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THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

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June 2, 2023

RE: International Council on Clean Transportation comments on LCFS Application No. B0430

These comments are submitted by the International Council on Clean Transportation (ICCT). The ICCT is an independent nonprofit organization founded to provide unbiased research and technical analysis to environmental regulators. Our mission is to improve the environmental performance and energy efficiency of road, marine, and air transportation, in order to benefit public health and mitigate climate change. We promote best practices and comprehensive solutions to increase vehicle efficiency, increase the sustainability of alternative fuels, reduce pollution from the in-use fleet, and curtail emissions of local air pollutants and greenhouse gases (GHG) from international goods movement.

The ICCT welcomes the opportunity to provide comments on FirstElement Fuel's Low-Carbon Fuel Standard (LCFS) pathway application. We commend the agency for its dedication to assessing its progress towards its climate goals and its willingness to evaluate policy options to meet its targets. The comments below offer a number of technical observations and recommendations for ARB to consider as it reviews the contributions of the LCFS to its broader climate goals.

We would be glad to clarify or elaborate on any points made in the below comments. If there are any questions, ARB staff can feel free to contact Nik Pavlenko (n.pavlenko@theicct.org) and Dr. Stephanie Searle (stephanie@theicct.org).

Stephanie Searle

Deputy Director

International Council on Clean Transportation

These comments pertain to FirstElement Fuel (FEF) and U.S. Venture, Inc.'s joint application (No. B0430) for nine hydrogen pathways seeking certification under the California LCFS. The applicant facility produces hydrogen from steam methane reforming (SMR) of fossil natural gas and has procured an equivalent volume of renewable natural gas (RNG) produced at dairy farms located in upstate New York and injected into a common carrier pipeline. RNG is assumed to be the input feedstock for SMR in the CA-GREET3.0 model using book-and-claim accounting; the proposed carbon intensities for the nine pathways range from -282.30 to -116.43 gCO₂e/MJ. It is critical that CARB assess claims of avoided emissions and counterfactual behavior with scrutiny, as these emissions reductions greatly exceed the measurable, verifiable emissions from the fuel production process itself yet are solely the product of assumptions on counterfactual behavior.

The highly negative CI values calculated for this pathway application are based on a faulty assumption of counterfactual manure management practices and do not reflect any CO₂ sequestration in the supply chain of the finished fuel itself. The proposed and previously certified CI values for biomethane intermediates produced at the Yellow Jacket dairy farms greatly overstate the climate benefits of the fuel, as they assume that methane produced at the Lakeshore, Lamb, and Boxler dairy farms would be vented to the atmosphere under baseline operating conditions; however, this assumption conflicts with project information listed on the company website. Specifically, the farms have installed a digester more than a decade ago and have already been capturing methane to “produce electricity used on-site and transmitted to the local electric grid.”¹ Increasing maintenance fees due to deterioration of equipment over the past decade may have impacted the project economics of these farms, leading the project owners to seek new revenue streams such as selling the value of environmental attributes to outside parties like FEF.

The pathways in question reflect a transition of biomethane from existing use for generating electricity to a different use to upgrade it for the natural gas grid. Yet, the proposed counterfactual assumption of methane venting in the pathway application implies that in the absence of the financial value of the LCFS program, that the methane would be released into the atmosphere. There is insufficient evidence in the package of information shared with the public to suggest that the LCFS does more than provide additional value to an existing capture system. To justify the sizeable emissions credits associated with avoided behavior, we recommend that CARB evaluate the additionality of the project. For example, the Clean Development Mechanism requires an investment analysis to demonstrate that the credit in question would justify a change from

¹ “The Yellowjacket Project,” Brightmark.com, accessed May 30, 2023, <https://brightmark.com/renewable-natural-gas/projects/the-yellow-jacket-project/>.

counterfactual behavior.² Though the LCFS does not normally consider additionality, it may be justified here due to the structure of the book-and-claim crediting provisions, which is more similar to an offset program.

If the LCFS credits existing biogas electricity projects with avoided methane credits for transitioning to RNG production, it would create a perverse incentive within the program. This would not only greatly inflate the GHG reductions from qualifying projects, but it would also provide more credit value for a biomethane RNG pathway than for a biomethane electricity pathway. We estimate that pipeline injected biomethane (i.e., RNG) has a CI of 36.42 gCO_{2e}/MJ while biogas that is combusted for electricity has a CI of 19.34 gCO_{2e}/MJ.³ This is because upgrading biogas to pipeline quality requires additional processing steps than combusting it for electricity to remove carbon dioxide and compress the gas. Thus, if emissions from electricity production was set as the operating baseline while emissions from RNG production was set as the project case, this would result in an *increase* in methane and carbon dioxide emissions.

Therefore, we recommend that CARB reassess the CI calculation methodology for the nine pathways by setting the projects' baseline operating conditions as biomethane electricity production rather than methane venting. Using data provided by FEF from CA-GREET 3.0, we recommend that lifecycle emissions for the proposed hydrogen pathways be set equal to their direct emissions provided in the pathway summary tables⁴ and remove avoided methane emissions crediting. To more accurately reflect the existing behavior for the project, we recommend that adjusting the net change in emissions associated with transitioning from producing electricity to producing RNG, rather than assuming that the methane would be vented.

Direct LCA emissions for the nine applicant pathways range from 36.05 to 90.45 gCO_{2e}/MJ, excluding emissions associated with transportation and distribution of the fuel. At \$100/mt credit prices, we find that updating the CI value to remove avoided methane emissions would reduce the LCFS credit value by approximately two-thirds

² <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v7.0.pdf>

³ This is an illustrative example calculated for an RNG facility of 2,000 dairy cows using CA-GREET and the Dairy Biomethane Tier 1 emissions calculator. Energy requirements are a function of the energy content of the final fuel, accounting for feedstock losses due to flaring and fugitive methane release. We set avoided methane and carbon dioxide emissions crediting to zero to calculate the direct emissions associated with each process in the baseline case.

⁴ CARB, "Lifecycle Assessment Application No. B0430," accessed May 31, 2023, https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/comments/tier2/b0430_report.pdf.

across all pathways (Table 1). We calculate LCFS credit prices for each pathway for the year 2023 accounting for hydrogen’s 2.5x EER value.⁵

Table 1. Proposed and updated CI with corresponding LCFS credit value for nine applicant pathways

Pathway No.	Fuel type	With avoided methane emissions crediting		Without avoided methane emissions crediting ⁶	
		Lifecycle CI (gCO _{2e} /MJ)	LCFS credit value (\$/kg)	Lifecycle CI (gCO _{2e} /MJ)	LCFS credit value (\$/kg)
B043001	LH2	-236.9	5.52	74.81	1.78
B043002	LH2	-243.54	5.6	74.81	1.78
B043003	LH2	-132.07	4.26	74.81	1.78
B043004	GH2	-275.67	5.98	36.05	2.24
B043005	GH2	-282.3	6.06	36.05	2.24
B043006	GH2	-170.83	4.72	36.05	2.24
B043007	Transfill H2	-221.27	5.33	90.45	1.59
B043008	Transfill H2	-227.91	5.41	90.45	1.59
B043009	Transfill H2	-116.43	4.07	90.45	1.59

Updating the CI value to reflect a more appropriate project baseline will more accurately capture the climate impact of hydrogen production at the applicant facility. This decision is especially important for the applicant pathways given that RNG is credited via book-and-claim rather than directly produced on-site.

⁵ CARB, “LCFS Credit Price Calculator,” n.d., <https://ww2.arb.ca.gov/sites/default/files/2022-03/creditvaluecalculator.xlsx>.

⁶ Only captures emissions associated with direct hydrogen production