

August 27, 2024

Rajinder Sahota
California Air Resources Board
1001 I Street
Sacramento, CA 95815

RE: Comments on the Proposed Modifications (15-Day Changes) to the Proposed Low Carbon Fuel Standard (LCFS) Amendments

Dear Ms. Sahota:

We represent a group of distinct businesses and perspectives related to the Low Carbon Fuel Standard (LCFS) and the State's various climate change-related programs. Individually, we each have specific priorities and recommendations for the program, which we may address in separate comment letters. Collectively, however, we agree that the LCFS is a critical program for achieving the State's methane reduction, transportation electrification, and other climate change related goals.

We strongly support the program and encourage CARB to adopt amendments at the November 8, 2024, Board meeting, including those that extend the program through 2045, step-down program stringency by at least 9% in 2025, create an auto acceleration mechanism to automatically strengthen program stringency when market conditions warrant, and expand fast charging and hydrogen refueling capacity crediting to include heavy-duty vehicles and applications. In addition to myriad other items, these are important proposed amendments that will strengthen the program and allow it to continue to flourish and drive additional investment and availability of low carbon fuels and infrastructure in California.

Additionally, we write in our shared capacity to request minor amendments through additional 15-Day Changes to enable biogas-to-electricity and hydrogen-to-electricity electric vehicle (EV) charging projects, which can uniquely support both the state's methane reduction and transportation electrification goals. Specifically, we strongly encourage additional amendments that would:

- Allow for book-and-claim accounting of biomethane and hydrogen for electric vehicle charging when that biomethane or hydrogen is used for clean, distributed electricity generation produced remote from the source of biogas or hydrogen production.
- Establish temporary carbon intensity scores for biomethane-to-electricity and hydrogen-to-electricity EV charging pathways.

These minor, targeted changes would go a long way towards enabling additional methane reductions and accelerating progress towards the state's transportation electrification goals, especially in heavy-duty applications where infrastructure-related challenges and delays may be most significant. They would align with CARB's intent to support transitioning biomethane resources from current applications to stationary sources and zero emission vehicle (ZEV) fuels. And they would serve to provide equal treatment among ZEV fuel pathways by allowing for book-and-claim eligibility of biomethane-to-electricity and hydrogen-to-electricity pathways, just as currently is proposed for biomethane-to-hydrogen pathways and as currently exists for CNG, LNG and L-CNG pathways.

Onsite microgrids, biogas can accelerate transportation electrification

California has aggressive transportation electrification goals, including for medium- and heavy-duty (MHD) fleets. These fleets can be difficult to electrify on timelines envisioned by CARB regulations, in no small part because developing charging infrastructure for MHD vehicles and fleets can be extremely capacity and energy intensive. This makes them very time consuming to connect to the grid – a process that can take several years.

Projects in this predicament look to on-site generation with energy storage as a solution to meet fleet electrification objectives ahead of utility connections, with the added benefit of additional resiliency for critical fleet operations when the utility connection is eventually established in parallel. However, due to the exceptional energy intensity of industrial MHD charging projects on limited footprints, dispatchable power-dense on-site generation such as fuel cells or linear generators developed by Mainspring and Hyliion, sometimes can be the only feasible technical solution that can fit the available real estate and meet the energy demand.

Recently, Prologis Mobility and Performance Team, a Maersk company that operates electric vehicles across the country, demonstrated a unique solution to this challenge by developing the world's largest electric vehicle (EV) charging project powered by a self-sufficient microgrid using Mainspring technology with dual hydrogen and natural gas capabilities.¹ The project was completed in five months, rather than years it would have taken otherwise, and allows the fleet to electrify quickly, while interconnection to the electricity grid proceeds. Once the project is directly interconnected to the grid, the added resiliency for electric vehicle fleet operations during periods of grid stress or power outage will be critical. The infrastructure also preserves partial infrastructure flexibility for expanding to support fuel cell vehicles in the future. This is a replicable model that can serve to accelerate progress toward the State's ZEV goals.

Utilizing renewable fuels, such as dairy biomethane and renewable hydrogen, would add to the benefits of the project, including further supporting the State's short-lived climate pollutant reduction and Scoping Plan goals. However, under the current proposed rules of the LCFS, while book-and-claim accounting can be used for biomethane in a compressed natural gas truck or to produce hydrogen for use in a fuel cell vehicle, it cannot be used to generate electricity remote from a digester or biogas source, including onsite for use in an EV. This current approach not only hinders broader deployment of innovative strategies like microgrids to accelerate EV deployment in MHD fleets, but it also disadvantages electricity-based pathways compared to other pathways and directs biomethane to less efficient and higher emissions end uses. The Appendix demonstrates that using natural gas in a linear generator for EV charging results in a 97% NOx emissions reduction compared to an equivalent diesel fleet.

Provide equal access to book-and-claim accounting for EV charging

We urge CARB to propose additional 15-Day Changes that would ensure equal access (similar to the provisions outlined for hydrogen in the proposed regulations) to book and-claim accounting for biomethane used to produce electricity for EV charging employing efficient and low emissions technologies, such as linear generators or fuel cells, that operate remote from the source of biogas production. Specifically, we urge the following amendments **(in bold underline)** to the regulation:

¹ <https://www.prologis.com/insights/success-stories/north-americas-largest-heavy-duty-ev-charging-hub-powered-microgrid>

- **Section §95488.8(i)(2)(A):**
 - RNG injected into the common carrier pipeline in North America (and thus comingled with fossil natural gas) can be reported as dispensed as bio-CNG, bio-LNG, or bio-L-CNG, or as an input to hydrogen production **or to fuel cell or linear generator electricity generation for remote EV charging**, without regards to physical traceability.
- **Section 95488.8(g)(1)(A)(2):**
 - Biomethane supplied using book-and-claim accounting pursuant to section 95488.8(i)(2) and is claimed as feedstock in pathways for bio-CNG, bio-LNG, bio-L-CNG, hydrogen via steam methane reformation **or other methods, and to fuel cell or linear generator electricity generation for remote EV charging**;
- **Section §95488.8(i)(2):**
 - (2) *Book-and-Claim Accounting for Pipeline-Injected Biomethane Used as a Transportation Fuel or to Produce Hydrogen **or to Generate Electricity***. Indirect accounting may be used for RNG used as a transportation fuel or to produce hydrogen **or to generate electricity** for transportation purposes (including hydrogen that is used in the production of a transportation fuel), provided the conditions set forth below are met:

(A) RNG injected into the common carrier pipeline in North America (and thus comingled with fossil natural gas) can be reported as dispensed as bio-CNG, bio-LNG, or bio-L-CNG, or as an input to hydrogen production **or to fuel cell or linear generator Electricity generation for remote EV charging**, without regards to physical traceability. Entities may report natural gas as RNG within only a three-quarter time span. If a quantity of RNG (and all associated environmental attributes, including a beneficial CI) is pipeline-injected in the first calendar quarter, the quantity claimed for LCFS reporting must be matched to natural gas sold in California as RNG no later than the end of the third calendar quarter. After that period is over, any unmatched RNG quantities expire for the purpose of LCFS reporting.

(B) Biomethane reported under fuel pathways associated with projects that break ground after December 31, 2029, injected into the common carrier pipeline, and claimed indirectly under the LCFS program for use as bio-CNG, bio-LNG, or bio-L-CNG in CNG vehicles or as an input to hydrogen production **or to fuel cell or linear generator Electricity generation for remote EV charging** for transportation purposes, must demonstrate compliance with the following requirements:

1. Starting January 1, 2041 for bio-CNG, bio-LNG and bio-LCNG pathways, and January 1, 2046 for biomethane used as an input to hydrogen production **or to fuel cell or linear generator Electricity generation for remote EV charging**, the entity reporting biomethane must demonstrate that the pipeline or pipelines along the delivery path physically flow from the initial injection point toward the fuel dispensing facility at least 50 percent of the time on an annual basis. Notwithstanding the above, if the Executive Officer approves a gas system map by July 1, 2026, to support implementation of deliverability, then the entity reporting under bio-CNG, bio-LNG and bio-L-CNG pathways for CNG vehicles must demonstrate the physical flow listed above after December 31, 2037. The Executive Officer will only approve a gas system map if it includes identification of transcontinental and connected pipelines posted on a local, state or federal

government website, for which the gas flows to CA at least fifty percent of the time on an annual basis, and will be based on directional flow data from 2020 to 2023. Entities may report natural gas as RNG within only a three-quarter time span. If a quantity of RNG (and all associated environmental attributes, including a beneficial CI) is pipeline-injected in the first calendar quarter, the quantity claimed for LCFS reporting must be matched to natural gas sold in California as RNG no later than the end of the third calendar quarter. After that period is over, any unmatched RNG quantities expire for the purpose of LCFS reporting.

(D) Starting January 1, 2041, for bio-CNG, bio-LNG and bio-L-CNG pathways, (unless the accelerated timeline is activated by the criteria described in section 95488.8(i)(2)(B)1.) and January 1, 2046, for biomethane used as an input to hydrogen production **or to fuel cell or linear generator Electricity generation for remote EV charging**, to substantiate RNG quantities injected into the pipeline for dispensing as bio-CNG, bio-LNG, or bio-L-CNG under fuel pathways associated with projects that break ground after December 31, 2029, the pathway application and subsequent Annual Fuel Pathway Reports must include the documents required by section 95488.8(i)(2)(C) as well as the following documents.

- **Section §95488.8(i)(3):**

Book-and-Claim Accounting for Pipeline-Injected low-CI Hydrogen Used in FCV and Alternative Fuel Production **including fuel cell or linear generator Electricity generation for remote EV charging**. Indirect accounting may be used for low-CI hydrogen used in FCVs or to produce alternative fuel for transportation purposes provided the conditions set forth below are met:

- (A) Low-CI hydrogen is injected into a dedicated hydrogen pipeline physically connected to California.
- (B) The well-to-wheel carbon intensity of low-CI hydrogen does not exceed 55.00 gCO₂e/MJ of gaseous hydrogen or 95.00 gCO₂e/MJ if transported as liquid before pipeline injection. If hydrogen is produced from steam methane reforming of natural gas, book-and-claim accounting of biomethane may be used to meet the carbon intensity thresholds.
- (C) Low-CI hydrogen is produced from production facilities that become operational or expand production after December 31, 2022.
- (D) Low-CI hydrogen can be reported as dispensed to FCVs or as an input to transportation fuel production **including fuel cell or linear generator Electricity generation for remote EV charging**, without regards to physical traceability. Entities may report low-CI hydrogen using a monthly balancing period substantiated by contractual documents. After that period is over, any unmatched low-CI hydrogen quantities expire for the purpose of LCFS reporting. Any unmatched quantities of hydrogen must either use a default emission factor for hydrogen provided in the Tier 1 CI Calculator for renewable diesel if hydrogen is used as process input in biofuel production, or use the CI calculated from the Tier 1 CI

calculator for hydrogen by considering natural gas as feedstock if hydrogen is used in fuel cell vehicles.

- (E) To substantiate low-CI hydrogen quantities injected into the pipeline for dispensing in FCVs or as an input to alternative fuel production **including fuel cell or linear generator Electricity generation for remote EV charging**, the pathway application and subsequent Annual Fuel Pathway Reports must include the following documents linking the environmental attributes of low-CI hydrogen in kg with corresponding quantities of hydrogen in kg withdrawn from the pipeline: unredacted monthly invoices showing the quantities of low-CI hydrogen (in kg) sourced and the contracted price per kg; 162 and the unredacted contract by which the fuel pathway holder obtained the environmental attributes.

Establish a temporary carbon intensity (CI) for biogas-to-electricity and hydrogen-to-electricity pathways

No temporary CI exists for dairy biogas-to-electricity pathways, which arbitrarily disadvantages dairy digester projects contributing to California's SB 1383 goals and providing renewable electricity for EV charging. The lack of a temporary CI for these pathways adds unnecessary costs and delay to these projects, which are already more challenging than other dairy biogas pathways given that they are not currently eligible to participate in the federal Renewable Fuel Standard. Dairy biogas-to-electricity pathways directly align with the priorities of the LCFS program, which as referenced in the ISOR and quoted in previous comments,² include supporting electric and hydrogen truck refueling, supporting methane emissions reductions and deploying biomethane for best uses across transportation.

A similar oversight exists in the electricity pathway involving hydrogen. CARB should correct these oversights and treat biogas-to-electricity pathways that utilize efficient and low emissions fuel cell or linear generator technology equally to CNG, LNG, LNCG and FCV pathways by updating Table 8 as follows:

Table 8. Temporary Pathways for Fuels with Indeterminate CIs

<i>Fuel</i>	<i>Feedstock</i>	<i>Process Energy</i>	<i>CI (gCO₂e/MJ)</i>
<u>Electricity</u>	<u>Dairy Manure and Swine Manure</u>	<u>Grid electricity/solar and wind electricity, natural gas, and/or parasitic load</u>	<u>-300</u>
<u>Electricity</u>	<u>Landfill gas or Municipal Wastewater Sludge</u>	<u>Grid electricity/solar and wind electricity, natural gas, and/or parasitic load</u>	<u>130</u>
<u>Electricity</u>	<u>Food Scraps, Urban Landscaping Waste, or Other Organic Waste</u>	<u>Grid electricity/solar and wind electricity, natural gas, and/or parasitic load</u>	<u>90</u>

² See CalBio's February 20, 2024, comment letter on the Low Carbon Fuel Standard Rulemaking Package: <https://www.arb.ca.gov/lists/com-attach/6967-lcfs2024-BWYCZVM+BTRWOVI9.pdf>

<u>Electricity</u>	<u>Electrolysis of Water using zero-CI or Negative-CI electricity and using linear generators or fuel cells</u>	<u>Gaseous hydrogen transport distance of less than 500 miles or liquid hydrogen transport distance of less than 2,000 miles or pipeline injection</u>	<u>110</u>
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We firmly believe that these two changes will strengthen the LCFS in alignment with CARB's priorities by supporting additional investment in methane reduction efforts and EV charging projects. These projects, which incorporate onsite renewable electricity generation, will boost resiliency and expedite the deployment of EV charging infrastructure, particularly in areas facing transmission and distribution upgrade delays. Thank you for your consideration of these comments and recommendations.

Sincerely,

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Appendix



Memo - Denker
Facility Emissions Cor