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Subject: OPR's comments on the role of biomass waste in supporting California's decarbonization goals

Dear Low Carbon Fuel Standard Program staff,

We commend you for your excellent work on the proposed amendments to the Low Carbon Fuel Standard (LCFS) Program. The Governor's Office of Planning and Research (OPR) is leading the state's Woody Feedstock Aggregation pilot program to establish reliable access to woody feedstock sourced from California's forested lands and to enhance community fire resilience. With this letter, we provide comments on the role of woody biomass feedstocks in the proposed LCFS amendments and their potential role in supporting the state's decarbonization goals.

Background

The 2022 Scoping Plan identified the need for expanding the use of woody biomass residue, particularly from forest and agricultural residues, as necessary for achieving carbon neutrality by 2045. This is because biomass conversion into energy products, such as clean hydrogen with carbon capture and sequestration, can provide carbon removal needed to compensate for residual emissions remaining in the economy beyond midcentury. Non-combustion technologies (i.e., gasification, pyrolysis) can also provide clean, non-fossil fuels for decarbonizing aviation, shipping, and other hard-to-abate industries.[1,2] Additionally, State-sponsored research has identified biomass conversion to liquid and gaseous transportation fuels as a key option for improving forest health and addressing the wildfire crisis.[3]

A robust innovative wood products market is needed to increase forest management and restoration in California and drive biomass residue utilization at the scale necessary to meet the state's ambitious climate goals.[4] The state has developed a number of market and technology development programs, including a grant program administered by the Department of Conservation that supports carbon-negative hydrogen and liquid fuels sourced from forest biomass. The Infrastructure and Economic Development Bank currently administers a public loan fund to support forest biomass management and

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[1] Lawrence Livermore National Laboratory. 2020. *Getting to Neutral: Options for Negative Carbon Emissions in California*. https://gs.llnl.gov/sites/gs/files/2021-08/getting_to_neutral.pdf

[2] Lawrence Livermore National Laboratory. 2023. *Roads to Removal: Options for Carbon Dioxide Removal in the United States*. https://roads2removal.org/

[3] Joint Institute for Wood Products Innovation. 2020. *Literature review and evaluation of research gaps to support wood products innovation*. https://bof.fire.ca.gov/media/9688/full-12-a-jiwpi_formattedv12_3_05_2020.pdf

[4] Joint Institute for Wood Products Innovation. 2020. *Joint Institute Recommendations to Expand Wood and Biomass Utilization in California*. https://bof.fire.ca.gov/media/31nfixsv/final-board-approved-joint-institute-wood-and-biomass-utilization-recommendations-_11-4-20_ada.pdf

utilization projects. The Department of Forestry and Fire Protection also administers a grant program to enhance wood utilization and bioenergy projects.

As a matter of practice however, biomass utilization projects have been difficult to launch. A key barrier to achieving this vision, that we have learned as part of implementing the pilot program at OPR, is a lack of a recurring revenue incentive for prospective project developers. LCFS is a policy tool that has the potential to support the development of woody biomass residue utilization projects because it can provide recurring incentives for these earlier stage projects. We provide recommendations on the proposed 2024 LCFS Program amendments that could ease the barriers for prospective biomass utilization projects.

Forest biomass

CARB is proposing to include Tier 2 pathways that utilize feedstocks from small-diameter, non-merchantable forest residues removed for the purpose of forest fuel reduction or forest stand improvement, as eligible to receive a reduced carbon intensity (CI) score under the LCFS Program.

This would be a positive change for prospective projects; however, this is unlikely to be sufficient to drive residue utilization consistent with the Scoping Plan. California currently produces tens of millions of tons of forest and agricultural waste annually that are typically left to decompose or be open burned, resulting in substantial emissions of greenhouse gases, criteria air pollutants and precursors. These impacts are anticipated to worsen as the state seeks to increase its wildfire prevention treatments to one million acres per year.

One suggestion, based on feedback from OPR's regional pilots, is to develop further guidance about how to more comprehensively evaluate the full emissions profile (e.g., emissions benefits from avoided pile burning, decay, etc.) for fuels created using biomass waste feedstocks, particularly forest and agricultural residues. It is currently unclear what an acceptable lifecycle assessment looks like for biomass waste-to-fuels pathways under the Low Carbon Fuel Standard. This uncertainty limits the ability of prospective developers to acquire credits.

Crop- and forest-based feedstocks

CARB is proposing to include third party–certified sustainability requirements for crop- and forest-based feedstocks used in LCFS fuel pathway applications. This would be useful for minimizing unsustainable or illegal forestry practices and improving the transparency and accountability of biomass feedstock supply chains.

Crop-based fuel production in the United States and globally has been identified as having potentially significant indirect global land use impacts, including deforestation and competition with food production .[5] More broadly, there is significant uncertainty in the

[5] California Air Resources Board. Low Carbon Fuel Standard Public Workshop: Potential Regulation Amendment Concepts. February 22, 2023. https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/lcfs_meetings/LCFSpresentation_02222023.pdf

ability to estimate the complete lifecycle emissions from crop-based biofuels.[6] There is also a risk that fuels produced from out-of-state crop-based feedstocks may compete with in-state waste feedstocks that are needed to address catastrophic wildfire. CARB should consider stricter requirements on crop-based fuels production given these inherent risks. We outline alternatives that would avoid perverse sustainability outcomes and encourage high-quality biomass waste utilization projects in California.

- *Prioritizing in-state biomass waste feedstocks*. CARB could consider options that prioritize biomass waste feedstocks sourced from within California. 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.[7] 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.[8]
- *Cap on crop-based fuels*. CARB could consider placing a cap on crop-based fuels to avoid the proliferation of fuels pathways from out-of-state crops. Renewable diesel pathways under the LCFS Program have historically utilized waste fats, oil, and grease as the primary feedstock. However, these feedstocks are currently supply-limited.[9] Additionally, CARB anticipates an increase in renewable diesel consumption by 2025.[10] There is a risk that renewable diesel under the LCFS Program could become increasingly reliant on crop-based feedstocks such as soybean and other virgin vegetable oils.[11] The implication here is that an increase in demand for crop-based biofuels could feasibly incentivize the conversion of productive farmland into bioenergy crops and lead to deforestation.

Alternative jet fuel

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

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[6] Comment letter submitted to the U.S. Environmental Protection Agency on Renewable Fuel Standard Program proposed rule setting standards for 2023 through 2025. Comment submitted by Earthjustice and World Resources Institute. Docket ID No. EPA-HQ-OAR-2021-0427.

[7] Cabiyo, B. et al. Innovative wood use can enable carbon-beneficial forest management in California. *Proceedings of the National Academy of Sciences*. 2021. https://doi.org/10.1073/pnas.2019073118

[8] Sanchez et al. Policy Options for Deep Decarbonization and Wood Utilization in California's Low Carbon Fuel Standard. *Front. Clim.*, 14 May 2021 Sec. Carbon Dioxide Removal Volume 3 – 2021. https://doi.org/10.3389/fclim.2021.665778

[9] Christensen, A., and Hobbs, B. (2016). A model of state and federal biofuel policy: feasibility assessment of the California Low Carbon Fuel Standard. *Appl. Energy* 169, 799–812. https://doi.org/10.1016/j.apenergy.2016.01.121

[10] California Air Resources Board. *Low Carbon Fuel Standard 2023 Amendments – Standardized Regulatory Impact Assessment*. September 8, 2023.

[11] Bushnell, J. et al. Working paper: *Forecasting Credit Supply Demand Balance for the Low-Carbon Fuel Standard Program*. August 2023. https://haas.berkeley.edu/energy-institute/research/abstracts/wp-340/

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.

We commend CARB for its leadership in working to advance decarbonization in the transportation fuels sector. We hope this letter is informative to CARB staff as it explores potential revisions to the LCFS Program.

Sincerely,

Samuel Assefa
Director, Governor's Office of Planning and Research