January 7, 2022

RE: California Air Resources Board's *Potential Future Changes to the LCFS Program*

These comments are submitted by the International Council on Clean Transportation (ICCT). The ICCT is an independent nonprofit organization founded to provide unbiased research and technical analysis to environmental regulators. Our mission is to improve the environmental performance and energy efficiency of road, marine, and air transportation, in order to benefit public health and mitigate climate change. Over the past decade, the ICCT has been highly engaged in California low-carbon fuel policy, participating in expert working groups, submitting public comments on technical design issues for the Low-Carbon Fuel Standard (LCFS), and regularly publishing research on the operation of the California LCFS program.

The ICCT welcomes the opportunity to provide comments on the California Air Resources Board's "Potential Future Changes to the LCFS Program" workshop. We commend the agency for its continuing efforts to promote a cleaner, lower-carbon transportation sector that uses less petroleum-based fuels. The comments below offer a number of recommendations for CARB to consider in its continued efforts to strengthen the program and maximize the program's benefits in mitigating the risks of climate change and reducing petroleum use.

We would be glad to clarify or elaborate on any points made in the below comments. If there are any questions, CARB staff can feel free to contact Nik Pavlenko (n.pavlenko@theicct.org) or Dr. Stephanie Searle (stephanie@theicct.org).

Stephanie Searle, PhD

Program Director, Fuels and United States

International Council on Clean Transportation

www.theicct.org

communications@theicct.org

twitter @theicct

THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

1500 K STREET NW | SUITE 650 | WASHINGTON DC 20005

Introduction

The ICCT commends CARB for reviewing the role of the LCFS in achieving California's broader climate targets and for exploring implementation changes to expand and enhance the LCFS program as part of its 2022 Scoping Plan. Proposed changes discussed at the December 7th Scoping Plan workshop include updated carbon intensity (CI) targets for the LCFS, changes to hydrogen crediting requirements, and expanding the LCFS credit pool to include intra-state aviation. Our comments pertinent to the presentation include hydrogen crediting and intra-state aviation; we also discuss considerations for renewable natural gas and lipid-based biofuel pathways.

Ensuring the Additionality of Renewable Electricity to Produce Low-CI Hydrogen

During the workshop and in supporting documentation, CARB expressed interest in streamlining hydrogen certification and expanding the LCFS to use book-and-claim accounting for hydrogen injected into pipelines in order to increase low-CI hydrogen capacity. CARB currently assesses the low-CI hydrogen produced via electrolysis using a book-and-claim system for low-CI electricity.[i]

Based on CARB's 2019 guidance document, hydrogen producers can claim renewable electricity consumption by retiring RECs purchased within the Western Renewable Energy Generation Information System (WREGIS). Renewable electricity that is used to qualify for state-level Renewable Portfolio Standards (RPS) is restricted from qualifying. Although CARB implemented these measures to ensure that low-CI electricity is not double-counted across different policies, they do not comprehensively ensure additionality. Due to favorable economics, renewable electricity supply has outpaced RPS targets in California and neighboring states;[ii] thus a unit of electiricty retired as a REC is likely to have been produced in absence of added demand from a low-CI hydrogen producer.

To minimize the risk of crediting low-CI hydrogen from non-additional renewable electricity, we recommend that CARB strengthens the additionality requirements for low-CI electricity in its guidance. More reliable measures include requiring power purchase agreements (PPAs) and certification showing that renewable power generators are not receiving other policy or financial support.[iii]

Obligating Intra-State Aviation Fuels

ICCT supports expanding the LCFS to include intra-state aviation by adding fossil jet consumed for intra-state flights in California as a deficit-generating fuel. This would increase the quantity of deficits generated within the LCFS and increase the incentive to produce and blend sustainable aviation fuels. However, we note that expanding the overall

www.theicct.org

communications@theicct.org

twitter @theicct

pool of deficits could lead to increased hydrotreating of virgin vegetable oils and waste fats, oils and greases from refiners producing multiple distillate products.[iv] Expanded hydrotreating capacity presents significant sustainability risks, discussed in the next section below.

Bio-refineries hydrotreating lipids to produce a mixed distillate product slate can optimize their product slate to produce greater shares of HEFA fuel, often known as sustainable aviation fuel (SAF). Since maximizing the jet fuel fraction of products is less efficient than diesel-maximized hydrotreating,[v] producing higher shares of HEFA by optimizing for a higher share of jet fuel at existing renewable diesel bio-refineries may reduce the net benefits of alternative aviation fuels compared to the status quo. In order to mitigate the risks of incentivizing additional lipid imports and inefficient fuel-switching between sectors, we recommend a cap on the contribution of lipids to the LCFS, as discussed in the next section. This safeguard would better ensure that SAF produced in California would be made from second-generation biofuel feedstocks with lower sustainability risks.

Capping the Contribution of Lipids to the LCFS

Renewable diesel production from hydrotreated lipids has accounted for the largest growth in LCFS credits over the past several years, as it can be used without any blending restrictions. RD production capacity is expected to rapidly grow in the U.S. over the next several years up to 5 billion gallons annually, according to Energy Information Authority (EIA) projections.[vi] Expanding the use of hydrotreated vegetable oils and waste fats, oils and greases, whether for RD or SAF production, poses a variety of sustainability risks. For vegetable oils such as soy oil, key risks include indirect land-use change (ILUC). ILUC risks are exacerbated due to the fungibility of vegetable oils in other markets. An econometric analysis of U.S. and EU oil markets identifies a consistent relationship between increased soy biodiesel demand and increased palm oil imports.[vii] This relationship is expected to hold for other biofuels derived from soy oil. Because virgin vegetable oils like soy can be substituted with palm in food and feed, increased soy biofuel demand can lead to increased palm oil cultivation, which is strongly associated with deforestation and very high land conversion GHG emissions.[viii]

Although non-food based feedstocks such as animal fat and used cooking oil (UCO) are credited with low CI's in the LCFS, their increasing usage presents separate sustainability concerns. Since waste fats and oils in the U.S. have limited resource availability,[ix] increased demand for these feedstocks can lead to indirect emissions impacts. This occurs when feedstocks are diverted from their exsiting usage in other markets (e.g. soapmaking, animal feed).[x] In many cases, replacement materials will have a higher GHG footprint than the diverted oil, leading to an overall increase in emissions.

Due to the difficulty in conducting quality control testing and ensuring supply chain integrity for imported lipids, there have been several

www.theicct.org
communications@theicct.org
twitter @theicct

documented cases of UCO fraud in U.S. and European fuels markets. In several cases in Europe, imports labeled as UCO were actually virgin vegetable oil including palm.[xi] Fraudulent cases have also been documented in the U.S. such as a producer claiming more than two-fold in Renewable Fuel Standard (RFS) credits than actual volumes produced.[xii] As such, we recommend that CARB sets a cap on the volumes of lipid-based biofuels credited within the LCFS to limit growth to the amount that can be sustainably supplied from domestic resources. For reference, Zhou et al. estimate that domestic lipids availability will increase 1.5 billion pounds, or 195 million gallons of biodiesel-equivalent, between 2018 and 2032.[xiii]

Renewable Natural Gas

Although not directly addressed in the workshop presentation, several workshop attendees remarked on the inclusion of RNG as a credit pathway and the default CI assumptions for RNG pathways. These include an assumption of methane venting at manure treatment facilities and 25% leakage from landfill gas facilities. The former assumption has led to tremendously low CI scores for manure biogas; CI scores for credit-generating facilities range between -762 and -109 gCO2e/MJ.

Due to this, biomethane pathways may generate an outsized portion of credits, with little effect on the total volume of fossil fuel displaced. Although credits and supply shares for biomethane were fairly proportionate in previous years, RNG made up 11% of total credits generated under the LCFS while it made up only 8% of total volume supplied in 2020.[xiv]

Moreover, the CI of biomethane or RNG pathways is highly sensitive to assumptions around the counterfactual. Based on different handling or management practices of biomethane feedstocks, methane release occurs to varying degrees. For example, the IPCC estimates that manure treated in solid storage applications has a methane conversion factor (MCF) of 0.015 while it has a MCF of 0.9 when stored in open lagoons.[xv] Thus, if an incorrect counterfactual scenario is chosen, the CI of the resulting fuel could be vastly over- or under-estimated. In an analysis of biomethane production pathways in the EU, Zhou et al. estimate that the final CI score for manure biomethane ranges between -207 gCOe2/MJ and +8 gCO2e/MJ depending on the reference treatment scenario selected.[xvi]

Although venting remains the default baseline in LCFS guidance for manure biogas, in many cases, other practices such as solid storage or land application would have occurred in the absence of the LCFS program. As of 2015, roughly 60% of dairy farmers processed manure in lagoons in California according to data from EPA's Inventory of Greenhouse Gas Emissions and Sinks.[xvii]

Ongoing changes in manure management practices are expected to become even more relevant under the State's impending methane capture regulations. The new law[xviii] requires the livestock industry to cut methane emissions 40% from a 2013 baseline by 2030. To account for a shifting baseline, we recommend that California updates the counterfactual for the manure and landfill biogas pathways based on impending state-level methane regulations and current management practices.

This could involve periodically assessing current management practices and those allowed under the Short-Lived Climate Pollutants strategy. CARB could then update the counterfactual assumptions for manure management in its LCA, affecting any new projects applying for certification. For flexibility, existing projects already generating credits under a certified CI could be phased out within a 5-10 year time period and require recertication using an updated baseline for an updated CI.

---

[i] CARB, "Book-and-Claim Accounting for Low-CI Electricity," April 2019, https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/guidance/lcfsguidance_19-01.pdf.

[ii] California Public Utilities Commission, "Renewables Portfolio Standard (RPS) Program," accessed January 5, 2022, https://www.cpuc.ca.gov/rps/.

[iii] Chris Malins, "What Does It Mean to Be a Renewable Electron?" (Washington, D.C.: International Council on Clean Transportation, December 9, 2019), https://theicct.org/publications/cerulogy-renewable-electrons-20191209.

[iv] Solomon Moore, "US Lawmaker Floats LCFS for Aviation Fuel | Argus Media," November 24, 2020, https://www.argusmedia.com/en/news/2162880-us-lawmaker-floats-lcfs-for-aviation-fuel.

[v] Nikita Pavlenko, Stephanie Searle, and Adam Christensen, "The Cost of Supporting Alternative Jet Fuels in the European Union" (Washington, D.C.: International Council on Clean Transportation, March 20, 2019), https://theicct.org/publications/cost-supporting-alternative-jet-fuels-european-union.

[vi] U.S. Energy Information Administration (EIA), "U.S. Renewable Diesel Capacity Could Increase Due to Announced and Developing Projects - Today in Energy," July 29, 2021, https://www.eia.gov/todayinenergy/detail.php?id=48916.

[vii] Fabio Santeramo, "Cross-Price Elasticities for Oils and Fats in the U.S. and the EU" (Washington, D.C.: International Council on Clean Transportation, March 6, 2017), https://theicct.org/publications/cross-price-elasticities-oils-and-fats-us-and-eu.

[viii] K.G. Austin et al., "Shifting Patterns of Oil Palm Driven Deforestation in Indonesia and Implications for Zero-Deforestation Commitments," *Land Use Policy* 69 (December 2017): 41–48, https://doi.org/10.1016/j.landusepol.2017.08.036; Sue E. Page et al., "Review of Peat Surface Greenhouse Gas Emissions from Oil Palm Plantations in Southeast Asia" (Washington, D.C.: International Council on Clean Transportation, October 4, 2011), https://theicct.org/publications/review-peat-surface-greenhouse-gas-emissions-oil-palm-plantations-southeast-asia.

[ix] Yuanrong Zhou, Chelsea Baldino, and Stephanie Searle, "Potential Biomass-Based Diesel Production in the United States by 2032" (Washington, D.C.: International Council

www.theicct.org
communications@theicct.org
twitter @theicct
icct
THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

on Clean Transportation, February 28, 2020), https://theicct.org/publications/potential-biomass-based-diesel-production-united-states-2032.

[x] Jane O'Malley, Stephanie Searle, and Nikita Pavlenko, "Indirect Emissions from Waste and Residue Feedstocks: 10 Case Studies from the United States" (Washington, D.C.: International Council on Clean Transportation, December 15, 2021), https://theicct.org/publications/indirect-emissions-fuels-us-dec21.

[xi] OLAF - European Anti-Fraud Office, "The OLAF Report 2020," 2020, https://ec.europa.eu/anti-fraud/system/files/2021-12/olaf_report_2020_en.pdf.

[xii] U.S. Attorney's Office Eastern District of Pennsylvania, "Owners Of Lehigh Valley Companies And Their Engineer Charged In Green Energy Fraud Scheme," December 21, 2015, https://www.justice.gov/usao-edpa/pr/owners-lehigh-valley-companies-and-their-engineer-charged-green-energy-fraud-scheme.

[xiii] Zhou, Baldino, and Searle, "Potential Biomass-Based Diesel Production in the United States by 2032."

[xiv] California Air Resources Board, "LCFS Data Dashboard," accessed January 6, 2022, https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard.

[xv] Grietje Zeeman and Sybren Gerbens, "Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories" (IPCC, 2006), https://www.ipcc-nggip.iges.or.jp/public/gp/bgp/4_3_CH4_Animal_Manure.pdf.

[xvi] Yuanrong Zhou et al., "Life-Cycle Greenhouse Gas Emissions of Biomethane and Hydrogen Pathways in the European Union" (Washington, D.C.: International Council on Clean Transportation, October 10, 2021), https://theicct.org/publications/lca-biomethane-hydrogen-eu-oct21.

[xvii] U.S. Environmental Protection Agency, "Market Opportunities for Biogas Recovery Systems at U.S. Livestock Facilities," June 2018.

[xviii] California Legislature, "SB-1383 Short-Lived Climate Pollutants: Methane Emissions: Dairy and Livestock: Organic Waste: Landfills." (2016), https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160SB1383.

www.theicct.org

communications@theicct.org

twitter @theicct

THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

1500 K STREET NW | SUITE 650 | WASHINGTON DC 20005