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October 16, 2024

Liane M. Randolph
Chair, California Air Resources Board

(Comment submitted electronically)

RE: CleanFuture's Comments on the Low Carbon Fuel Standard Proposal for §95488.8(i)(2)

Dear Chair Randolph:

CleanFuture appreciates the opportunity to provide written comments on the Proposed Amendments to the Low Carbon Fuel Standard ("LCFS") Regulation, as reflected by the second 15-day rulemaking package released on October 1, 2024 (the "LCFS Proposal"). CleanFuture broadly supports the California Air Resources Board's ("CARB's") LCFS Proposal. CleanFuture particularly appreciates and supports the acceleration of the rate of carbon intensity ("CI") reductions, the extension of the CI reduction tables to 2045, and the continued expansion of electrification crediting.

This comment letter ("Comment") is focused solely on the provision that CARB has included in the LCFS Proposal via the language contained in §95488.8(i)(2) to include electricity for EV charging for book-and-claim for biomethane. CleanFuture commends staff on inclusion of book-and-claim biomethane to electricity as an eligible fuel. However restricting the generation of electricity to fuel cells goes against a central tenet of technology neutrality in the LCFS. CleanFuture requests CARB to allow biomethane to produce electricity without restriction on a specific generation technology.

CleanFuture is an industry leading company connecting clean vehicle fleet customers with low CI fuels, serving both on the supply and demand side in California's LCFS, Oregon's Clean Fuels Program ("CFP"), Washington's Clean Fuels Standard ("CFS"), and other emerging clean fuel standards. CleanFuture is a designated credit generator and aggregator for hundreds of fleets and thousands of vehicle units for these state CFS programs. CleanFuture provides full-service low carbon consulting to its clients including fleet efficiency; low carbon fuel utilization; clean vehicles and vehicle technologies; and monetization strategies. CleanFuture has worked for over a decade to improve the efficiency of a wide range of vehicle fleets. CleanFuture is the leading supplier of renewable electricity from biogas as a transportation fuel to heavy-duty EVs in California's LCFS and Oregon's CFP. We also serve as a third-party aggregator and supply funding to fleets to incentivize and advance heavy-duty vehicle electrification and charging stations, while improving economics for biogas to renewable energy projects. CleanFuture is under contract with numerous heavy-duty vehicle fleets with constrained electricity capacity and/or lengthy lead-times for interconnections to upgrade

electric service at fleet depots which hinders widespread adoption of heavy-duty EVs. Distributed generation with biomethane to electricity for EV charging can alleviate constraints and streamline electrification. However we are concerned on CARB's intent to restrict eligibility of biomethane to electricity for EV charging to a specific generation technology, and instead encourage flexibility.

A Dairy Digester Emissions Matrix and Assumptions (November 30, 2018) was developed by the California Air Resources Board during the Dairy and Livestock Subgroup #2 collaborative process. This document is included by reference in Exhibit 1 which outlines the net benefits of greenhouse gas and criteria pollutant emissions that could result from capturing and utilizing dairy biogas in one of five fuel pathway scenarios as compared to the reference scenario where the biogas is emitted into the atmosphere from an uncovered lagoon.[1] A summary of the Dairy Digester Emissions Matrix[2] is shown in Table 1 below:

Table 1- Summary of Dairy Digester Emission Matrix

	Net Benefits							
Scenario	CO_2e (20-yr GWP)	CO_2e (100-yr GWP)	NOx	PM_{10}	$^{PM}2.5$	CO	SOx	VOCs
Onsite Reciprocating Engine to Grid and EVs	-60,934	-24,356	-4.9	-0.9	-0.4	3.2	-2.3	-3.4
Pipeline Injection to NG Vehicles	-54,491	-19,402	-4.1	-0.2	<0.1	52.1	-1.0	-14.1
Pipeline Injection to Power Plant, Grid and EVs	-63,190	-26,853	-7.1	-1.5	-0.8	-5.8	-3.1	-4.0
Pipeline Injection to Hydrogen Vehicles	-56,702	-21,066	-1.3	-0.4	<0.1	-1.7	0.3	-3.2
Pipeline Injection to Fuel Cell, Grid and EVs	-64,565	-28,073	-7.8	-1.7	-0.9	-6.6	-3.6	-4.2
Uncovered Lagoon	70,581	24,519	<0.1	<0.1	<0.1	<0.1	<0.1	3.0

The "Onsite Reciprocating Engine to Grid and EVs" scenario provides equivalent or superior net benefits of greenhouse gas and criteria pollutant emissions in comparison to "Pipeline Injection to NG Vehicles" so we urge CARB to remove the restriction to fuel cells only. We urge CARB to allow for Pipeline Injection to Reciprocating Engine to Grid and EVs on the premise that this scenario would be more similar to Onsite Reciprocating Engine to Grid and EVs instead of Pipeline Injection to Power Plant, Grid, and EVs.

New electric generation technologies have emerged since the 2018 Dairy Digester Emission Matrix such as linear generators – these are commercially available now yet were not on the market back in 2018. Allowing biomethane to produce electricity for EV charging should have flexibility, whether that generation technology is a reciprocating engine, linear generator, fuel cell, a micro-turbine, or another generation technology.

The clean emissions performance of linear generators and comparability to fuel cells was recently validated through AB 1921, which was signed into law by Governor Newsom last month. AB 1921 explicitly includes linear generators using renewable fuels as eligible under the state's RPS, just like fuel cells currently are. Linear generators are clean, low-emission technologies. We understand that CARB staff have seen data comparing emissions from linear generators to those from fuel cells, which demonstrate similar criteria pollutant emissions between the technologies. Including linear generators in the LCFS program aligns with

[1] https://ww2.arb.ca.gov/resources/documents/dairy-digester-emissions-matrix
[2] https://ww2.arb.ca.gov/sites/default/files/2020-07/dairy-emissions-matrix-113018.pdf

CARB's objectives of reducing transportation-related emissions and promoting cutting-edge, clean technologies.

The ability to use renewable fuels, such as biomethane to produce electricity, would further align with California's climate goals, but unfortunately, the LCFS Proposal only allows book-and-claim access for biomethane if used in a fuel cell to produce electricity. While we appreciate this proposed amendment and the use of fuel cells for book-and-claim for biomethane, we encourage CARB to provide additional flexibility for book-and-claim biomethane across all generation technologies.

The operative language of LCFS Proposal is as follows[3]:

§95488.8(i)(2). Indirect Accounting for Low-CI Electricity, Biomethane, and Low-CI Hydrogen.

(…)

(2) → *Book-and-Claim Accounting for Pipeline-Injected Biomethane Used as a Transportation Fuel, to Produce Electricity for EV Charging, or to Produce Hydrogen.* Indirect accounting may be used for RNG used as a transportation fuel, to produce electricity for EV charging, or to produce hydrogen 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 to produce electricity using a fuel cell for EV charging, or as an input to hydrogen production, 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.¶

(…)

To provide flexibility for biomethane to produce electricity for EV charging, CleanFuture recommends a slight modification to the language contained in the LCFS Proposal:

Section §95488.8(i)(2):

(2) *Book-and-Claim Accounting for Pipeline-Injected Biomethane Used as a Transportation Fuel, to Produce Electricity for EV Charging, or to Produce Hydrogen.* Indirect accounting may be used for RNG used as a transportation fuel, to produce electricity ~~using a fuel cell~~ for EV charging, or to produce hydrogen for transportation purposes (including hydrogen that is used in

[3] This version shows in marked-up format all proposed changes made to the current LCFS regulation during the LCFS rulemaking process as reflected in Attachment A-1.2 referenced in the Notice as "Proposed Second 15-Day Modifications to Proposed Regulation Order (First and Second 15-Day Modifications and 45-Day Modifications combined and compared to existing regulatory text) in Alternative format as released with the second 15-day package and available at https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/2nd_15day_atta-1.2.docx

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 to produce electricity ~~using a fuel cell~~ for EV charging, or as an input to hydrogen production, 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.

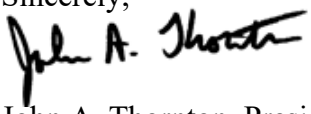
(B) Biomethane reported under fuel pathways associated with projects that break ground after December 31, 2029, injected into the common carrier pipeline, and claimed indirectly under the LCFS program for use as bio-CNG, bio-LNG, or bio-L-CNG in CNG vehicles, or to produce electricity ~~using a fuel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

1. Starting January 1, 2041, for bio-CNG, bio-LNG and bio-L-CNG pathways, and January 1, 2046, for biomethane used to produce electricity ~~using a fuel cell~~ for EV charging, or as an input to hydrogen production, 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 number of unique Class 3-8 ZEVs reported or registered in California exceeds 132,000 ZEVs or NZEVs on December 31, 2029, based on the evaluation and notification specified by subsection 95488(d)(1), 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. 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.

(C) To substantiate RNG quantities injected into the pipeline for dispensing as bio-CNG, bio-LNG, or bio-L-CNG, or to produce electricity ~~using a fuel cell~~ for EV charging, or as an input to hydrogen production, the pathway application and subsequent Annual Fuel Pathway Reports must include the following documents linking the environmental attributes of RNG (in MMBtu or Therms) with corresponding quantities of natural gas withdrawn:

Thank you for your consideration of these comments. Please advise if any further input on these issues would be constructive.

Sincerely,



John A. Thornton, President
CleanFuture, Inc.

Exhibit 1[4]

Dairy Digester Emissions Matrix

November 30, 2018

			A	B	C	D	E	F	G	H
			CO_2e (20-yr GWP)	CO_2e (100-yr GWP)	NOx	PM_{10}	$PM_{2.5}$	CO	SOx	VOCs
1	**Uncovered Lagoon**	**Baseline Totals** (Local + Remote)	**70,581**	**24,519**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**3.0**
2	**Onsite Reciprocating Engine to Grid and EVs**	Local	17,491	7,474	0.5	0.2	0.2	8.5	<0.1	0.6
3		Remote	765	318	0.1	<0.1	<0.1	0.1	0.1	<0.1
4		**Subtotal** (Row 2 + Row 3)	**18,256**	**7,792**	**0.6**	**0.2**	**0.2**	**8.6**	**0.1**	**0.6**
5		Diesel Displaced	8,609	7,629	5.5	1.1	0.6	5.4	2.4	1.0
6		**Pathway Emissions** (Row 4 - Row 5)	**9,647**	**163**	**-4.9**	**-0.9**	**-0.4**	**3.2**	**-2.3**	**-0.4**
7		**Net Benefit** *vs. uncovered lagoon* (Row 6 – Row 1)	**-60,934**	**-24,356**	**-4.9**	**-0.9**	**-0.4**	**3.2**	**-2.3**	**-3.4**
8	**Pipeline Injection to NG Vehicles**	Local	15,448	5,268	0.1	<0.1	<0.1	1.2	<0.1	0.3
9		Remote	4,839	3,568	4.6	0.2	0.2	52.5	0.2	0.6
10		**Subtotal** (Row 8 + Row 9)	**20,287**	**8,837**	**4.7**	**0.2**	**0.2**	**53.7**	**0.2**	**0.9**
11		Diesel Displaced	4,197	3,720	8.8	0.4	0.2	1.6	1.2	12.0
12		**Pathway Emissions** (Row 10 - Row 11)	**16,090**	**5,117**	**-4.1**	**-0.2**	**<0.1**	**52.1**	**-1.0**	**-11.1**
13		**Net Benefit** *vs. uncovered lagoon* (Row 12 – Row 1)	**-54,491**	**-19,402**	**-4.1**	**-0.2**	**<0.1**	**52.1**	**-1.0**	**-14.1**
14	**Pipeline Injection to Power Plant, Grid and EVs**	Local	15,448	5,268	0.1	<0.1	<0.1	1.2	<0.1	0.3
15		Remote	3,860	2,957	0.4	0.1	0.1	0.4	0.2	0.1
16		**Subtotal** (Row 12 + Row 13)	**19,307**	**8,226**	**0.5**	**0.1**	**0.1**	**1.6**	**0.2**	**0.4**
17		Diesel Displaced	11,916	10,560	7.6	1.6	0.9	7.4	3.3	1.4
18		**Pathway Emissions** (Row 16 - Row 17)	**7,391**	**-2,334**	**-7.1**	**-1.5**	**-0.8**	**-5.8**	**-3.1**	**-1.0**
19		**Net Benefit** *vs. uncovered lagoon* (Row 18 – Row 1)	**-63,190**	**-26,853**	**-7.1**	**-1.5**	**-0.8**	**-5.8**	**-3.1**	**-4.0**
17	**Pipeline Injection to Hydrogen Vehicles** (H_2 from SMR)	Local	15,448	5,268	0.1	<0.1	<0.1	1.2	<0.1	0.3
18		Remote	6,140	5,017	3.5	0.6	0.6	1.9	2.4	0.4
19		**Subtotal** (Row 17 + Row 18)	**21,588**	**10,285**	**3.6**	**0.6**	**0.6**	**3.1**	**2.4**	**0.7**
20		Diesel Displaced	7,709	6,832	4.9	1.0	0.6	4.8	2.1	0.9
21		**Pathway Emissions** (Row 19 - Row 20)	**13,879**	**3,453**	**-1.3**	**-0.4**	**<0.1**	**-1.7**	**0.3**	**-0.2**
22		**Net Benefit** *vs. uncovered lagoon* (Row 21 – Row 1)	**-56,702**	**-21,066**	**-1.3**	**-0.4**	**<0.1**	**-1.7**	**0.3**	**-3.2**
23	**Pipeline Injection to Fuel Cell, Grid and EVs** (Solid Oxide Fuel Cell)	Local	15,448	5,268	0.1	<0.1	<0.1	1.2	<0.1	0.3
24		Remote	3,860	2,957	0.6	<0.1	<0.1	0.5	0.1	0.1
25		**Subtotal** (Row 23 + Row 24)	**19,308**	**8,225**	**0.7**	**0.1**	**0.1**	**1.7**	**0.1**	**0.3**
26		Diesel Displaced	13,292	11,779	8.5	1.8	1.0	8.3	3.7	1.5
27		**Pathway Emissions** (Row 25 - Row 26)	**6,016**	**-3,554**	**-7.8**	**-1.7**	**-0.9**	**-6.6**	**-3.6**	**-1.2**
28		**Net Benefit** *vs. uncovered lagoon* (Row 27 – Row 1)	**-64,565**	**-28,073**	**-7.8**	**-1.7**	**-0.9**	**-6.6**	**-3.6**	**-4.2**

Note: Units are metric tons per year (MT/yr.) for all numerical values.

[4] https://ww2.arb.ca.gov/sites/default/files/2020-07/dairy-emissions-matrix-113018.pdf