



February 20, 2024

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

Re: Proposed Low Carbon Fuel Standard Amendments

Dear Chair Randolph and Members of the Board:

On behalf of Pacific Environment, thank you to the California Air Resources Board (CARB) for soliciting stakeholder input on the comment on potential changes to the California Low Carbon Fuel Standard (LCFS). 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. However, we would like to share our recommendations to align the LCFS program with all of California's other zero-emission transportation laws, regulations, and investments.

Pacific Environment is a 501(c)(3) public-benefit corporation, headquartered in San Francisco, with regional offices in Anchorage, Alaska, and Chongqing, China. Pacific Environment has earned rare permanent consultative status at the International Maritime Organization (IMO), the United Nations' entity that sets international shipping law. At the IMO, Pacific Environment has played a lead role in advocating for a new international regulatory regime (called the "Polar Code") to regulate ship traffic, pollutant emissions, and waste dumping in Arctic waters.

I. Recommendation Area One: Maritime Shipping

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.

To align the LCFS to support these new maritime regulations and help further decarbonize California maritime operations, we urge the following:

A. 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.

B. Shorepower for harbor craft

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.

II. Recommendation Area Three: Cleaning California Oil Imports to Do No Harm

Pacific Environment offers the following comments on the revised **Oil Production Greenhouse Gas Emission Estimator (OPGEE) Model** and data inputs released Feb. 21, 2023:

1. CARB should accelerate the adoption of the more robust Version 3.0b of the OPGEE model released Feb. 21, 2023.
2. CARB should implement a **rapid review/update process** to update CARB reporting from OPGEE data/modeling to reflect field specific contemporary peer review literature as it becomes available.
 - a. "Climate justice delayed is climate justice denied." Accurate and current data of the emissions is critical to understanding the nature and extent of the climate challenge. In 1954 oil companies knew that what they were doing had an adverse impact on the climate.¹ Their failure to disclose the nature and extent of their knowledge of those impacts is an indictment of their self interest in preserving profits despite horrific impacts on people and the environment. **CARB has a responsibility to use timely, accurate data.**
 - b. CARB should strive to "level the playing field" among oil producers and accelerate the reporting of field specific clean energy resources to encourage energy developers to strive for lower life cycle emissions.
3. CARB should support OPGEE model **data updates to reflect the unique challenges of Arctic oil and gas development** highlighted in the peer review literature, including:
 - a. Exploration & Development (§6.1 to §6.2.2.3)
 - i. CARB should allocate the GHG emissions estimates associated with **unsuccessful exploration activities** at the field level. If the emissions

¹ <https://www.desmog.com/2024/01/30/fossil-fuel-industry-sponsored-climate-science-1954-keeling-api-wspa/>

estimate from unsuccessful exploration activities cannot be directly assigned to a producing field, the CARB should assign those emissions to regional or national oil producing provinces. For example, Shell conducted and abandoned exploration activities in Alaska's Chukchi Sea. The emissions associated with those activities could be assigned to Alaska's North Slope, Alaska as a whole, or the U.S.

- ii. CARB should task the OPGEE team with conducting a peer review literature for **Alaska North Slope land use impacts related to tundra disturbances and acceleration of melting permafrost and associated methane/biogenic carbon emissions.**
- iii. CARB should task the OPGEE team to review **field drilling and development data for Alaska's North Slope field data** in OPGEE data tables to verify:
 1. that the drilling energy consumption estimates reflect the **high level of energy consumption** required to drill through typically **thick permafrost strata.**
 2. that the **well completion activities** associated with working in **thick permafrost** are reflected in the emissions estimates.
 3. that the **field development emissions** data adequately include the **risk of gas leakage around inadequately completed and monitored wells** [CD-1 Pad, Alpine Field, Alaska North Slope, March 4, 2022]
 4. that the **hydraulic fracturing energy consumption and associated emissions** estimates reflect the **higher level of energy consumption required in the typically lower temperature North Slope oil producing strata near thick permafrost strata**, especially for viscous and heavy oil prospects that are being developed at shallower depths.
 5. that the **energy expenditures and GHG emissions** that arise from the **extraordinary surface use activities necessary to protect the fragile tundra ecosystem, e.g., snow/ice roads**, are adequately reflected in emissions estimates.
 6. that the GHG emissions associated with **surface disturbances of highly thermally sensitive tundra which leave trails in the tundra which accumulate surface water which in turn absorb heat during the increasingly warming climate and accelerate the thermal degradation of permafrost which in turn releases high concentrations of methane** are adequately reflected.
- b. Production (§6.4 through §6.53)
 - i. CARB should task the OPGEE team with reviewing the data associated with the use of **miscible injectant** (CH₄, CO₂ mixture) for **enhanced oil recovery** on Alaska's North Slope to verify that the data adequately accounts for **CH₄ and CO₂ leakages.**
 - ii. CARB should task the OPGEE team with reviewing the data associated with the use of **polymer flooding** for **enhanced oil recovery of viscous and heavy oils** on Alaska's North Slope to verify that the data adequately accounts for the life cycle emissions of those activities to produce viscous and heavy oils.

- c. Fuel Cycle & Embodied Emissions (§7)
 - i. CARB should task the OPGEE team with reviewing and verifying the **assumptions underlying the co-production credit for prospective LNG exports from Alaska**, i.e., the “natural gas displaces coal” vs. “natural gas could be substantially displaced by renewables.” Verify the estimates for the **magnitude and direction of the savings/cost of natural gas vs. coal** supply chains, especially considering the energy intensive LNG supply chain associated with Alaska’s North Slope natural gas, either an 800-mile pipeline + LNG or arctic ice breaking LNG tankers. We note that commentary research on coal v. natural gas supply chains suggests that any LNG advantage evaporates with more rigorous analysis.² Adding an 800-mile pipeline clearly disadvantages that supply chain compared to a local coal supply.
 - ii. CARB should task the OPGEE team with reviewing and verifying the OPGEE model and field specific data to ascertain the extent to which GHG emissions associated with the **long energy intensive supply chain for mobilization, transport and storage of equipment and materials** associated with Alaska’s North Slope are taken into account. In addition, subsequent GHG emissions associated with landfilling and recycling materials from Alaska’s North Slope – including the emissions associated with **dismantlement, removal and restoration fossil fuel lease obligations** – should be included in the embodied emissions accounting or a separate category.
 - d. Venting, Global Warming Potential & Fugitive Emissions (§8, §9.1, §10.2.3.1)
 - i. CARB should task the OPGEE team with reviewing and incorporating contemporary flaring emissions data **by field** instead of **country** to more accurately reflect highly variable CH₄ emissions. See for example the data within OCI+ (Oil Climate Index + Gas)³.
 - ii. CARB should **adopt the 20-year Global Warming Potential (GWP) for CH₄** as the default and require OPGEE to adopt the 20-year GWP for CH₄.
4. CARB should require the OPGEE team to **divest itself of funding sources that create the appearance of conflict of interest**, e.g., Aramco and Chevron.
 5. CARB should avoid the trap of only updating the data in the OPGEE model when ALL fields have ALL data input fields updated with field-specific data as this will create a perverse incentive for dirty oil producers to refrain from reporting field-specific data while cleaner oils fail to get credit for cleaner field-specific data – skewing comparisons between fields as well as underestimating aggregate emissions.

² See for example the working paper of Robert Warren Howarth, “The Greenhouse Gas Footprint of Liquefied Natural Gas (LNG) Exported from the United States,” Department of Ecology & Evolutionary Biology, Cornell University, Ithaca, NY 14853 USA. In review at a peer-reviewed journal; Submitted October 24, 2023; Revised January 13, 2024; Subject to further revision before publication as a peer-reviewed article.

³ See the OCI+ methodology page, which includes a description of the flaring emissions data developed by a team that includes members from the Colorado School of Mines. <https://ociplus.rmi.org/methodology#opgee>

6. CARB should **independently audit and verify data provided by the field operators** to ensure reliable reporting of the data that drives emissions estimates.

Thank you for your consideration of these comments. We would welcome the opportunity to discuss them with respective staff, and we look forward to continued participation and discussion to further strengthen the LCFS.

Sincerely,



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