



June 14, 2023

Dr. Cheryl Laskowski  
Chief, Low Carbon Fuel Standard  
California Air Resources Board  
1001 I Street, Sacramento, CA 95814  
Submitted electronically via [helpline@arb.ca.gov](mailto:helpline@arb.ca.gov)

**RE: Pacific Environment Comments on Climate-Imperative LCFS Program Changes**

Dear Dr. Laskowski,

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).

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**

Starting January this year, two important new CARB regulations slated to go into effect relating to maritime shipping: CARB's new Commercial Harbor Craft (CHC) regulation that requires ferries and excursion vessels to go zero emission and other regulated harbor craft to go to tier 4 engines, and CARB's updated Ocean Going Vessel At Berth regulation, which requires container, reefer, and cruise vessels, as well as tankers and auto carriers, to significantly eliminate in port emissions, such as by plugging into electric shorepower. In addition, major cargo owners including Amazon, Target and IKEA have already [committed](#) to 100% zero-carbon shipping by 2040 and container companies including Maersk, Hapag Lloyd, and HHM [responded](#) that they're ready to meet that target. Financial incentives are now needed to accelerate the zero-emission market, transition land-side fueling, and help save lives, our ocean, and our climate.

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

**First, we urge CARB to update the LCFS regulation to apply to shore power installations serving electrified harbor craft and for dispensing renewable hydrogen.** CARB's CHC regulation has a technology-forcing effect on harbor craft vessel design and operations and LCFS credits will be important to help finance a successful transition to decarbonization. CARB lists "Shore Power to Ocean Going Vessels at-berth (OGV)" as eligible for LCFS crediting. However, at this time if a port, vessel owner or other energy supplier were to build a station to dispense green hydrogen or electricity to a ZEV harbor craft vessel, they would not be eligible to receive LCFS credits. Currently, ZEV commercial harbor craft cannot generate infrastructure credits as this provision is limited to light-duty hydrogen refueling stations and DC fast chargers. Also, there is not a provision in the LCFS regulation for entities to generate credits for shore power to CHC.

**Second, we urge CARB to update the LCFS to allow for credits for zero-emission transportation fuels used for ships such as green hydrogen.** According to 95482(d), the LCFS does not apply to transportation fuel used for 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. Green hydrogen and its derivatives are showing great promise as a zero-emission fuel for shipping. An International Council on Clean Transportation study shows the potential of using hydrogen fuel cells to power container ships servicing a busy corridor between China and the United States<sup>1</sup>. According to that analysis, 99% of the voyages made in 2015 could be powered by hydrogen with only minor changes to fuel capacity or operations, by replacing 5% of cargo space with more hydrogen fuel or by adding one additional port of call to refuel.

## **II. Recommendation Area Two: Aviation**

The inclusion of intra-state aviation as an obligated sector in the LCFS program may begin to incentivize aviation to reduce its carbon emissions, but intra-state flights do not represent a large enough share of aviation fuel consumption to lead to significant changes in the sector.

**Therefore, we urge CARB to expand the program's obligation to include both intra-state and inter-state flights to drive meaningful emissions reductions in the aviation sector.**

The International Council on Clean Transportation (ICCT) submitted comments in response to CARB's LCFS workshops in 2022 and 2023 assessing the scale of expanding LCFS to aviation fuels. ICCT's Global Aviation Carbon Assessment model shows that intra-state flights represent 6-12% of California aviation emissions, whereas inter-state domestic aviation emissions contribute approximately 45% of state aviation emissions.

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<sup>1</sup> [Liquid hydrogen refueling infrastructure to support a zero-emission U.S.–China container shipping corridor - International Council on Clean Transportation \(theicct.org\)](https://www.theicct.org/publications/liquid-hydrogen-refueling-infrastructure-to-support-a-zero-emission-u.s.-china-container-shipping-corridor)

ICCT estimates that the LCFS deficits generated by aviation fuel from intra-state flights would grow from approximated 6 thousand tonnes CO<sub>2e</sub> in 2023 to over 280 thousand tonnes by 2035, which represents a miniscule share of total LCFS obligations in 2021. The maximum 60 million gallons of sustainable aviation fuel (SAF) required to meet these deficits is well below the 1.5-billion-gallon target under AB 1322 (Muratsuchi and Rivas, 2021) or the 20% SAF target set by Governor Newsom.

ICCT estimates that expanding the program's obligation to include both intra-state and inter-state flights would generate approximately 2.3 million deficits in 2023 and would require up to 450 million gallons of SAF to offset.

### **III. Recommendation Area Three: Cleaning California Oil Imports to Do No Harm**

California is a large importer of Alaska North Slope (ANS) oil, which is getting dirtier and dirtier. The ramp up of ANS viscus/heavy oil production is well underway, now at more than 91,000 barrels/day. Because heavy oil is more carbon intensive than conventional oil, the overall ANS blended stream is becoming more carbon intensive. **To ensure California does no harm, we urge CARB to revise the LCFS to account for land use impacts of using Alaska North Slope (ANS) crude.**

Just as the LCFS attempts to account for land use impacts of biofuels and for other impacts on the carbon intensity of imported crude oil steams, it should also account for the land use impacts of using ANS crude. The Land Use Change (LUC) factor should be modified to apply to ANS crude and its impacts.

Petroleum operations on the North Slope contribute to and exacerbate climate, ecological and social impacts in the region including loss of sea ice, release of methane and tundra subsidence due to thawing permafrost, destruction of vital habitats for migratory birds, waterfowl, caribou, polar bears and other wildlife, reduction of air quality due to methane leakages from industry operations, black carbon emissions, and loss of subsistence opportunities for residents.

Thawing permafrost is one such significant land use change resulting from petroleum development. The Alaska North Slope is overlain by continuous permafrost covering more than 90% of the landscape. The thawing of permafrost, caused by the warming climate, has the ancillary effect of releasing methane previously trapped in frozen soil for thousands of years into the atmosphere. Although quantifying the volume of carbon releases from permafrost thaw is uncertain due to gaps in monitoring and modeling, permafrost thaw is dramatically changing the atmosphere and land upon which people live. Methane is a potent GHG with a near-term warming potential many times greater than carbon dioxide.

The ANS heavy oil accumulation is a huge resource (20-30 billion barrels original oil in place), a portion of which has recently become commercial to produce due to advances in Enhanced Oil Recovery (EOR) using polymer flooding technology. Polymer flooding technology was field tested and validated at the Milne Point Unit in a U.S. Department of Energy-funded, four-year study that concluded in 2022, which dramatically improved the outlook for production of ANS

heavy oil. The study was conducted by the petroleum engineering department of the University of Alaska - Fairbanks, with technical support from Hilcorp.<sup>[1]</sup>

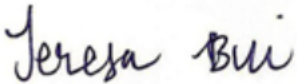
The combination of rapidly aging fields (Prudhoe, Kuparuk, Alpine), new fields in the West, e.g., Willow and Pika, and viscous/heavy oil (Milne Point, Schrader Bluff, Ugnu, et al) will continue to drive the carbon intensity of ANS oil upward from its already high levels. See attached chart.

**Reliance on carbon intensive ANS heavy oil means more air pollution and adverse health impacts for California communities and residents living near refineries.**

To further discourage the import of carbon-intensive heavy oils, such as ANS, Canadian tar sands and Amazonian Ecuador oils, into California refineries, CARB should consider adopting rules for California refineries that parallel the U.S. Environmental Protection Agency's proposed new carbon pollution standards for coal and natural gas-fired power plants to reduce GHG emissions.

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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Climate Policy Director  
Pacific Environment

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CC: Steve Cliff  
Members of the Board

<sup>[1]</sup> <https://www.netl.doe.gov/projects/project-information.aspx?k=FE0031606>; <https://www.osti.gov/biblio/1916626/>