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Carolyn Lozo, Chief, Low Carbon Fuels Standard
Matthew Botill, Chief, Industrial Strategies Division
California Air Resources Board
Per email: LCFSWorkshop@arb.ca.gov

Comments on 4/10/24 ARB Workshop on LCFS Amendments:
Recommendation: Exclude crop-based biofuels from the program

Dear Ms. Lozo and Mr. Botill:

To maintain California's climate leadership position, ARB must make substantial changes to its Low Carbon Fuel Standard (LCFS) program. 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. More credits should be available for accelerating the transition to vehicles powered by electricity, so California can attain carbon neutrality by 2045.

We believe the models and data ARB uses to estimate the land use change values of both crop-based and residue-based biofuels are out-of-date, resulting in underestimated values of carbon intensity. The discount rate that ARB uses to calculate the social cost of carbon is also outdated, resulting in an underestimation of the benefits of replacing internal combustion engine vehicles with electric vehicles.

In this comment letter, we discuss the sustainability problems created by crop-based and residue-based biofuels; and propose guidelines for major changes to the LCFS program. These include:

- Accelerate the Advanced Clean Cars II target date to 2030
- Cap crop-based and residue-based credits
- Phase out all crop-based pathways as soon as possible
- No credits for crop-based sustainable aviation fuels

An appendix discusses the disparity in the carbon intensity estimates of different national and international transportation and land use models, thus supporting our argument for phasing out credits for crop-based biofuels.

Biofuels' Impact on Natural Lands

Agricultural productivity has not been improving fast enough to meet the world's ever increasing demand for food that results from population and per capita income growth.[1] As a consequence, natural primary forests, savannas, and wetlands in many tropical countries are being converted to agriculture. **Any increase in the production of crop-based biofuels increases the conversion of primary natural land to cropland.** Natural lands not only provide numerous ecosystem services and abundant biodiversity, they are also the planet's most effective land-based means of sequestering and storing carbon.

Deforestation and land conversion are the largest contributors to climate change after the burning of fossil fuels. The Intergovernmental Panel on Climate Change (IPCC) determined that only 16% of all global land was undisturbed forest, grassland or wetlands in 2015.[2] This is far less than the 30-50% of Earth's land that must be conserved for "maintaining the resilience of biodiversity and ecosystem services at a global scale,"according to the IPCC.[3]

The University of Maryland (UMD)'s Global Land Analysis and Discovery (GLAD) lab interpretation of NASA Landsat data indicates that the average rate of primary tropical deforestation has *increased* over the last five years compared to the beginning of this century.[4] One might have expected that deforestation rates would have decreased because global population growth rates declined from 2000-2020

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[1] The UN forecasts that the world's current population of 8 billion will grow by more than 2 billion before leveling off in the 2080's and global per capita income will continue to increase.
[2] IPCC, Special Report on Climate Change and Land, Chapter 1, Table 1.1, 2019.
[3] IPCC, Climate Change 2023: Synthesis Report, Longer Report, p 73.
[4] Weisse, M et al, Tropical Forest Loss Drops Steeply in Brazil and Columbia but High Rates Persist Overall, World Resources Institute, Global Forest Review, 4/4/24. UMD defines deforestation as human caused, permanent removal of forest cover. It does not include temporary losses from wildfires.

and real per capita GDP grew less rapidly over the last 5 years than from 2000-2005.[5] **The most likely explanation of the increase in the deforestation rate is the more than ten-fold increase in global production of crop-based biofuels from 2000 to 2020.[6]** In 2023 alone tropical primary forest loss created 2.4 gigatons (Gt) of CO2 emissions.[7]

The UN's 2014 Declaration on Forests was an agreement to end primary forest loss by 2030, but the world is not progressing towards this goal. More than 96% of the world's deforestation occurs in tropical forests,[8] which lack basic protections. At least 90% of tropical deforestation is driven by agriculture. However, policies that promote deforestation-free international supply chains have been limited in their ability to reduce deforestation.[9]

CARB's proposal for dealing with deforestation risk—by tracking the chain of custody of a biofuel crop back to its origin in order to ensure it was not grown on recently deforested land—will not work either. As the Union of Concerned Scientists makes clear, there is enough cropland in the US, Brazil and Argentina that is not recently cleared forestland to supply the US with all the biofuel crops it wants, but "California won't be tracking the chain of custody of vegetable oils being used to replace those diverted from global markets" to the US by the LCFS.[10] China, by far the largest importer of soybeans, imported 100 million metric tons of soybeans in 2023, while India, the largest importer of edible vegetable oils, imported 16 million metric tons of edible oils in 2023. India appears to have no deforestation certification requirements for these imports. China has supported efforts to limit deforestation-linked imports, for example by signing Brazil's Soy Moratorium, but has not taken steps to implement or enforce them.[11]

The only feasible way for the world to achieve its goal of ending deforestation by 2030 is to phase out the use of crop-based biofuels.

The European Union (EU) recognized that consumption of crop-based biofuels needed to be capped to prevent further deforestation and food price increases

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[5] World Bank national account data for world GDP per capita (constant 2015$).
[6] Statista, Biofuel production worldwide from 2000 to 2022, 2024.
[7] Weisse, op. cit.
[8] Deforestation is defined as human caused permanent removal of forest cover for some other land use. Ibid.
[9] Pendrill, F. et al, Disentangling the numbers behind agriculture-driven tropical deforestation, Science, 9/9/22.
[10] Martin, J, A Cap on Vegetable Oil-Based Fuels Will Stabilize and Strengthen California's Low Carbon Fuel Standard, Union of Concerned Scientists (UCS), 1/30/2024.
[11] Chavkin, S, Despite billions tied to clean supply chains, China's Cofco still turns to deforesters, Mongabay, 2023.

resulting from consumption increases. The EU capped the level of crop-based biofuels eligible for emissions reduction credits at a country's 2020 consumption levels. Several countries have continued to decrease their caps annually. In addition, the EU recently excluded crop-based biofuels from counting towards mandated reductions in airplane and maritime greenhouse gas emissions.

Disparities in Carbon Intensity and Indirect Land Use Change Estimates for Crop-based Biofuels

The EU's decision to cap biofuels in order to halt deforestation and spikes in food prices relied on Global Biosphere Management Model (GLOBIOM) estimates of fuel carbon intensity (CI). This model, which takes into account indirect land use change (ILUC) effects, shows that vegetable seed oil-based diesel, such as diesel derived from soybean, canola, sunflower seed and palm oil, produces more carbon emissions than fossil diesel. In other words, any increase in the use of these crops to meet the demand for biomass-based diesel leads to the clearing of natural forest or grassland in tropical countries, releasing enough carbon stored on this land and sufficiently reducing the ability of the land to sequester carbon in the future, to make the life cycle carbon emissions ot these vegetable oil-based diesels greater than those of fossil diesel.

There is a large disparity in the carbon intensity estimates of vegetable-seed oil-based diesel between ARB's GTAP/AEZ-EF models and the EU's GLOBIOM and other well respected transportation and land use models. GLOBIOM estimates the CI of renewable diesel made from soybean oil to be 182.9 gCO2e/MJ, while CARB's models estimate it to be around 55gCO2e/MJ.[12] Both GLOBIOM and GREET estimate the CI of fossil diesel to be around 94 gCO2e/MJ. The University of Maryland's Global Change Assessment Model (GCAM) model, using up-to-date Landsat forest loss data, and the Research Triangle Institute's Applied Dynamic Analysis of the Global Economy (ADAGE) model both estimate the CI of soybean oil-based diesel to be greater than fossil diesel's, because of soybeans' large ILUC effects.[13]

Differences in the EU's GLOBIOM and ARB's GTAP model assumptions and data categories shed light on why the two models likely produce such different CI estimates. To us, many of the GTAP's assumptions, parameters and data files seem ill-suited to estimating land use change in tropical countries, where most land conversions occur, in response to US increases in biofuel production. An Appendix to this comment discusses these differences.

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[12] Transport & Environment, Globiom:the basis for biofuel policy post 2020, April 2016.
[13] Lashof D, EPA's New Renewable Fuel Standard Will Increase Carbon Emissions—Not Lower Them, World Resources Institute, 7/3/2023.

CARB's December, 2023 Initial Statement of Reasons (ISOR) for its Proposed Amendments to the LCFS mentions that it has not assessed the land use change emissions associated with crop-based biofuels since 2013-2015.[14] This is unacceptable, considering the Environmental Justice Advisory Committee (EJAC), appointed by ARB to make recommendations regarding the LCFS program, recommended in August 2023 that crop-based biofuel credits be capped at 2020 levels because of their unsustainability. How was ARB able to declare that the EJAC proposal did not reduce carbon emissions as much as ARB's proposal when it had not reassessed its estimated ILUC values since 2013-2015? Interpretation of Landsat data on deforestation has improved dramatically since then, providing improved time series data on deforestation and a better understanding of the variables affecting deforestation. Furthermore, ARB had to have been aware of the EU's capping of all crop-based biofuels at 2020 levels because of sustainability concerns, and of the GLOBIOM estimates showing that the carbon intensity of all vegetable seed oil-based diesel is greater than fossil diesel. The fact that ARB has not assessed ILUC values since 2013-2015 gives the appearance of an agency captured by the biofuel industries, rather than an agency making policy decisions based on the most up-to-date science. **We want to know why CARB has not proposed a cap on LCFS credits for crop-based fuels?**

ARB's same ISOR states that "waste-and-residue-based feedstocks … are not associated with land use change impacts," but recent research disputes this.[15] 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.

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.[16] 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. The study's assumption that 50% of additional UCO feedstocks will come from previously uncollected sources also seems optimistic. If

[14] CARB, Staff Report: Initial Statement of Reasons, (ISOR), Public Hearing to Consider the Proposed Amendments to the Low Carbon Fuel Standard, 12/19/23.
[15] Ibid.
[16] O'Malley, J et al, Indirect Emissions from Waste and Residue Feedstocks: 10 Case Studies from the US, International Council on Clean Transportation, December 2021.

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. A recent Cerulogy study reaches the same conclusion for using tallow, which has almost no opportunities for bringing new sources to market, as a feedstock in either the EU or the US.[17]

For these sustainability reasons and concerns over food price increases, several organizations have recommended that ARB cap credits for these residues.[18] 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.[19]

UCO imports have dramatically increased in both the US and EU, reaching unsustainable levels.[20] 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.[21] 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."[22] 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?**

Regrettably, the International Civil Aviation Organization (ICAO) chose a political approach to developing its Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), and as a result it allows sustainable aviation fuel (SAF) credits for crop-based biofuels. ICAO chose the average of the US GTAP and EU GLOBIOM model ILUC scores as its default ILUC values for crop starch-based sustainable aviation fuels (SAFs). However, because this approach would have prevented

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[17] Malins, C, The Fat of the Land, Cerulogy, 2023.
[18] O'Malley, J et al, Setting a lipids cap under the California Low Carbon Fuel Standard, International Council on Clean Transportation, August 2022.
[19] Suzan, S, Biofuels: from Unsustainable Crops to Dubious Waste?, Transport & Environment, December, 2023.
[20] Ibid.
[21] Pratt, S, Used cooking oil amount proves surprising, The Western Producer, 4/11/24.
[22] Ibid.

vegetable seed oil-based fuels from receiving any credits, it arbitrarily decided to set its default ILUC values for those biofuels closer to the model with the lower score . The ICAO did try to determine the factors that led to such different ILUC estimates for seed-based biofuels in the 2 models, but then made no attempt to scientifically analyze which model was more accurate, reflecting its overall approach of adopting biofuel-positive assumptions.[23] We discuss these factors in the Appendix.

Had the ICAO made a science-based decision, using recent research and data trends, to determine ILUC values, it would likely have excluded all crop-based SAFs, including corn-based ethanol, from CORSIA. Recent US research suggests that corn ethanol has a higher CI than gasoline. One study used actual US data from 2008-2016 to calculate the additional amounts of land and fertilizer used to produce the massive increase in corn ethanol mandated by the Renewable Fuel Standard over this period.[24] **Using these values it estimated corn ethanol's CI to be 115.7gCO2e/MJ, 24% higher than gasoline's CI of 93.1 gCO2e/MJ.** The study also noted that millions of acres of Conservation Reserve Program land were converted into corn during this period.

Even more regrettable than the ICAO's compromise approach to determining CORSIA's default CI values, was the US Treasury's recent political decision to adopt GREET/GTAP CI values instead of CORSIA's for determining eligibility for SAF credits provided by the Inflation Reduction Act (IRA). The Biden Administration's voluntary SAF Grand Challenge sets an annual target of 3 billion gallons of sustainable aviation fuel (SAF) by 2030 and 35 billion gallons by 2050. Currently, almost all the SAF used in the US is made from vegetable seed oils and residue oils. However, ethanol companies plan on meeting the IRA's requisite 50% reduction in carbon emissions, for receiving up to $1.75 per gallon of SAF, by adding carbon, capture and storage (CCS) to their production facilities. Pathways for this highly unsustainable method of producing SAF should be excluded from the LCFS program.

Other Ways to measure harmful effects of crop-based fuels

A recent EU study estimated what global carbon emission reductions would be if the land used to grow its biofuels were instead returned to nature.[25] The study estimated that greenhouse gas reductions from re-wilding, plus greater use of zero-emission vehicles, would be 25-33 million tons greater than those from using biofuels, even if

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[23] Malins, C, Understanding the Indirect Land Use Change Analysis for CORSIA, Cerulogy, December 2019.

[24] Lark, T, Environmental Outcomes of the US Renewable Fuel Standard, Proceedings of the National Academy of Sciences, 2/2022.

[25] Fehrenbach, H et al, The Carbon and Food Opportunity Costs of Biofuels in the EU27 plus the UK, Transport and Environment, 2023.

ILUC effects were ignored.[26] The study's goal was to highlight the importance of "land as a scarce and precious resource".[27]

The same study calculated that if the 24 million acres of global cropland used to grow crops to produce the biofuels consumed annually in the EU, were instead used to grow crops to feed people, an additional 221 million people could be fed annually, assuming an average daily intake of 2200 kcal per capita. The US, which produces and consumes more crop-based biofuels than any other country, devotes over 60 million acres, one fifth of its cropland area, to growing corn and soybeans for ethanol and biomass-diesel.[28] The EU study implies that this amount of land could instead be used to feed an additional 552 million people annually. Brazil, the second largest producer and consumer of crops for biofuels, devotes around 35 million acres a year to growing soybeans, sugarcane and corn for biomass-based diesel and ethanol for domestic use. Indonesia uses 9 million acres to grow palm oil for biomass-based diesel for domestic use.[29] If the US, the EU, Brazil and Indonesia stopped consuming biofuels, enough cropland would become available to feed about 1.2 billion more people annually. This might make eliminating deforestation by 2030 a realistic goal.

Additional Negative effects of LCFS credits for crop-based biofuels

Corn and soybeans account for over 50% of US harvested acreage, almost half of this is used for biofuels. The monocultural farming techniques employed by these two crops perpetuate the rural biodiversity crisis and worsen soil quality. 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.[30] The rapid growth in renewable diesel consumption in California from 2021-2023 resulted in global vegetable oil prices

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[26] Their re-wilding estimate excluded the amount of land needed to provide photovoltaic solar to charge ZEVs enough to drive the same number of miles that biofuels were powering. The study assumed increased carbon sequestration from re-wilding would vary by region, it calculated results for the replacement of crops grown in the EU as well as those grown abroad and it estimated average annual sequestration rates over a 30 year period.

[27] Fehrenbach, op.cit.

[28] US Agricultural Census, 2022 and USDA crop surveys.

[29] USDA, GAIN annual publications: Oil Seeds and Products Annual, Brazil, 4/25/23 and 3/22/24; Sugar Annual, Brazil, 4/18/24; Cereals Annual, Brazil, 2023; Oilseeds and Products Annual, Indonesia, 3/20/23 and 3/20/24.

[30] Martin, J, A Cap on Vegetable Oil-Based Fuels Will Stabilize and Strengthen California's Low Carbon Fuel Standard, Union of Concerned Scientists (UCS), 1/30/2024.

almost doubling from 2020-2022.[31] 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.[32] Global Forest Watch satellite data show tropical primary forest loss increased 10% from 2021-2022.[33] 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.[34] 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%.

Social Cost of Carbon (SCC) used to calculate LCFS benefits

ARB is using a lower SCC in its cost-benefit analyses than the federal government. The Biden Administration recently increased its SCC from $51 per mt CO2 to $190 per mt CO2 and decided to use a 2% discount rate to evaluate estimated carbon costs in the future. ARB appears to be still using the old $51 per mt CO2 value and a 3% discount rate.[35] This results in a lower estimation of the benefits of replacing internal combustion (ICE) vehicles with electric vehicles. For example, using the lower SCC of $51 per mt CO2 and 3% discount rate used by ARB result in a SCC of $63 per mt CO2 for 2025 and $68 per mt CO2 for 2030. Using the higher SCC of $190 per mt CO2 and 2% discount rate result in a SCC that is more than 3 times greater, $210 per mt CO2 for 2025 and $230 per mt CO2 for 2030.[36] We recommend that CARB adopt the higher SCC and the lower discount rate used by the federal government. This would produce an estimate for the benefits of electrifying transportation more rapidly that is more in line with the opinions of scientists, and possibly justify increasing LCFS credits for ZEVs by a factor of three. It also strengthens the argument for including more credits for rebates for zero emission cars and trucks in the LCFS program.

In short, the LCFS program relies on CI numbers for both crop-based and residue-based fuels that are highly uncertain. They do not comport with European

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[31] Food and Agriculture Organization (FAO) Food Price Index, annual, 1990-2024, 2014-2016=100.

[32] Statista, Production of major vegetable oils worldwide from 2012/13 to 2023/2024 by type, 2024.

[33] Weisse, M et al, op. cit.

[34] FAO Food Price Index, op. cit.

[35] CARB, ISOR, op cit., p. 40 and the White House, Biden-Harris Administration Releases Final Guidance to Improve Regulatory Analysis, 11/9/23.

[36] Institute for Policy Integrity, EPA Values for the Social Cost of Greenhouse Gases, New York University School of Law.

model results or with the latest research. 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. All crop-based subsidies should be phased out by 2030 at the latest and credits for soybean oil-based diesel should be phased out immediately. Many of our proposed recommendations for the LCFS program mirror T&E's recommendations to the EU regarding their biofuel mandates.[37] Allocating annual credits of up to $2 billion for crop-based biofuels in the absence of reliable data showing that this is reducing greenhouse gas emissions is unacceptable.

Our proposals:

1) **Adjust LCFS crediting to facilitate the goal of accelerating Advanced Clean Cars II rules, so all new light-duty vehicle sales can be zero emission by 2030.**

This is definitely doable. Norway will require all new passenger vehicle sales in 2025 to be ZEV, only 7 years after its new ZEV market share reached 21%. California reached the same 21% market share in 2023, surpassing its 2025 ZEV sales target of 1.5 million by 300,000.[38] In a 2022 survey of Californians half the respondents said they would seriously consider buying an EV.[39] Norway's success resulted from policies that made EVs both cheaper to purchase than comparable ICE vehicles and cheaper to drive, e.g. by lowering bridge and road tolls and municipal parking fees for ZEVs. If Norway, a country with many cold winter months, that effectively reduce ZEV driving range by 20%, can transition to ZEVs as quickly as it has, certainly California should be able to do the same.

Another indication that accelerated adoption of ZEVs should be possible sooner than expected is the development of inexpensive Chinese models that are already selling well in Asia. BYD's Seagull introduced last year in China for $10,0000 and this year in Brazil and Mexico for about $20,000 is the cheapest, though it still offers a range of 186 miles with the possibility of upgrading to 236 miles for an additional $3000.[40] This is putting pressure on US and European manufacturers to design cheaper ZEV models.

California recently reached a light-duty charging station total of 100,000, well behind its 2025 target of 250,000 stations. However, California is scheduled to receive more than $380 million of federal funds to create charging infrastructure along 6,600 miles

[37] Suzan, op cit..
[38] Zero-Emission Vehicle Market Development Strategy, California Government.
[39] Ibid.
[40] Johnson, P, BYD leads EV sales surge in Brazil with affordable electric cars, electrek, 4/5/24.

of highways, with at least 4 fast chargers every 50 miles. CARB needs to be incentivizing the building of charging stations in other areas, e.g adding charging connections to local gas stations, creating charging hubs that include battery swaps and car sharing as well as charging, and adding charging stations to multi-family housing units.

> Tesla's recently announced cutbacks in its supercharging program suggest that even the best, most reliable charging companies are not profitable, possibly ARB should increase LCFS capacity credits.
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> Most EVs are charged overnight at home. CARB might set up a system that would double or triple credits for EV fueling if sufficient solar with battery storage had been installed to charge household vehicles, with a further multiple for bidirectional charging systems. Households need more incentives to buy EVs and to install solar to charge them. This would also encourage apartment building owners to install chargers, though both building owner and tenant would need to share the credits. These credits could be allocated to individual residential buildings rather than to the utilities dispensing electricity. They could be sold on CARB's platform with households receiving annual or monthly payments.

ARB deserves substantial credit for jump-starting sales of ZEVs, but it now needs to assist California in accelerating its ZEV adoption rate the way the government of Norway did. The Governor's FY 2024-25 budget proposal to defer $600 million for CARB's Low Carbon Transportation Programs (mostly ZEV programs) until FY 2027-28 has resulted in auto manufacturer discussions to scale back planned ZEV production. LCFS funds could be made available for these programs or new ones as early as FY 2025-26. The Clean Vehicle Rebate Project should be reactivated and the Clean Cars 4 All program maintained. Phasing out credits for crop-based alternative fuels would enable this.

Adopting the 2030 target rather than the current 2035 target for stopping sales of new light-duty ICE vehicles could provide an additional 256 million tons of carbon emission reductions; and it would align with the state's 2045 carbon neutrality goal, as nearly all passenger vehicles on the road in 2045 would be ZEVs.[41]

US Climate Action Network's VECA platform, supported by over 100 environmental organizations, recommended the 2030 target.[42]

2) Cap LCFS credits for crop-based biofuels at 2020 levels beginning in 2025.

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[41] Center for Biological Diversity, All-Electric Drive: How California's Climate Success Depends on Zero-Emission Vehicles, December 2020.
[42] US Climate Action Network (USCAN), Vision for Equitable Climate Action, 2021-2022.

Capping credits at 2020 levels will have no effect on ethanol and biodiesel producers because ethanol sales have changed little and biodiesel sales have actually decreased since then. Only renewable diesel will be impacted. Since most of the increased renewable diesel capacity in the US is from old, recently converted fossil fuel refineries which would have been decommissioned had they not been converted to renewable diesel production, closing them would not be that burdensome for their oil company owners. As compensation, these companies will benefit from higher fossil diesel sales in the short run.

Capping can be easily implemented. When a credit pathway reaches its 2020 level it would no longer eligible for more credits that year. Pathways originating after 2020 would only receive credits if they replaced a pathway that no longer received credits or was willing to forgo receiving credits. Corn oil is a crop-based fuel that should also be capped at 2020 levels.

An additional benefit to capping credits for crop-based biofuels at 2020 levels would be its influence on increasing LCFS credit prices. Oil refineries would need to buy more credits because they would receive fewer credits for renewable diesel.

This policy has been recommended by CARB's Environmental Justice Advisory Committee (EJAC) and a myriad of scientists and environmental organizations.[43]

3) Phase out all LCFS crop-based biofuel credits as soon as possible.
This would reduce deforestation and land conversion pressure in the tropics by freeing up land for food production.

US biodiesel production capacity is expected to continue to decline as feedstocks switch to renewable diesel. Oxygenation requirements will prevent reduction in ethanol production to some extent, but removing incentives should encourage the search for less land-intensive options. Renewable diesel conversions of oil refineries in California have failed to reduce local greenhouse gas emissions and have even worsened air quality in some cases.These refineries need to be decommissioned.

It would give the world time to expand and improve the United Nations' REDD+ (Reducing Emissions from Deforestation and forest Degradation) program in developing countries, and establish effective carbon market incentives for protecting

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[43] Environmental Justice Advisory Committee, Low Carbon Fuel Standard, 9/14/2023.
Michael Wara, et al. testimony to CARB Sept. 14, 2023
https://ww2.arb.ca.gov/sites/default/files/barcu/board/books/2023/091423/ejacguestspeakerpres.pdf.
Martin, J, op. cit.
O'Malley, J, Setting a Lipids cap under the California Low Carbon Fuel Standard, op. cit.
Suzan, op. cit.
Velez, V, CARB Must Reform LCFS Program to Meet Climate Goals, Natural Resources Defense Council, 8/23/23.

forests, wetlands and undisturbed grasslands. In addition, it would reduce pressure on food prices, declining aquifers and biodiversity.

Caps for crop-based fuels would decrease annually until they are phased out, possibly in a few years, but definitely no later than 2030. For example, in 2026 crop-based biofuel pathway credits could be capped at three quarters of their 2020 level, in 2027 at half their 2020 level and beginning in 2028 all crop-based biofuel pathways could be eliminated.

Germany, Netherlands and Spain have been lowering their credit caps for crop-based fuels for several years, and France and Denmark allow no credits for either palm- or soy-based diesel.[44]

4) 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.[45]

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.

5) 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.

6) Develop strategies to enable accelerating Advanced Clean Fleets targets.

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[44] Foreign Agricultural Service, USDA, Biofuel Mandates in the EU by Member State-2023, 7/2023.

[45] Kristiana, T et al, An estimate of current collection and potential collection of used cooking oil from major Asian exporting countries, ICCT, February, 2022.

Design incentives for trucking companies to use their existing ICE trucks more intensively so purchases of new vehicles can be delayed and the expected life of existing vehicles will be reduced. This might make it possible to advance the target date for requiring all sales of new trucks to be electric.

Design a system to include rebates for the purchase of new medium- and heavy-duty electric trucks in the LCFS program, possibly by crediting them upfront for their electric fueling for several years.

7) Offer credits for off-grid renewable energy hubs that will provide community charging sites.

Work with the state's 25 Community Choice Aggregation Programs to see how they could expand their rebate and charging incentives as well as provide additional credits for new renewable energy projects. Richmond, under the Marin Clean Energy CCA, offers customers three plans, one is 100% renewable electricity and one is 100% local solar. Providing credits for other 100% local solar projects that are linked to community charging stations would be worthwhile.

Conclusion

In summary, the deep uncertainty associated with ARB's CI scoring for all crop-based fuels and the large negative side-effects not factored into ARB's CI scoring call for capping immediately and then quickly eliminating all crop-based fuels from the LCFS program. This would free up $2 billion a year for accelerating the state's transition to ZEVs. It is crucial that California correct its LCFS problems and adopt goals to accelerate the transition to electric vehicles because it effectively sets the standards for many other states as well.

Thank you for considering these comments.

Sincerely,

Janet Cox, CEO
Climate Action California

Daniel Chandler, Ph.D., Steering Committee
350 Humboldt

Appendix: Models for calculating CI of crop-based biofuels

A previous comment letter from 350 Humboldt 350 (dated 2/19/24) described in detail concerns about CARB's Global Trade Analysis Project(GTAP) and Agro-Ecological Zone (AEZ) model assumptions and data files. This discussion is repeated here.

Comparison of ARB's GTAP and EU's GLOBIOM estimates of ILUC

The GTAP model assumes greater productivity increases result from feedstock price increases, though historical data does not seem to support this assumption.[46] The GTAP model also assumes that consumers will buy fewer vegetable oils as prices rise in response to greater biofuel production.[47] Yet global consumption of vegetable oils has been increasing more rapidly than most food types making this an unreasonable assumption. The GLOBIOM model assumes people will maintain a caloric intake sufficient to live, the GTAP model does not.

Crushing more soybeans to produce soybean oil for biofuels also produces more of the co-product soybean meal which is used as animal feed. The GTAP model predicts that farmers will substitute this cheaper feed for other feeds, while the GLOBIOM model predicts that the lower price will encourage more livestock production and hence increase demand for complementary feeds such as cereals.[48] Global meat consumption has also been increasing more rapidly than most food items adding support to GLOBIOM's approach.

The two models categorize land differently. In the GTAP model there is a "cropland pasture" category that refers to pasture land that was previously cropland and is easily converted back to cropland with little loss of carbon.[49] The model relies on this category to account for most of the land conversion in the US and Brazil. The GLOBIOM model includes an "other natural land" category which refers to unmanaged natural land that has a lower carbon stock than forests but higher than the cropland pasture category of the GTAP model. This is the land category that absorbs much of the land conversion resulting from increased biofuel production in the GLOBIOM model. Certainly for Brazil which has accounted for over 50% of the growth in soybean production since 2008 the GLOBIOM model's description of land use change is more accurate.

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[46] Malins, C, Understanding the indirect land use change Analysis for CORSIA, Cerulogy, 2019.

[47] Ibid.

[48] Ibld.

[49] Ibid.