treatments to ensure fire risk is minimized. We believe that, as the rules stand, it will be exceedingly difficult for the use of such material to qualify for LCFS credits.

We believe the best solution to this challenge is, as we suggested previously, that the definition of Forest Biomass Waste 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.*

Note that if the definition of Forest Biomass Waste were amended in this manner, this would expand the amount of forests biomass that could qualify as Specified Source Feedstock. If the Board instead chooses to leave the definition of Forest Biomass Waste as is, then removing the word “waste” from the Specified Source Feedstock definition would expand the definition of Specified Source Feedstock in a manner that could provide flexibility that would enable all fire mitigation work to qualify. As such, we respectfully request that the Specified Source Feedstock definition for forest biomass should be amended as follows:

*“3. Forest biomass waste from non-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; 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.” (15d2-263.2)

**Comment:** When it comes to forest waste biomass, EDF recognizes that many forests in the western U.S. are “overstocked,” which increases wildfire vulnerability, particularly in a warming climate. In this context, there may be a need for clarification in the handling of biomass types derived from fuel reduction practices, including mechanical thinning and beneficial fire, which are essential for enhancing forest resilience. (15d2-289.11)

**Comment:** First, the different definitions of forest waste biomass are confusing, exclude some types of waste biomass, and may slow the beneficial use of forest waste to produce low carbon fuels. (15d2-294.1)

**Comment:** Section 95488.8(g)(1)(A)

BAC strongly supports the additional language in this section that specifies that forest biomass waste is biomass that is removed for “wildfire fuel reduction, to reduce the risk to public safety or infrastructure, to create defensible space, or for forest restoration.” However, the next clause of this same section undermines these specified goals by excluding clearcutting in all cases, even though that is often the method needed to create defensible space or fire breaks to stop catastrophic fires.

This can easily be corrected by either 1) changing the “and” at the beginning of the second clause to an “or” or 2) by clarifying that clearcutting is only allowed when necessary for wildfire mitigation or forest health.

These two changes will help to remove contradictions and uncertainty that will otherwise slow efforts to convert forest biomass waste to low carbon fuels. (15d2-294.6)

**Agency Response:** Changes were made in response to these comments.

Characteristics of forest-derived material that is considered to be a waste were added to the definition of “forest biomass waste” in section 95480. In section 95488.8(g)(1)(A), staff have revised the definition of forest biomass waste eligible as a specified-source feedstock to include forestry residues generated as a result of activities that are conducted for the purposes of wildfire risk reduction, forest health restoration, and for the protection of critical infrastructure such as power lines and evacuation routes. Criteria were added to the Proposed Amendments to require that forest biomass waste be sourced from non-industrial forestland in order to be considered a specified source feedstock, in recognition of the fact that forest health restoration and wildfire risk reduction treatments are needed on public lands and unmanaged lands.

Sources of forest biomass not meeting this definition may still be used as feedstock for fuel supplied to California, but will be subject to sustainability requirements in subsection 95488.9(g). Staff recognizes that there are cases in which clear-cutting is silviculturally appropriate and can be conducted in a manner that is consistent with California Forest Practice Rules. Feedstocks obtained from operations on industrial forestlands or from clear-cutting are subject to sustainability criteria to ensure the operations are performed in compliance with legal requirements, and to provide CARB

with the information necessary to appropriately assess potential climate and land use change impacts. In subsection 95488.9(g)(1)(B), staff have added a compliance option to the sustainability requirements for forest-derived biomass sourced from forest land that meets General Eligibility Requirements identified in Section 3.1(a) of CARB's Compliance Offset Protocol U.S. Forest Projects (Adopted June 25, 2015), with the exception of section 3.1(a)(5).

The forest biomass waste criteria in subsection 95488.8(g)(1)(A) of the Proposed Amendments indicates which feedstocks are subject to the chain of custody evidence and other requirements in subsection 95488.8(g)(1)(B). Biomass that does not meet this criteria is subject to sustainability certification in section 95488.9(g). These designations do not specify the carbon intensity of biomass feedstocks, which is assessed during the pathway application process based on applicable data.

See also Response GG-3.

**EE-2 Multiple Comments: *Exclude Forest Biomass Language from this Rulemaking and/or Address in Future Rulemaking or through an Expert Working Group***

**Comment:** 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).

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. (15d1-018.3)

**Comment:** 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.

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. (15d1-180.2)

**Comment:** 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.

...

Participate in an interagency working group to develop a Tier 1 LCFS pathway for woody biomass to fuels and power.

...

Establish a working group of experts to investigate the biogenic treatment of forest material. (15d1-195.4)

**Agency Response:** No changes were made in response to these comments. Staff have revised the definition of forest biomass waste eligible as a specified-source feedstock to include forestry residues generated as a result of activities that are conducted for the purposes of wildfire risk reduction, forest health restoration, and for the protection of critical infrastructure such as power lines and evacuation routes. This definition is intended to support forest treatments to reduce wildfire risk without incentivizing changes to forest management practices that prioritize wood production over forest health (see Response EE-1).

### **EE-3 CARB Should Remove Woody Biomass Feedstocks from the LCFS Program**

**Comment:** 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 CO<sub>2</sub>, as well as methane (CH<sub>4</sub>), carbon monoxide (CO), and hydrogen (H<sub>2</sub>), 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.<sup>37</sup> Further, biomass gasification and pyrolysis produce a wide range of health-harming pollutants including fine particulate matter, NO<sub>x</sub>, SO<sub>x</sub>, 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 dibenzofurans (PCDD/Fs).<sup>38</sup> 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.<sup>39</sup> Fine particulate matter pollution is linked to a higher risk of premature death,

heart disease, stroke, and aggravated asthma.<sup>40</sup> With biomass gasification and pyrolysis project proposals slated for Central Valley communities already overburdened with pollution, <sup>41</sup> 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, CO<sub>2</sub> leakage, and ecosystem damage.

Similar to biomass combustion, gasification and pyrolysis of biomass produce large quantities of CO<sub>2</sub> as well as methane emissions that worsen the climate emergency. The claim that woody biomass is a carbon neutral feedstock has been thoroughly debunked,<sup>42</sup> given the lost carbon storage and sequestration from extracting biomass, and the significant CO<sub>2</sub> emissions during biomass processing and gasification, pyrolysis, or combustion.<sup>43</sup> 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.<sup>44</sup> 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 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 “nonmerchantable.” 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. (15d1-038.7)

**Agency Response:** No changes were made in response to this comment. Staff have revised the definition of forest biomass waste eligible as a specified-source feedstock to include forestry residues generated as a result of activities that are conducted for the purposes of wildfire risk reduction, forest health restoration, and for the protection of critical infrastructure such as power lines and evacuation routes. This definition is designed to support forest treatments to reduce wildfire risk without incentivizing changes to forest management practices that prioritize wood production over forest health (see Response EE-1).

## **FF. Intermediate Crops**

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### **FF-1 Multiple Comments: *Provide More Support for Intermediate Crops (e.g., Cover Crops, Secondary Crops)***

**Comment:** As you endeavor to create an accounting mechanism to track feedstocks to their point of origin and develop the independent feedstock certification process recommended within your proposed LCFS rule, we encourage you to recognize the importance of emerging crops like camelina. By incentivizing the further adoption of “Intermediate Crops” among growers and renewable fuel producers, we can help ensure land use change is prevented, soil health is protected, and renewable fuel feedstock demand can be met responsibly.

As new crops, education and incentives are vital to ensure the continued adoption and future success of “Intermediate Crops” like camelina. Recognizing that newer feedstocks lack the resources of traditional commodities like soy or corn, we recommend that accounting rules should not place “Intermediate Crops” like camelina at a financial disadvantage as they establish themselves within the market. (45d-175.2, Apr-002.1)

**Comment:** As currently written, the Sustainability Audit Process requirements put forward by staff will be costly for farmers to adopt, providing a barrier to entry for promising new feedstock crops like camelina. Recognizing that newer feedstocks lack the resources of traditional commodities like soy, corn, or canola, we recommend that accounting rules should not place Intermediate Crops at a financial disadvantage as they establish themselves within the market. (Apr-80.1)

**Comment:** In addition, we urge CARB to fully consider that feedstocks from newly commercialized crops such as CoverCress, grown on fallow or idle land between rotations of primary crops and acting as functional cover crops, should be afforded negative LUC values in the updated LCFS, as has been calculated in published, peer reviewed studies. Feedstocks from these new crops are incremental, additive sources of material without driving any land use change. Processing of these crops adds other materials, such as animal feeds, into our economy that helps decrease the risk of land use changes globally. (Apr-130.1)

**Comment:** CARB should consider the indirect benefits potentially attained from producing oilseeds on fallow acres. Feedstocks from crops which grow between rotations of primary crops, and act as a functional cover crop, should be afforded negative land use change values in the updated LCFS. Feedstocks from these new crops are incremental, additive sources of feedstock without driving any land use change. Additionally, processing of these crops adds other materials, such as animal feeds, into our economy that help to decrease the risk of land use changes globally. (Apr-168.7)

**Comment:** At a minimum, we would ask CARB to add intermediate crops as a listed compliance strategy and allow the utilization of intermediate cover crops like Carinata similar to the actions taken by the European Union as adopted in recent changes to Annex IX of its Renewable Energy Directive. Inaction would cede usage and development of these crops and, more importantly, the oil derived from them to European refiners and European aviation markets, thus impacting the ability to deliver our shared commitment to deep decarbonization of fuels in California and across the United States. (Apr-170.2)

**Comment: Include winter canola as a key feedstock:** Winter canola is an emerging crop with a materially different emissions and land use profile. CARB should recognize that intermediate oilseed crop feedstock sources such as canola, grown as a second crop, provide multiple sustainability benefits to the environment in addition to its value as a low-carbon-intensity feedstock (source: Cover Crops for Climate Resilience | USDA Climate Hubs). Specifically, they:

- Store carbon in the soil;

- Reduce soil erosion and runoff;

- Increase soil organic matter;

Reduce weeds, pests, and disease pressure;

Provide habitat for pollinators and wildlife;

Winter canola and other intermediate crops provide early forage resources for pollinators (source: Using pennycress, camelina, and canola cash cover crops to provision pollinators - ScienceDirect) (15d2-200.3)

**Comment:** CARB should recognize that the intermediate oilseed crop feedstock sources such as winter canola that is grown as a second crop are grown on land that would otherwise be fallow during the intermediate growing season. Production of biomass-based diesel feedstock in these systems is effectively adding “virtual acres” to the overall acreage pool without displacing other crops or changing land use in other parts of the globe. Therefore, the use of intermediate oilseed crop feedstock sources - such as canola grown as a second crop - reduces the potential for land use change. As these oilseed crops are crushed for oil feedstock, the meal produced as a co-product increases the available supply of vegetable protein meal, such as that used in California’s dairy and other livestock industries, thereby reducing the economic incentive for land use change.

As such, winter canola has the potential to be a key feedstock crop for renewable fuels; its adoption is just beginning to increase. Inclusion in CARB is a key step to support this low carbon- intensity crop as an alternative feedstock not subject to the 20% cap. It is important that CARB clarify inclusion of winter canola – and at the same time, ensure that no alternative feedstocks are included. As CARB is updated to add sunflower oil, we also recommend adding the following definition to § 95481(a):

“Primary-Crop Canola” means canola that is the crop produced during that geographical area’s main growing season. Primary-crop canola does not include canola that is grown as a second crop or as a cover crop. (15d2-200.4)

**Comment:** As currently written, the Sustainability Audit Process requirements put forward by staff will be costly for farmers to adopt, providing a barrier to entry for promising new feedstock crops like camelina. Recognizing that newer feedstocks lack the resources of traditional commodities like soy, corn, or canola, we recommend that accounting rules should not place Intermediate Crops at a financial disadvantage as they establish themselves within the market. (Apr-080.1)

**Agency Response:** Changes were made in response to these comments. While staff acknowledge the potential benefits and advantages of intermediate crops compared to the primary crop-feedstocks currently in the program, CARB staff are still evaluating the latest science to understand how these potential benefits should most appropriately be accounted for in life cycle analysis. As the production of intermediate crops scales up, concerns may arise around sustainability and market impacts. Favorable treatment of intermediate crops through reduced carbon intensity in life cycle accounting could further increase these risks. Staff have added flexibility as they continue to evaluate intermediate crops with the addition of provisions in section 95488.3(d)(2) that permit staff to use empirical data to analyze and assign LUC values for intermediate crops that are potentially lower than Table 6 LUC values for primary crops:

*“For feedstocks not listed in Table 6, the Executive Officer may determine and assign an appropriate LUC value based on empirical land cover data, yields, and emission factors.”*

## **GG. Specified Source Feedstock Attestations**

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### **GG-1 Multiple Comments: *Oppose Specified Source Feedstock Attestation Requirements***

**Comment:** MPC opposes the attestation requirement for specified source feedstocks. The attestation requirement would add significant and unnecessary verification workload to the annual verification process, as the chain-of-custody evidence is already reviewed and verified under the current regulatory provisions.

The specified source feedstock supply chain includes multiple entities, such as points of origin, collectors, aggregators, storage terminals and at times pre-treatment facilities. Each of these entities must provide an attestation stating a feedstock has not been altered from the pathway application. This requirement is problematic. A downstream entity within the supply chain likely lacks the knowledge of how a previous entity handled the feedstock, including whether it has undergone additional processing.

If CARB retains the attestation requirement, then CARB must do two things. First, CARB must narrow the attestation to information about the feedstock while the feedstock was in that attesting entity’s control. An entity representative should not be required to attest to information of which he has no knowledge. Second, CARB must explain the energy systems that are included in CARB’s emission factors. The existing default emission factor documentation<sup>5</sup> does not explain to entities within the supply chain what is included in CARB’s default values for feedstock collection, processing, and handling. Any activities not included in the default emission factors would be considered “additional processing” and thus should be identified in the attestation. Unless each entity understands the activities considered to be “additional processing,” entities may not submit accurate attestations. (45d-217.7, 45d-217.8)

**Comment:** CARB’s proposed attestation requirement is unnecessary. The specified source feedstock attestation requirements would unduly burden fuel producers with no significant benefit as existing regulatory provisions already require review and verification related to the chain of custody. Fuel pathway holders must submit to third party verification evidence of chain of custody for specified source feedstocks as well as provide a RFS separated food waste plan. Imposing additional attestation requirements on top of these existing provisions would significantly add to process workloads.

WSPA requests that CARB clarify procedural obligations associated with attestations. First, CARB must clearly specify which default emission factors supply chain entities are required to attest against. It is not possible to attest that a step within the supply chain does not meet a pathway CI unless the default emission factors CARB requires pathway holders to utilize are clearly understood by each entity within the supply chain. For example, using the terms “additional processing” is a broad category that fuel producers may interpret differently than CARB. WSPA does not view water removal and basic filtration at the point of collection as additional processing. But separating out solids, removing soluble impurities, drying the

feedstock and filtration using bleaching clay, diatomaceous earth and/or other filter agents may be considered additional processing.

Second, without some limiting factor, every entity within a supply chain could be pulled into attestation requirements. For example, for a used cooking oil supply chain, current provisions could be read to require that each individual restaurant maintain attestations, all the way back to the first collection point. WSPA recommends that CARB specify that attestation requirements begin at the physical feedstock aggregator where feedstocks are collected before any processing occurs upstream of the fuel producer to limit burdens associated with this requirement. This approach would be consistent with the limited attestation language provided in § 95488.8(g)(1)(D)(3), which contains information that only later entities in the supply chain would be able to attest to (specifically, that “the specified source feedstock has not undergone additional processing, such as drying or clean-up except as explicitly included in the pathway life cycle analysis and pathway CI”).

Third, CARB should clarify that attestations will not be required to be passed down the supply chain from entity to entity, and that fuel pathway holders will not be liable for failure of supply chain entities to meet the attestation letter requirement. Such a requirement is unnecessary given the existing feedstock supplier auditing requirements, which ensure that both third-party verifiers and CARB have sufficient information to verify compliance. To address these procedural issues, WSPA recommends that CARB provide guidance documents, including examples, for regulated entities, supported by clear regulatory language. CARB already has third-party requirements on specified source feedstocks; however, as indicated above, the verification (or attestation) requirement belongs with the feedstock producer, not with the renewable fuel producer that purchases the feedstock.

WSPA recommends that CARB specify that attestation requirements begin at the physical feedstock aggregator where feedstocks are collected before any processing occurs upstream of the fuel producer to limit burdens associated with this requirement. (45d-241.9)

**Comment:** Both the RFS and LCFS currently require significant documentation for feedstock sourcing, including detailed chain-of-custody records, in addition to third-party audits. The RFS specifically requires point of origin documentation for these feedstocks. Additional attestation requirements are duplicative.

As written, these new requirements have the potential to add considerable burden to feedstock supply chains. It is not clear which feedstock producers, distributors, or users would be required to maintain attestations or which operating conditions require them. It should also be made clear that this would be a recordkeeping requirement only and not akin to a product transfer document. We urge CARB to forego these added requirements or at least work more closely with feedstock producers and suppliers to clarify the purpose and nature of these new requirements. (45d-164.4)

**Comment:** DGD has some concerns regarding the proposed specified source feedstock attestation letter requirement because they will increase the annual verification burden for pathway holders without any associated “value add” to the program. If it is the intent of the provision that upstream suppliers be held accountable through the pathway holder, then it is duplicative of the currently effective provisions requiring chain of custody documentation.

CARB should consider an approach consistent with the International Sustainability and Carbon Certification ("ISCC") requirements. (45d-173.1)

**Comment:** 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. (15d-228.33)

**Comment:** The requirements in section § 95488.8 (g)(D) unnecessarily duplicate responsibilities already on the fuel pathway holder and impose onerous requirements on supply chain participants that may have no willingness or need to participate in the LCFS program. This requirement should be removed.

The requirement that every single node in the specified source feedstock supply chain provide such a letter is unreasonable. For example, the supply chain may include storage sites that are nothing more than a storage tank owner who leases space to a feedstock vendor/aggregator/trader. That owner has no knowledge of LCFS, is not otherwise obligated in any way with respect to compliance with LCFS regulation and would need to hire expensive legal counsel to evaluate the obligations they would be attesting to. Such feedstock supply chain participants will refuse to sign the letter and/or at the earliest opportunity, consider alternative options to renting tank space for feedstock storage that now incurs an additional obligation for regulations that do not otherwise apply to them. This is just one example of supply chain participants opting out from supplying low-carbon feedstocks for biofuel production that for California consumption.

The market has already experienced limitations on specified sources that limit low carbon feedstock availability due to feedstock vendors' unwillingness to submit to existing LCFS verification requirements. The unwillingness is not related to the inability to adhere to program requirements but is because the vendors have alternate markets (e.g. animal feed) without onerous LCFS requirements. Adding additional requirements such as a feedstock attestation from each specified source feedstock supply chain will materially degrade the availability of low carbon feedstocks for credit-generating fuels. Thus, Crimson respectfully requests CARB to remove the unnecessary requirements in § 95488.8 (g)(D). (15d2-274.11)

**Agency Response:** No changes were made in response to these comments. Specified source feedstocks are associated with reduced CIs, and so there has been increased demand for these low-CI feedstocks in the LCFS program and across global markets. The potential for significant additional LCFS credits being generated from specified source feedstocks for the same finished fuel justifies the additional documentation requirements for such feedstocks. The specified source feedstock attestations will further improve the chain-of-custody requirements in the current regulation. Chain-of-custody documentation is necessary for specified source feedstocks to ensure that the source, type and quantity of the feedstock is verifiable and that the correct CIs are assigned to the fuel pathway application. Staff considers this evidence to be indispensable in establishing that a material is indeed a waste.

The intent of the specified source feedstock attestation requirements for supply chain entities is that at the time and/or physical location where the feedstock material was in the supply chain entity's possession that the supply chain entity attests that no additional processing occurred except as explicitly included in the pathway lifecycle analysis and pathway CI. Refer to KK-9 on clarification on emission factors of tallow, UCO, and natural gas for the default emission factors and the energy systems that are included in CARB's emission factors. Fuel pathway holders provide certain site-specific input values associated with operations or processing that occur throughout the feedstock supply chain, some of which may not be under the direct control of the fuel producer or pathway holder. The specified source feedstock attestation requirement ensures the relevant supply chain entities provide necessary information to fuel pathway holders.

The Proposed Amendments require that the specified source feedstock attestation letters be maintained by supply chain entities, but not require that the attestations be sent with the feedstocks as they move down the supply chain. These attestations must be made available for LCFS verifiers or CARB review upon request.

LCFS fuel pathway holders are responsible for accurate reporting to CARB. Fuel pathway holders that source specified source feedstocks are subject to the requirements under section 95488.8(g) and must work with entities in their supply chain to meet the requirements. The benefit of additional rigor is that it would provide reasonable assurance that ineligible feedstocks are not incentivized in the LCFS program. This benefit outweighs the potential disbenefit that some smaller feedstock suppliers or aggregators may choose not to participate. CARB does not agree that the specified source feedstocks should begin at the first aggregation point or collection point as all supply chain entities upstream of the fuel producer are part of the chain of custody.

RFS separated food waste plans and ISCC self-declarations are useful documentation that LCFS verifiers may review, but these documents alone are not sufficient to meet LCFS requirements specified in the Proposed Amendments. LCFS verifiers must use their professional judgement to review the data available to them and, as needed, perform additional sampling including site visits as necessary to come to reasonable assurance that requirements under section 95488.8(g) are met.



## **GG-2 Multiple Comments: *Support Specified Source Feedstock Attestation Requirements and Oversight of All Pathways***

**Comment:** We support the tracing requirements for specified source feedstocks that are included in the proposed regulation. Full chain-of-custody documentation throughout the entire supply chain will demonstrate that waste feedstocks meet the goals of the program and help facilitate continued broad support for these important low carbon products. We support CARB staff engaging in rigorous oversight over all pathways – whether virgin or waste – to ensure accuracy and legitimacy of the respective low carbon fuels. (Apr-124.4)

**Comment:** We appreciate the addition to section 95488.8(g)(1)(D) in January requiring attestation letters for specified source feedstocks, at each entity spanning the chain of custody from the point of origin to the fuel production facility. (15d2-289.7)

**Agency Response:** No changes were made to these comments. Staff acknowledges the commenter's support for CARB's specified source feedstock attestation requirements and oversight of fuel pathways in the program. Staff agrees that full supply chain traceability for waste feedstocks is essential to maintain the integrity of the LCFS program.

## **GG-3 Multiple Comments: *Support Specified Source Feedstock Attestation Requirements and Suggest Changes***

**Comment:** We appreciate the importance of maintaining a rigorous chain of custody for all waste feedstocks and support the amended text under §95488.8.g.D regarding supplier attestation letters:

Requirements for Feedstock Attestation Letter. Each specified source feedstock supply chain entity must maintain a specified source feedstock supplier attestation letter. Supply chain entities supplying biogas or biomethane used as a feedstock must follow the requirements under section 95488.8(i)(2). The specified source feedstock supply chain entities include points of origin, collectors, aggregators, traders, distributors, and storage facilities that participate in the supply chain from point of origin to the fuel producer for specified source feedstocks. The attestation letter must attest to the veracity of the information supplied, declare that the information accurately represents the specified source feedstock(s), and conform to the requirements of this subsection. The specified source feedstock attestation letter must make the following specific attestations:

However, we seek clarity and flexibility on the specific definitions introduced in this requirement. For example, regarding traceability to “point-of-origin”, we suggest clarifying the language to define the point-of-origin for biomass wastes as the location where the waste or the residue was generated. In this case, forestry residues would be traced to the specific timber stand, and lumbermill waste to the lumbermill. Bills of lading, already used for chain of custody purposes, should be an acceptable verification method. (45d-333.5)

**Comment:** We recognize potential challenges in applying these requirements to certain feedstocks, like sawdust, where tracing the origin throughout the entire supply chain might be impractical or infeasible. Therefore, we urge CARB to consider a more flexible approach for such specific cases. This flexibility could involve:

- Alternative verification methods: Accepting alternative forms of documentation or verification mechanisms suitable for the specific feedstock type.
- Focus on key points: Prioritizing attestation requirements on critical stages of the supply chain, such as initial collection and final delivery, rather than demanding origin details for every intermediary step.
- Tiered approach: Implementing a tiered system where the level of detail required in the attestation letter varies depending on the feedstock type and potential risks associated with its origin.

By adopting a more nuanced approach, we can ensure the integrity of the program while also fostering the utilization of diverse and potentially important waste feedstocks. (45d-333.6)

**Comment:** Letters of attestation are an appropriate means of providing feedstock certification that aligns with the 7 priorities identified by CARB in its recent LCFS proposal, as well as appropriately fitting the maturity of the upstream biomass industry.

In terms of establishing a chain of custody for traceability purposes, bills of lading (“BOLs”) are a tool used by multiple sectors today to trace material movements along their supply chains. Whether it be forestry management materials, landfill diversion, ag residues, or other material groups, BOLs provide a means of tracing the supply chain of custody for biomass to be used by BECCS facilities from the point of origin to final user. As a legally binding document, BOLs provide a complete description of shipments and parties involved, including:

- The quantity, value, and weight of the cargo.
- A complete description of items within the cargo, and its freight classification.
- The shipping and receiving parties as well as their signatures and the shipping date.
- Location of origin and destination

By tracking and documenting these components, BOL’s ensure that there is oversight from point of origin to transport vehicle, to staging destination (if applicable) to end-user. In doing so, this document creates a receipt for the products, and generates a traceable supply chain for BECCS facilities.

Depending on the type of biomass material being utilized and the scale of the BECCS facility, the length and structure of the supply chain will vary. BOL’s will allow these variances to be captured. Two examples that help demonstrate this difference are:

- Residues sourced from a local mill and trucked to the BECCS facility.

In the case of mill residues and chips, the point of origin would be the mill where the materials were generated as a secondary waste in the milling process and loaded for transit. It is at this point that the residues would become a secondary product eligible as a feedstock for usage under CARB’s LCFS, as well as other programs, given they are a waste stream and were not purposefully generated as a fuel or feedstock.

A single BOL would be generated in this instance: at the loading of materials onto a truck at the local mill, to be delivered to the BECCS facility and signed by the receiving personnel on site with specific details around the batch (volume, product, quality, etc.).

Because these feedstocks are a processing residue resulting from the production of primary materials such as finished lumber, furniture, pallets, barrels, etc., it is an undue burden upon the mill owner to trace residues upstream of the facility. Furthermore upstream actions were not intended for the utilization or consumption of these residual fibers. Should these fibers not be utilized, mills would landfill the product, leading to CO2 emissions in the decomposition process.

- Pulpwood, and other byproducts and residues, sourced from managed forestry stands.

In the case of this example, this could include but would not be limited to: wood fiber of low grade quality and various diameters, material falling within a pulp classification, limbs/tops/slash/bark, or other low-grade material that would be harvested, potentially in-woods chipped, and/or left on the forest floor.

In the case of forestry management material, the point of origin would be where this pulpwood and low-grade fiber would be collected, and potentially chipped, and loaded into trucks at the timber stand where the material was harvested as part of established forestry management practices and loaded for transit.

Tracking BOLs from point of origin to the end-user will enable the certifiability of the material utilized for the benefit of BECCS facilities, increasing oversight and transparency across the supply chain. (45d-045.4, Apr-122.5)

**Agency Response:** No changes were made in response to these comments. CARB agrees that Bills of Lading (BOLs) are important documents that can help to support chain of custody and traceability requirements. Regarding support for specified source feedstock attestations please see Response GG-2.

No LCFS fuel pathways utilizing lumber mill waste or residues have been approved and therefore the point of origin for lumber mills has not needed to be assessed by CARB staff. The determination would be made if and when such a pathway application is submitted to CARB. See also Response EE-1.

## **HH. Higher Ethanol Blend**

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### **HH-1 Multiple Comments: *Initiate Rulemaking to Certify E15 Blends***

**Comment:** Higher blends of ethanol are an immediate option for maximizing carbon intensity reductions, lowering criteria emissions, and reducing consumer costs in the LCFS. Concurrent with adoption of LCFS amendments, CARB should initiate a rulemaking to certify E15 blends in California.

With Montana's approval of E15 in December of 2023, California is now the only state not recognizing the blend as a legal fuel. Decarbonizing the liquid fuels that will be in the market for decades to come is a critically important complement to electrification in achieving the goals of the CARB Scoping Plan. Science informs us that time is of the essence to achieve maximum GHG reductions now. E15 is the leading opportunity under the LCFS to immediately and significantly further reduce GHG emissions while at the same time reducing criteria

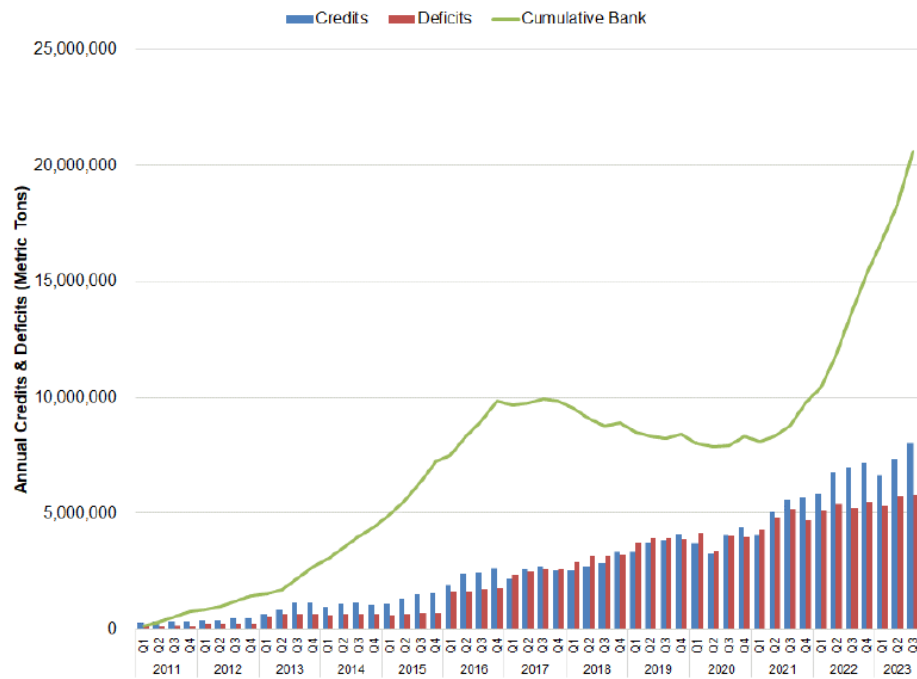
pollutant emissions and consumer costs. Higher ethanol blends in California will not lead to substantial increases of ethanol in the California fuels market, but rather utilize existing supplies to displace more petroleum as gasoline consumption in California declines, meeting both decarbonization and petroleum displacement goals.

Ethanol has been a workhorse of the LCFS program generating one-quarter of the credits program to date. Opening the LCFS to higher blends of ethanol supports a more stringent compliance curve resulting in greater GHG and criteria pollutant reductions. A vehicle emissions study co-funded by CARB demonstrated remarkable air quality benefits when increasing the blend of ethanol from 10 to 15 percent. E15 as the standard fuel in California would result in an additional annual reduction of two million metric tons of GHGs while reducing the cost of gasoline to consumers.

RFA is part of the broad coalition of clean fuel suppliers who have documented through analysis by ICF that carbon reductions of over 40 percent by 2030 are readily achievable. E15 is a significant contributor to these additional carbon reductions. The ICF analysis has been shared with CARB Board members and staff.

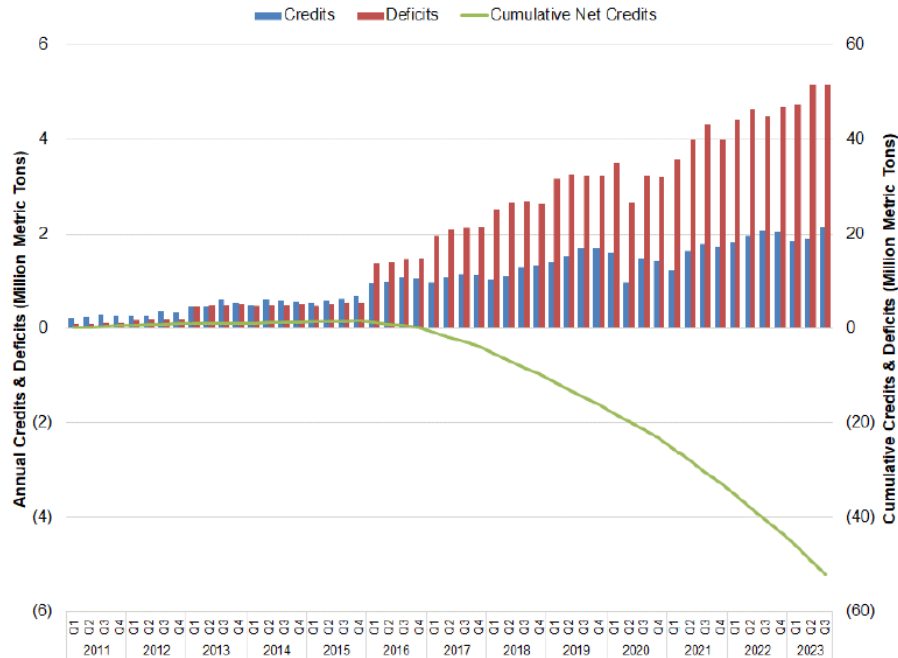
Additional credit generation in the gasoline pool is critical in the near term to reverse the growing and alarming trend of large deficit balances in the light duty transportation sector. Figure 2 and Figure 3, which are updated from prior RFA comment letters, show the credit surpluses in the overall LCFS program due to large credit generation from RNG and bio-based diesel (now 60 percent of total diesel consumption) contrasted with the large deficits in the gasoline pool, where ethanol is limited to ten-percent blends (E10) and petroleum continues to be the dominant source of fuel.

**Figure 2: Total California LCFS Credits and Deficits for All Fuels**



Source: California Air Resources Board

**Figure 3: Net Credits (Deficits) Generated by Gasoline, Ethanol and Charging of On-road Electric Vehicles, Excluding Heavy-duty Vehicles**



Source: RFA Analysis of California Air Resources Board data

The Department of Finance was correct in responding to the SRIA by questioning the assumption that E10 would be the standard ethanol blend through 2045 when the consequence is greater dependence on liquid petroleum fuel, which runs counter to stated CARB policy. The response by CARB to the Department of Finance in defending the E10 assumption was misleading. The Multimedia Working Group (MMWG) process evaluating E15 blends has been ongoing for over three years and is nearly complete, merely waiting for finalization by CARB staff to then refer to the Environmental Policy Council for a final recommendation.

Due to California leading underground tank policies, all underground tanks in California are legally required to be compatible with E15 and higher blends as of January 1, 2024. Virtually all the cars on the road are approved by EPA for E15 use and virtually all the new dispensers sold are warranted for at least E15 blends. With E15 approval by CARB, fuel marketers will have the option of providing a lower cost and cleaner fuel choice to consumers.

CARB has expressed interest in leveraging federal support in meeting LCFS and climate neutrality goals. The Inflation Reduction Act (IRA) of 2022 allocated \$500 million to the High Blend Infrastructure Incentive Program (HBIIP) to support the building of new infrastructure for the distribution of higher blends of both ethanol and biodiesel produced from agricultural products. The first round of \$50 million in HBIIP funding is committed with \$450 million still available over the next several years. This program is available to California businesses to invest in new infrastructure for dispensing E15 and higher ethanol blends.

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." California's exemption from the Clean Air Act to implement its own clean air programs is predicated on the state's regulations going further than the federal government on improving air quality and human health. Expediently approving E15 use in California is consistent and necessary for CARB to comply with both state and federal clean air policies.

As commented by the RFA from the beginning of this process, E15 certification should be part of the current LCFS rulemaking. We respectfully ask that the CARB Board direct staff to expedite the simple gasoline specification change allowing for (not mandating) E15 to facilitate greater emissions reductions, petroleum displacement and cost savings as soon as possible to advance the success of the LCFS program. (45d-171.2)

**Comment:** NCGA urges CARB to adopt E15 due to the immediate benefits it can help achieve as a lower carbon and lower cost fuel which is readily available. Ethanol has a low-CI and can help reduce greenhouse gas (GHG), criteria, and toxic pollutant emissions. Compared to E10, E15 can reduce annual GHG emissions by 2 million metric tons.

Notably, California is the last state that has not approved E15 despite gasoline-ethanol blends having a long history of being used in the state.<sup>1</sup> Today, almost all gasoline sold in California uses blends of up to 10% ethanol (E10). As California looks to electrify much of its transportation, higher ethanol blends are a complementary solution, especially for hard-to-abate sectors and heavy-duty applications. California has long been a leader in championing progressive climate policies, with the LCFS being one of them. With more jurisdictions looking to introduce their own clean fuels programs, the lack of approval for E15 in California will be a significant obstacle to exporting the program as E15 helps garner agricultural support.

The ethanol industry and CARB have invested significant resources in conducting the proper analyses to get E15 approved in California. Among these efforts is the Multimedia Evaluation (MME) of E15, which is in the final stages.<sup>2</sup> In the Tier II Report for the MME, the ethanol industry and CARB jointly funded vehicle emission testing conducted by the University of California Riverside which found significant air quality improvements (see results in the table below).<sup>3</sup> Throughout the MME process, ethanol stakeholders have been responsive and collaborative with CARB to ensure the evaluation could move at a quick pace.

E15 is a readily available and affordable solution which can swiftly enable additional CI reductions in the LCFS. Approving E15 in California will allow for the LCFS to be even more ambitious in setting targets and achieving California's transportation decarbonization goals. (45d-190.2)

**Comment:** More broadly, the proposed changes to the Low Carbon Fuel Standard risk doubling down on California's inexplicable decision to effectively reject cleaner fuels and lower emissions through the failure to permit the use of E15.

For instance, if E15 had replaced E10 in California cars as recently as 2022, the Golden State would have enjoyed an additional greenhouse gas savings of 2.2 billion metric tons (CO<sub>2</sub>e) that year alone.<sup>1</sup> And California residents could have joined drivers nationwide in saving an average of more than 25 cents per gallon when filling up their tanks.<sup>2</sup>

<sup>1</sup> Letter from Renewable Fuels Association, October 3, 2023.

<sup>1</sup> Renewable Fuels Association study, April 2023.

Yet, despite the substantial greenhouse gas emissions benefits associated with E15 — and the significant financial savings to consumers — California continues to abstain from this commonsense step towards a better and cleaner energy future. And that hurts California residents from all walks of life both financially and environmentally. (45d-174.3)

**Comment:** Though technically related to CARB’s “Advanced Clean Cars” (ACC) proposed amendments, we must take this opportunity to implore you to once and for all approve the use of E15 in California. Afterall, allowing E15 will help reduce the carbon intensity of the state’s gasoline supply and also cut emissions of criteria pollutants. In fact, 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.<sup>1</sup> It should also be noted E15 is EPA-approved for nearly all vehicles on the road and offers meaningful cost savings, but Californians are currently paying more at the pump because CARB has not yet approved E15.

<sup>1</sup> <https://ww2arb.ca.gov/resources/documents/comparison-exhaust-emissions-between-e10-carfg-and-splashblended-e15>

(45d-196.3)

**Comment:** Finally, Aemetis strongly encourages CARB to approve 15% ethanol blended gasoline (E-15) in California in 2024. E-15 was first approved by the US EPA in 2012, and California remains the only US State not to adopt an E-15 gasoline blend.

Over the past 12 years, billions of miles have been driven utilizing E-15, and no notable safety, environmental, or vehicle damage concerns have been presented. In 2023, the US EPA approved E-15 for year-round use. California has performed all of the required air and road testing required to adopt E-15, and yet CARB inexplicably refuses to approve the use of E-15.

Beyond the environmental attributes of renewable E-15 (higher octane, lower tailpipe emissions), E-15 will reduce prices at the pump for California residents as ethanol consistently sells at a discount to gasoline. Californians continue to suffer from higher gasoline prices than most states, which creates economic and environmental harm - especially to marginalized and disadvantaged communities. While Aemetis supports CARB’s push for increased adoption of ZEVs and alternative fuel vehicles, longer than anticipated adoption rates require interim steps that can provide immediate GHG reductions. E-15 will allow California to pursue aggressive ZEV adoption over the next decade while reaping the benefits of lower tailpipe emissions today. No action on E-15 keeps gasoline prices artificially high and causes more pollution than necessary.

As the world leader in environmental policy, it seems out of character for California to be the laggard as the only US state to support a 90% petroleum gasoline mandate. We urge CARB to fully approve an E-15 gasoline blend immediately. Otherwise, Californians will endure yet another summer of record setting gasoline prices, economic hardship, and increased air pollution. (45d-201.7)

**Comment:** CARB Should Take Concrete Steps to Allow the Use of E15 Fuel in California



We continue to urge CARB to expedite its approval of E15 fuel. E15, a blend consisting of 15% bioethanol, has been approved for use by the EPA in all passenger vehicles model year 2001 and newer — more than 96% of the vehicles on the road today — and is now for sale at more than 3,400 locations in 31 states. It is striking that in the state with the most aggressive climate policy in the country, the lowest carbon intensity gasoline product on the market (E15), remains unavailable to consumers and as a compliance tool for parties obligated to reduce the greenhouse gas emissions of California transportation fuel under the LCFS. In addition to its climate benefits through displacing more fossil fuel, E15 also provides substantial public health benefits through the reduction of criteria air pollutants, particularly PM<sub>2.5</sub> as discussed above. And E15 provides substantial cost benefits as well, selling for 15 cents less per gallon on average this summer where it was available. In certain states, these cost savings reached as high 60 cents per gallon. Many of these benefits are especially impactful to communities that are disproportionately overburdened by pollution, including urban communities in close proximity to highways and vehicular traffic, and low-income communities for which fuel costs make up a higher proportion of household expenditures.

We appreciate the Multimedia Working Group's continued work on the multi-media evaluation of E15, and we strongly encourage CARB to make material commitments towards expediting the approval of E15 for California consumers and to help drive immediate GHG reductions. (45d-243.11)

**Comment:** BIO also wishes to take this opportunity to urge CARB push for 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 one of only two states that does not permit the sale of E15.

Allowing E15 will help reduce the carbon intensity of the state's gasoline supply and cut emissions of criteria pollutants. In fact, the University of California-Riverside's Center for Environmental Research and Technology found that replacing E10 with E15 in California will significantly improve air quality. Additionally, E15 is EPA-approved for nearly all vehicles on the road and offers meaningful cost savings, but Californians are currently paying more at the pump because CARB has not yet approved E15. (45d-265.3)

**Comment: III. CARB Should Expedite E15 Adoption Rather Than Restrict Ethanol Imports into California as Proposed.**

In its rulemaking materials, CARB assumes that "E10 will continue to be used in California through 2046."<sup>21</sup> This assumption inconsistent with the near universal adoption of E15 throughout the United States. California the only state in the Union yet to approve E15 as part of its transportation fuel supply, and its reluctance to do so is in tension with the State's climate goals. Even under the most aggressive targets for electric vehicle adoption, there will be millions of internal combustion engines on the road for decades to come. Authorizing the use of E15, which is EPA-approved for 96% of light duty vehicles, will help decarbonize these legacy vehicles and, according to California's own studies, deliver improved public health outcomes in areas most affected by tailpipe emissions.

<sup>21</sup> See California Air Resources Board, *Proposed Low Carbon Fuel Standard Amendments, ISOR*, Appendix C-3, at 1 (Dec. 19, 2023), <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/appc-3.pdf>.

**A. E15 offers significant climate and public health benefits.**

The skepticism CARB expresses towards E15 adoption in the ISOR appears to arise from a series of factual misconceptions. First, CARB notes that E15 adoption requires a Multimedia Evaluation (“MME”) and approval by the Environmental Policy Council (“EPC”), and states that the process “takes years to complete.”<sup>22</sup> But the E15 MME process in California has been underway for over four years, with revisions to a Tier III Report now under review by the Multimedia Working Group (“MMWG”). UCR’s research conducted in connection with the MME process demonstrates public health benefits in association with the adoption of E15, concluding that E15 reduces CO, PM<sub>2.5</sub>, VOCs, and GHGs with no increase in NO<sub>x</sub>.<sup>23</sup> As discussed above, another study conducted by Environmental Health & Engineering, Inc., a multi-disciplinary team of environmental health scientists and engineers affiliated with Harvard and Tufts Universities, found that corn-based bioethanol has a 46% lower lifecycle CI on average than gasoline.<sup>24</sup> This finding confirms recent studies conducted by the Department of Energy and Department of Agriculture showing that bioethanol reduces lifecycle emissions by 43-52%.<sup>25</sup> A study by Air Improvement Resource, Inc. also showed that shifting from E10 to E15 in California would cut 1.8 million metric tons of GHG emissions annually, equivalent to removing more than 411,000 cars off the road.<sup>26</sup> In short, there is no basis for the MMWG or the EPC to conclude that “allowing E15 use in California would have significant adverse impacts on public health or the environment.”<sup>27</sup> To the contrary, MMWG, EPC and CARB have every reason to conclude that E15 adoption will promote California’s climate goals and alleviate air pollution. Indeed, E15 is likely to assist California in complying with EPA’s recently strengthened National Ambient Air Quality Standards for Particulate Matter.<sup>28</sup>

<sup>22</sup> *Id.*

<sup>23</sup> *Supra* note 14, at 54.

<sup>24</sup> *Supra* note 5, at 16; see Appendix B at 10.

<sup>25</sup> *Supra* note 4, at 1328; ICF, *A Life-Cycle Analysis of the GHG Emissions of Corn-Based Ethanol* (prepared for U.S. Department of Agriculture), at 99 (Sept. 5, 2018) [https://www.usda.gov/sites/default/files/documents/LCA\\_of\\_Corn\\_Ethanol\\_2018\\_Report.pdf](https://www.usda.gov/sites/default/files/documents/LCA_of_Corn_Ethanol_2018_Report.pdf).

<sup>26</sup> Air Improvement Resource, Inc., *GHG Benefits of 15% Ethanol (E15) Use in the United States*, at 4 (Nov. 30, 2020) <http://www.airimprovement.com/reports/national-e15-analysis-final.pdf>.

<sup>27</sup> ISOR, Appendix C-3 at 1.

<sup>28</sup> See EPA, *Reconsideration of the National Ambient Air Quality Standards for Particulate Matter* (Feb. 5, 2024) (to be codified at 40 CFR Parts 50, 53, and 58), <https://www.epa.gov/system/files/documents/2024-02/pm-naaqsfinal-frn-pre-publication.pdf>; EPA, *EPA Finalizes Stronger Standards for Harmful Soot Pollution, Significantly Increasing Health And Clean Air Protections for Families, Workers, and Communities* (Feb 7, 2024), <https://www.epa.gov/newsreleases/epa-finalizes-stronger-standards-harmful-soot-pollution-significantly-increasing> (According to EPA, of the 52 counties projected to be out of attainment with the new standards, 23 are in California.).

## **B. Assumed barriers to E15 adoption identified in the ISOR are easily surmountable.**

CARB expresses concern that “even if E15 is approved in California, there are still several market barriers that would limit its adoption and availability in the state including vehicle compatibility, fuel infrastructure readiness, and consumer acceptance.”<sup>29</sup> Each of these assumed barriers is either overstated or proceeds from factual misconceptions.

<sup>29</sup> See ISOR, Appendix C-3 at 1.

First, CARB presents as an obstacle to E15 adoption the fact that EPA has approved E15 for “only vehicles model year 2001 and newer.”<sup>30</sup> But that vehicle cohort constitutes the overwhelming majority of cars and trucks on the road in California. CARB next notes that “some automakers have warned that using E15 may void vehicle warranties or cause damage

to engines and fuel systems.”<sup>31</sup> But almost every automaker warranties for E15 in their new vehicles now, and Honda, Toyota, Volkswagen, GM, Ford, Hyundai, and Tata have done so since at least 2014.<sup>32</sup> CARB also states that “the existing fuel infrastructure in California is not universally compatible with E15, as some tanks, pipes, pumps, and dispensers may need to be upgraded or replaced to handle higher ethanol blends.” But most retail fueling infrastructure is ready for E15 today. According to numerous reports by the National Renewable Energy Laboratory, U.S. Department of Energy, EPA, Steel Tank Institute, and Fiberglass Tank and Pipe Institute,<sup>33</sup> most underground storage tanks made in the last 30 years are approved up to 100% bioethanol, and most fuel dispensing equipment is already manufacturer-approved for E15. In fact, since the 1980s, petroleum equipment manufacturers have offered compatible products for blends above 10% bioethanol, including storage tanks, piping, valves, hanging hardware, dispensers, hoses, and nozzles, as standard equipment.<sup>34</sup> Furthermore, any concerns regarding midstream infrastructure are also misplaced: 5% less gasoline flowing through California’s existing pipelines, storage tanks, and terminals can be reallocated to accommodate 5% more ethanol in order blend E15. And contrary to CARB’s stated concerns, there is evidence throughout the United States that consumers will choose E15 where it is offered. Among retailers that offer E15, the fuel has developed a strong sales record, generating 30 to 56% of total fuel sales in many locations.<sup>35</sup>

<sup>30</sup> *Id.*

<sup>31</sup> *Id.* at 2.

<sup>32</sup> See Renewable Fuels Association, *E15 Warranty Data Compiled*, [https://d35t1syewk4d42.cloudfront.net/file/2648/MY2024%20E15%20Chart\\_RFA%20vEngines.pdf](https://d35t1syewk4d42.cloudfront.net/file/2648/MY2024%20E15%20Chart_RFA%20vEngines.pdf).

<sup>33</sup> See e.g., U.S. Department of Energy, *Handbook for Handling, Storing and Dispensing E85 and Other Ethanol-Gasoline Blends*, at 11 (Feb. 2016), [https://afdc.energy.gov/files/u/publication/ethanol\\_handbook.pdf](https://afdc.energy.gov/files/u/publication/ethanol_handbook.pdf); see EPA, *Report on UST System Compatibility with Biofuels*, at 5 (July 2020), [https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.epa.gov%2Fsites%2Fdefault%2Ffiles%2F2020-07%2Fust\\_compatibility\\_booklet\\_formatted\\_final\\_7-13-2020.docx%23%3A~%3Atext%3DMost%2520currently%2520installed%2520UST%2520systems%2Chigher%2520blends%2520are%2520now%2520available.&wdOrigin=BROWSELINK](https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.epa.gov%2Fsites%2Fdefault%2Ffiles%2F2020-07%2Fust_compatibility_booklet_formatted_final_7-13-2020.docx%23%3A~%3Atext%3DMost%2520currently%2520installed%2520UST%2520systems%2Chigher%2520blends%2520are%2520now%2520available.&wdOrigin=BROWSELINK); Steel Tank Institute, *Steel Tanks: Compatible with All Biofuel Blends*, (last visited Feb. 17, 2024), <https://stispfa.org/resource/steel-tanks-compatible-with-all-biofuel-blends/>.

<sup>34</sup> See PEI, *Petroleum Equipment Institute Compliance Letters by Manufacturer*, (last visited Feb. 17, 2024), <https://stispfa.org/resource/steel-tanks-compatible-with-all-biofuel-blends/>.

<sup>35</sup> Growth Energy, *The E15 Advantage: The Secrets to Success*, at 1 (Feb. 2021), <https://e15advantage.com/wpcontent/uploads/2021/02/GE-E15-Advantage-White-Paper.pdf>.

In short, there is no reason for CARB to delay the E15 approval process in California, which will result in climate and public health benefits consistent with the agency’s policy goals. (45d-369.1)

**Comment:** We commend the California Air Resources Board’s (CARB) assessment of E15 as a means to reduce greenhouse gas (GHG) emissions and offer economic benefits to California motorists. Since the U.S. EPA sanctioned E15 in 2011, its adoption has surged to 3,400 retail locations across 32 states. This expansion highlights a national acceptance, contrasting sharply with California’s current stance, as it remains the only state yet to authorize this efficient and eco-friendly fuel. Should CARB approve and prefer E15 over E10, this switch could equate to removing over 400,000 internal combustion engine vehicles from California roads, all without adverse effects on consumers. (Apr-033.1)

**Comment:** We applaud the California Air Resources Board'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. 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 3,400 retail sites in 32 states. Since then, drivers in America have relied on E15 to drive 100 billion miles.

In contrast, with Nevada, Oregon, the Phoenix metro area, and most recently Montana approving E15 for sale, California remains that only state to have not approved this cost-effective, environmentally beneficial fuel that can be used in nearly all the state's 31 million gasoline-powered vehicles.

If CARB approved E15, and replaced E10 with E15, this change 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. (Apr-035.1)

**Comment Summary:** Also included on Slide 52, staff asked if E15 should be considered to reduce retail gasoline costs. The stakeholders ask CARB to refer to NCGA's written comments on February 20 and encourage the inclusion of E15. Studies show that E15 can save consumers an average of 16 cents per gallon, a significant amount of savings given California's high retail gasoline prices.<sup>3</sup> Despite being a climate leader, California remains the only state who has not approved E15, which is not only preventing additional emissions reductions, but will also be a significant obstacle to encouraging other jurisdictions to adopt their own LCFS programs. The E15 Multimedia Evaluation (MME) is in advanced stages and has shown the plethora of value that E15 can bring to California in the form of lower gasoline prices and reduced GHG and criteria pollutants. Ethanol stakeholders have invested significant time, efforts, and money into the MME process over the past six years. The MME is in its final stages, with the stakeholder group awaiting a rulemaking process to commence.

<sup>3</sup> Study: Nationwide E15 Would Save Drivers Over \$20 Billion in Annual Fuel Costs

(Apr-038.5, Apr-046.5)

**Comment:** Additionally, we ask that CARB continue the process of approving E15 for sale and use in California. With E15 approval, GHG reductions from bioethanol use will be even greater, as bioethanol has as much as a 46% reduction in GHG compared to gasoline. (Apr-049.5)

**Comment:** POET appreciates and agrees with CARB's acknowledgement for the "[p]otential role of E15 to reduce costs at the pump." See CARB April 10 Workshop (Slide 66). As California public university research shows, E15 also offers significant climate and public health benefits. Indeed, shifting from E10 to E15 in California would cut annual GHG emissions by approximately 1.8 million metric tons. For these reasons, POET continues to urge CARB to approve E15 for use in California. (Apr-063.11)

**Comment:** Please provide more information so that I can comment on this question in detail. How widely does CARB anticipate E15 would be available? Is it plausible or likely that E15 could quickly become the predominant gasoline blend in California? What would the impact be on total ethanol consumption?

My general view is that is that gradually increasing the ethanol blending rate at a speed that is offset by decreased gasoline consumption so that total ethanol consumption is flat or gradually declines is not a concern, since there would not any additional cropland required to supply that fuel. I would be concerned if total corn used a feedstock for fuel consumed in California grew rapidly, as has been recently observed for vegetable oil used to produce bio-based diesel. The land use impact is dictated by the total feedstock consumed for all fuel, including E10, E15, E85 and any corn ethanol made into jet fuel. The scaleup of these fuels, especially ethanol to jet fuel, is hard to predict and depends on many factors outside the control of the LCFS.

As a safeguard, CARB should clarify that total corn consumption for all fuels used in California will not be allowed to exceed the level used in 2023, roughly 0.5 billion bushels of corn. Under current expectations, this level seems unlikely to be exceeded, even with some growth in the use of E15 or ethanol made into jet, since E10 blending will be falling with gasoline consumption. By clarifying this expectation now, California can proactively avoid a future land use problem and provide investors a clearer expectation about the scale of the opportunity for new fuels based on corn and encourage investment in pathways based on underutilized feedstocks. (Apr-086.23)

**Comment:** 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 percent of all U.S. vehicles are approved to use E15 and nearly 3400 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.<sup>2</sup>

<sup>2</sup> <https://ww2arb.ca.gov/resources/documents/comparison-exhaust-emissions-between-e10-carfg-and-splash-blended-e15>

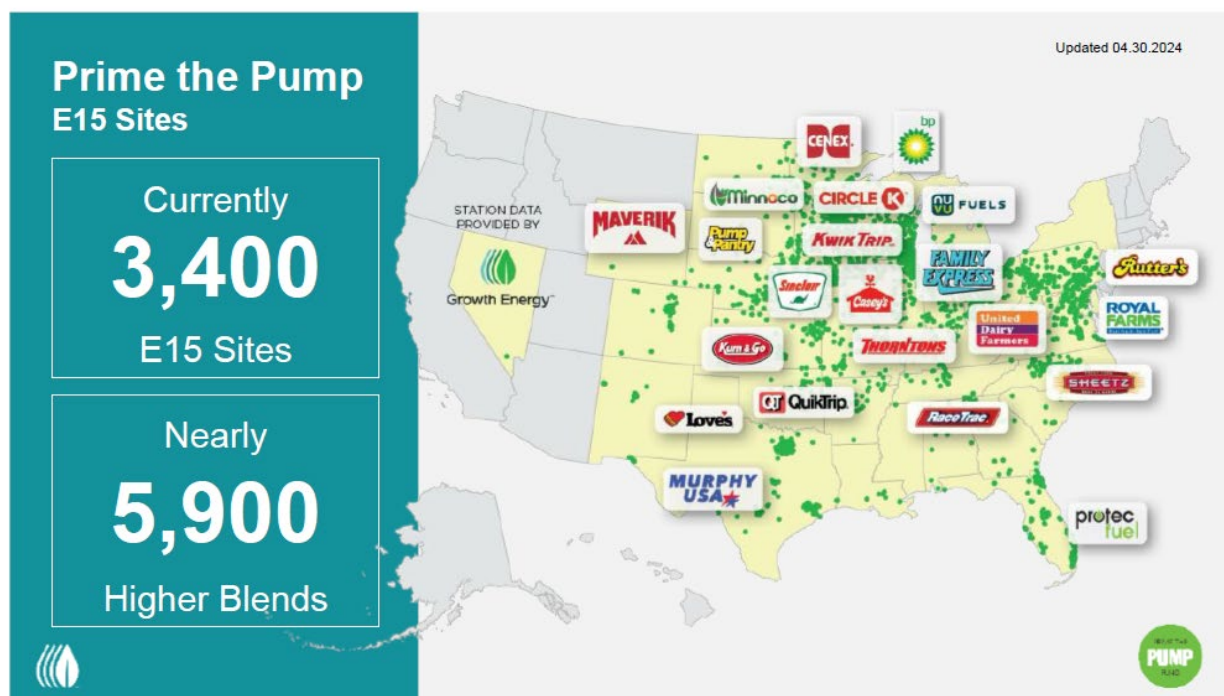
(Apr-090.6)

**Comment: Approval of E15**

We applaud the California Air Resources Board'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.<sup>2</sup> 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 32 states. Since then, drivers in America have relied on E15 to drive 100 billion miles.<sup>3</sup>

<sup>2</sup> <https://ww2.arb.ca.gov/sites/default/files/2024-04/LCFS%20April%20Workshop%20Slides.pdf>

<sup>3</sup> <https://growthenergy.org/2024/01/29/100-billion-miles-e15-growth-energy/>



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 million gasoline-powered vehicles.<sup>4</sup> 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*.<sup>5</sup> Neither will it have a negative impact on land use change for bioethanol.

<sup>4</sup> <https://ethanolproducer.com/articles/montana-becomes-49th-state-to-approve-the-sale-of-e15>

<sup>5</sup> <http://www.airimprovement.com/reports/national-e15-analysis-final.pdf>

(Apr-096.1)

**Comment:** RPMG looks forward to the approval and use of E15 in California. This logical next step for lowering the carbon intensity of California's gasoline supply will also provide further reduction in criteria air pollutants, thus achieving the dual goals being sought by CARB. Ethanol's role in California's gasoline market is firmly established and has been since the mandated phaseout of MTBE. The amount of ethanol used in California is not a function of LCFS incentives, but rather is a function of the State and Federal air quality rules requiring the use of Reformulated Gasoline and an Oxygenate. Under these air quality requirements, there is already a mandate for ethanol that is independent of the LCFS. The LCFS incents lower carbon ethanol *per gallon*, but the existing fuel regulations dictate the *total volume* consumed. It is also important to note that an increased volume of ethanol used in California will not result in an increase of acreage used for feedstock production. (Apr-111.14)

**Comment: 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. (Apr-121.2)

**Comment: E15 May Offer the Opportunity to Mitigate Gas Price Increases and More Rapidly Reduce Emissions**

On slide 52, Staff asked whether E15 should be considered to help reduce gas cost impacts. Our modeling has explored the possibility of shifting to E15 as the default fuel for spark-ignition engines.<sup>20</sup> The risks associated with an E15 standard are primarily focused around aggregate demand for agricultural commodities as feedstock, particularly corn. While significant expansion of total corn ethanol production in the U.S. could lead to significant ILUC or other impacts, the anticipated decline in gasoline consumption as the light-duty vehicle fleet shifts to EVs offers an opportunity to extract additional value out of ethanol with minimal risk. So long as the shift to an E15 standard is timed to ensure that no significant increases in total demand for ethanol occur, or that demand is satisfied by fuels and feedstocks that present low risk of ILUC, an E15 standard can be compatible with California's goal of carbon neutrality by 2045.

<sup>20</sup> See Brown *et al.* (2021), Ro, *et al.* (2023), and Murphy & Ro (2024)

Adopting an E15 standard would provide two notable benefits. First, it would rapidly displace a small but significant amount of petroleum from California's fuel pool. While corn ethanol offers only modest GHG benefits when displacing petroleum, the scale of California's transportation sector means that even relatively small shifts in fuel CI can yield significant GHG savings. Second, by reducing the amount of petroleum consumption, California may be able to insulate itself from oil price volatility and possibly begin driving down petroleum prices due to reduced structural demand. (Apr-163.21)

**Comment:** To facilitate more rapid achievement of California's petroleum and GHG reduction goals, Raizen 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. (15d1-019.3)

**Comment: 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%<sup>1</sup>, 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 CARB<sup>2</sup> 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 Association<sup>3</sup>, 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.

<sup>1</sup> Montana becomes 49th state to approve the sale of E15 | Ethanol Producer Magazine

<sup>2</sup> E15\_Final\_Report\_7-14-22\_0.pdf (ca.gov)

<sup>3</sup> RFA Letter to CARB re E15 10-3-23.pdf (d35t1syewk4d42.cloudfront.net)

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 year<sup>4</sup>. 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.

<sup>4</sup> E15 in California Initial Report (d35t1syewk4d42.cloudfront.net)

(15d1-045.6)

**Comment: 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.<sup>4</sup>

<sup>4</sup> <https://ww2arb.ca.gov/resources/documents/comparison-exhaust-emissions-between-e10-carfg-and-splash-blended-e15>

(15d1-102.6)

**Comment: 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.<sup>1</sup> 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.

<sup>1</sup>

<https://d35t1syewk4d42.cloudfront.net/file/2823/Impact%20of%20Introducing%20E15%20in%20California%2007-9-24.pdf>

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.” Expediently 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. (15d1-110.1)

**Comment:** 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 pollutants—like particulate matter and carbon monoxide—that cause air quality and human health problems.

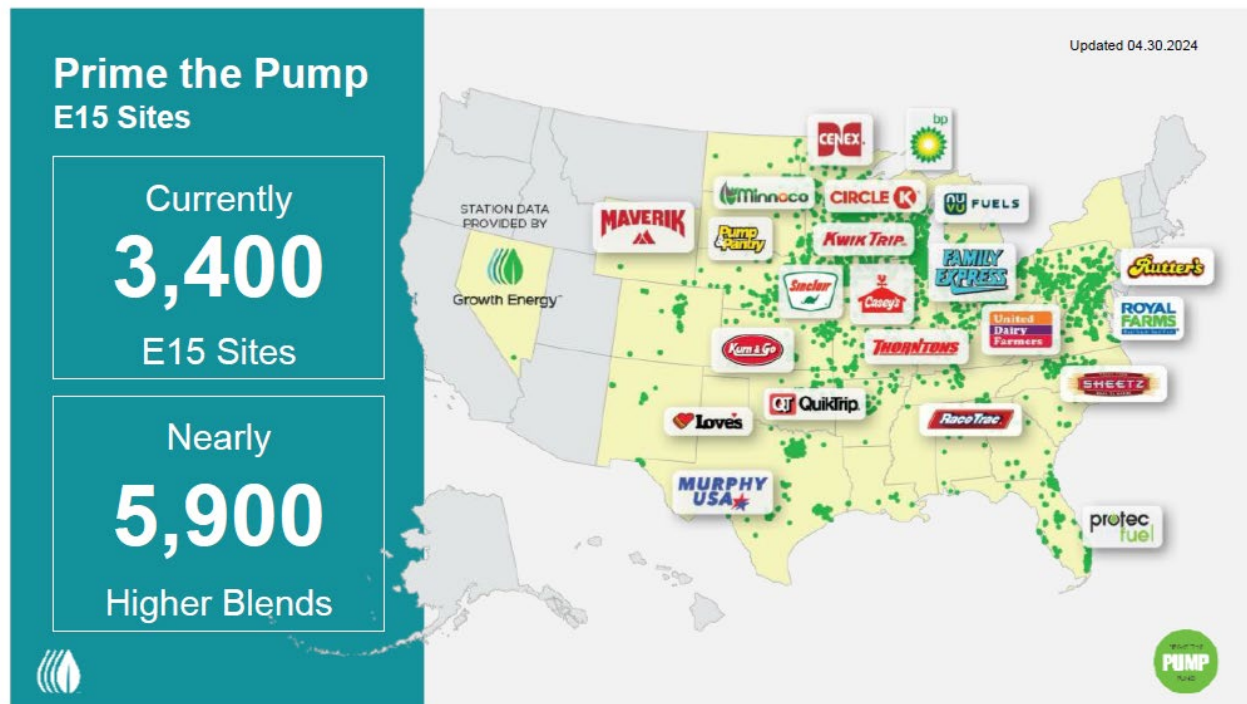
According to the Renewable Fuels Association, if all gasoline in California in 2022 had been E15 instead of E10, the state would have seen a 450-million-gallon reduction in petroleum consumption and additional GHG savings of 2.2 billion metric tons, based on CARB's own data. Furthermore, a recent UC 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. (15d1-144.9)

**Comment: 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.<sup>10</sup> 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.<sup>11</sup>

<sup>10</sup> <https://ww2.arb.ca.gov/sites/default/files/2024-04/LCFS%20April%20Workshop%20Slides.pdf>

<sup>11</sup> <https://growthenergy.org/2024/01/29/100-billion-miles-e15-growth-energy/>



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 million gasoline-powered vehicles.<sup>12</sup> 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*.<sup>13</sup> Neither will it have a negative impact on land use change for bioethanol.

<sup>12</sup> <https://ethanolproducer.com/articles/montana-becomes-49th-state-to-approve-the-sale-of-e15>

<sup>13</sup> <http://www.airimprovement.com/reports/national-e15-analysis-final.pdf>

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. (15d1-139.6)

**Comment:** 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.<sup>10</sup> 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 more than 3,500 retail sites in 33 states. Since then, drivers in America have relied on E15 to drive 100 billion miles.<sup>11</sup>

<sup>10</sup> <https://ww2.arb.ca.gov/sites/default/files/2024-04/LCFS%20April%20Workshop%20Slides.pdf>

<sup>11</sup> <https://growthenergy.org/2024/01/29/100-billion-miles-e15-growth-energy/>



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 million gasoline-powered vehicles.<sup>12</sup> 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*.<sup>13</sup> Neither will it have a negative impact on land use change for bioethanol.

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<sup>13</sup> <http://www.airimprovement.com/reports/national-e15-analysis-final.pdf>

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. (15d2-244.8)

**Comment:** 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 internal combustion engine vehicles off the road. (15d2-253.9)

**Comment:** NCGA also asks CARB to consider approving E15 as it is readily available and can support additional CI reductions for the LCFS Program. California is the only state which has not approved E15. (BHT-112)

**Agency Response:** No changes were made to the Proposed Amendments in response to these comments. Staff appreciates the commenters' insights but notes that the

recommendation is beyond the scope of this rulemaking. The adoption or amendment of a specific fuel specification regulation would require a new, separate rulemaking proceeding. Outside of this rulemaking, CARB is currently evaluating emissions data on higher ethanol blends through the multimedia process required by Health and Safety Code, §43830.8 to help determine whether E15 could be used in California without impacting public health and the environment and as a prerequisite for considering amendments to CARB's fuel regulations to allow E15.

In response to the comment related to potential land use impacts of higher ethanol blends, please see Master Response 2 of the *Response to Comments on the Draft and Recirculated Environmental Impact Analyses Prepared for the Amendments to the Low Carbon Fuel Standard*.

## **HH-2 Multiple Comments: E85 and Flexible Fuel Vehicles**

**Comment:** While E15 is not yet allowed for use in California, the availability of E85 enables the state to significantly reduce GHG emissions and save drivers of Flexible Fuel Vehicles (FFVs) substantial money at the pump. We specifically reinforce comments and concerns submitted to CARB from Pearson Fuels on January 15, 2024. Pearson is the largest distributor of E85 in California, supplying more than 350 fueling locations and planning more than 150 additional locations in the next 24 to 36 months.

In its January 15 comment letter, Pearson noted E85 use continues to rise in California but the number of FFVs declined from 2021 to 2022 by nearly 4 percent. As Pearson noted, “absent specific federal or state policy changes to motivate automakers to manufacture FFVs, we expect the FFV population will further shrink as automakers reduce model offerings. This will remove a key tool in the state’s push to reduce carbon emissions, scale down petroleum usage, and offer consumers affordable fuel.” We urge CARB to work with other state agencies, automakers, and the federal government to incentivize manufacturers to produce more FFVs and convert existing gasoline-operated internal combustion engines to operate on E85. (45d-196.4)

**Comment Summary:** 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.<sup>7</sup> California’s FFV fleet currently stands at more than 1.3 million vehicles.<sup>8</sup> The use of E85 will promote even greater reductions in GHG emissions and reductions of air toxics. The stakeholders encourage CARB to implement policies that strongly incentivize the production and use of flex-fuel vehicles, as well as continued investment in infrastructure for expanded access to E85. 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.

<sup>7</sup> [https://ww2.arb.ca.gov/sites/default/files/2024-03/Annual\\_E85\\_Volumes\\_Chart\\_3-8-2024.pdf](https://ww2.arb.ca.gov/sites/default/files/2024-03/Annual_E85_Volumes_Chart_3-8-2024.pdf)

<sup>8</sup> <https://afdc.energy.gov/vehicle-registration?year=2022>

(Apr-035.3, Apr-096.6)

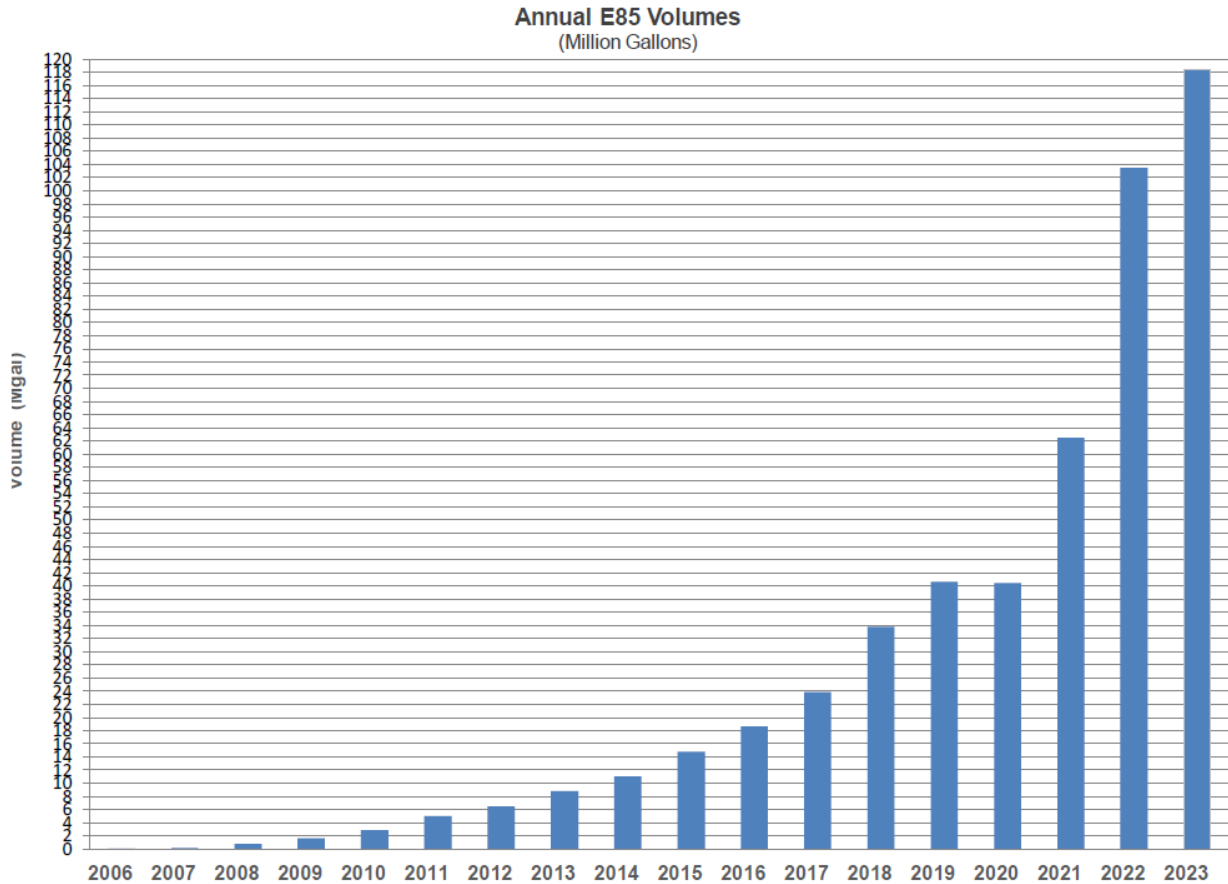
**Comment:** Pearson Fuel urges CARB to continue to leverage E85 by exploring opportunities to incentivize automakers to manufacture FFVs. (Apr-081.1)

**Comment:** To facilitate more rapid achievement of California’s petroleum and GHG reduction goals, Raizen 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. (15d1-019.3)

**Comment: 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 gCO<sub>2</sub>e/MJ to 35 gCO<sub>2</sub>e/MJ.<sup>14</sup> 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.

<sup>14</sup> [https://ww2.arb.ca.gov/sites/default/files/2023-08/CATS%20Technical\\_1.pdf](https://ww2.arb.ca.gov/sites/default/files/2023-08/CATS%20Technical_1.pdf)



Source: [https://ww2.arb.ca.gov/sites/default/files/2024-03/Annual\\_E85\\_Volumes\\_Chart\\_3-8-2024.pdf](https://ww2.arb.ca.gov/sites/default/files/2024-03/Annual_E85_Volumes_Chart_3-8-2024.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.<sup>15</sup> The current size of California’s FFV fleet stands at more than

1.3 million vehicles.<sup>16</sup> 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.

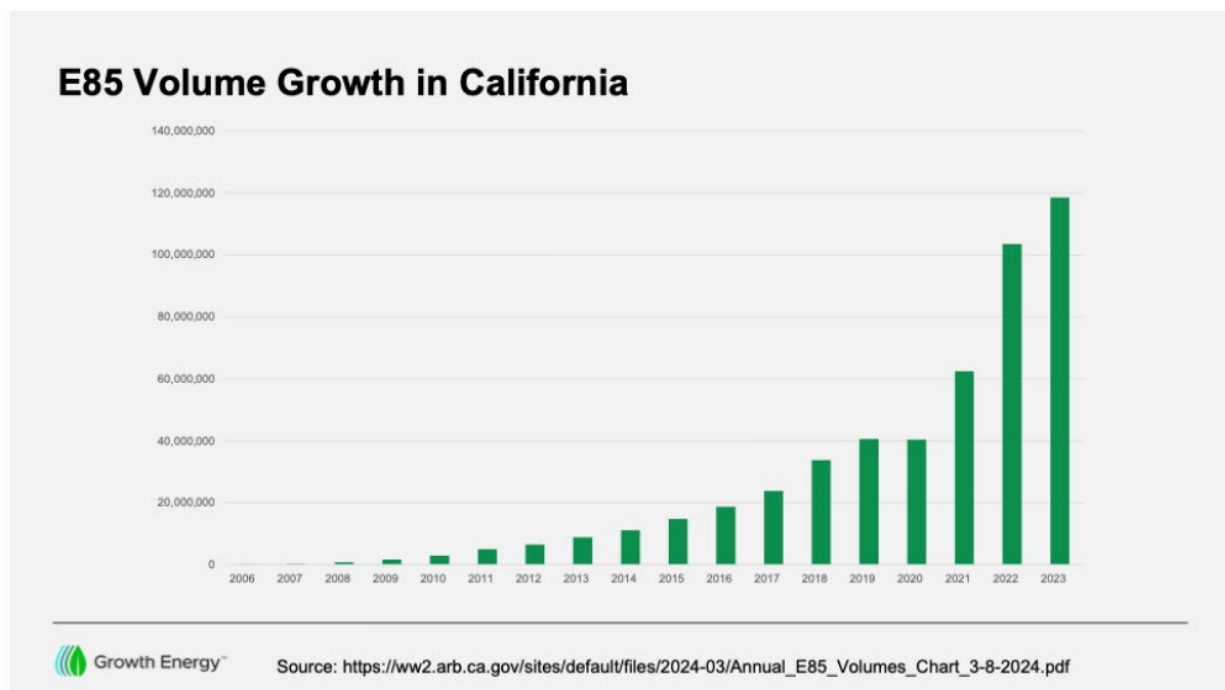
<sup>15</sup> [https://ww2.arb.ca.gov/sites/default/files/2024-03/Annual\\_E85\\_Volumes\\_Chart\\_3-8-2024.pdf](https://ww2.arb.ca.gov/sites/default/files/2024-03/Annual_E85_Volumes_Chart_3-8-2024.pdf)

<sup>16</sup> <https://afdc.energy.gov/vehicle-registration?year=2022>

(15d1-139.7)

**Comment:** 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 gCO<sub>2</sub>e/MJ to 35 gCO<sub>2</sub>e/MJ.<sup>14</sup> 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.

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the state in 2023 alone.<sup>15</sup> The current size of California's FFV fleet stands at more than 1.3 million vehicles.<sup>16</sup> 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.

<sup>15</sup> [https://ww2.arb.ca.gov/sites/default/files/2024-03/Annual\\_E85\\_Volumes\\_Chart\\_3-8-2024.pdf](https://ww2.arb.ca.gov/sites/default/files/2024-03/Annual_E85_Volumes_Chart_3-8-2024.pdf)

<sup>16</sup> <https://afdc.energy.gov/vehicle-registration?year=2022>

(15d2-244.9)

**Agency Response:** Staff appreciates the commenters' insights but notes that the recommendation is beyond the scope of this rulemaking. The adoption or amendment of a vehicle-specific regulation would require a new, separate rulemaking proceeding.