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VIA ELECTRONIC FILING

February 20, 2024

Matthew Botill
California Air Resources Board
1001 I Street
Sacramento, California 95814

Re: RNG Coalition's Comments on Low Carbon Fuel Standard Initial Statement of Reasons

Dear Mr. Botill:

The Coalition for Renewable Natural Gas (RNG Coalition) is a California-based nonprofit organization representing and providing public policy advocacy and education for the Renewable Natural Gas (RNG) industry.[1] RNG Coalition respectfully submits these comments to the California Air Resources Board (CARB) in response to the Proposed Amendments (Proposed Rule) to the Low Carbon Fuel Standard (LCFS) and associated Initial Statement of Reasons (ISOR).

We thank CARB staff for acknowledging the importance of continued RNG growth and share CARB's goal of supporting "methane emissions reductions and deploying biomethane for best uses across transportation." The biggest barrier to continued LCFS-driven methane reduction is the Proposed Rule's lack of overall ambition. We recommend that CARB focus on swiftly enhancing the program's goals to achieve the maximum technologically feasible and cost-effective greenhouse gas reductions from transportation fuels.

CARB should adopt an LCFS program target of at least 25% for the remainder of 2024 (and through 2025) to immediately reduce the program's credit bank to an appropriate level. CARB should also set midterm targets in the range of a 30-44% reduction by 2030. The Automatic Accelerator Mechanism should be allowed to trigger as early as possible, to guard against the case where the near-term target step down in not sufficient to address the current oversupply.

Additionally, the specifics of the Proposed Rule do not fully alleviate stakeholder uncertainty about RNG's future role in the program. Our comments below explain the importance of continued expansion of the robust national framework for RNG accounting, further adjustments to the credit true up concept, and avoiding the dangers of phasing out avoided methane crediting without a replacement strategy to ensure methane emissions reductions from various organic waste streams.

Sincerely,

/S/
Sam Wade
Director of Public Policy
Coalition for Renewable Natural Gas

[1] For more information see: http://www.rngcoalition.com/

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1 Increased Program Ambition is Critical for Continued Methane Reduction and Growth in All Low Carbon Fuels

Given the LCFS credit surpluses over the last two years, a significant step-down in the Annual Carbon Intensity (CI) Benchmarks is critical at this time. Based on all recent market information to date, 2024 will have many more credits produced than deficits. This will cause the bank to continue to build rapidly, prices to fall, and low carbon fuel investment to stall.

CARB's goal should be to reduce this troubling trend and take advantage of the opportunity to promote greater use of low carbon fuel. The key to accomplishing this goal is setting the appropriate stringency trajectory for the CI Benchmarks and to avoid unnecessary price volatility as we go from large quarterly surpluses to quarterly deficits. Therefore, improved target setting has always been, and remains, the most critical topic in this rulemaking.

1.1 We Support the Target-Setting Analytical Work Conducted by the Consulting Firm ICF

Throughout this rulemaking, a diverse group of Clean Fuel voices has contracted with the consulting firm ICF to independently prepare and submit an analysis of what program targets are feasible. ICF has extensive experience modeling supply and demand in analogous clean fuel programs, both for governments and non-governmental organizations—including the Colorado Energy Office, Great Plains Institute, Oregon Department of Environmental Quality, Puget Sound Clean Air Agency, and for private clients. We encourage CARB to rely upon the results of the ICF analytical work as it represents the most comprehensive and realistic analysis of supply and economics of RNG available to the LCFS system, as well as for other low carbon fuels.

Key findings of the ICF work include the following:

- ICF recommends a "step down" of 10.5% to 11.5% in 2025 to achieve a target credit bank equivalent of 2-3 quarters worth of deficits. This is equivalent to a 2025 target of 24.25-25.25%.
- ICF recommends that the Automatic Acceleration Mechanism be considered for implementation as soon as 2026, rather than waiting until 2028. ICF also recommends that the first criteria for the Automatic Acceleration Mechanism be modified such that the mechanism is enacted when the credit bank is more than 2.5 times greater than the quarterly deficits generated in a given year.
- ICF recommends that Staff increase transparency in credit price modeling so that stakeholders can better understand what is driving the magnitude of credit pricing and the patterns emerging from the data.
- ICF's analysis shows that the proposed changes to the fossil diesel baseline significantly change the relative stringency of the program's targets, when expressed as a percentage of baseline levels.

1.2 A 2025 Target of ≥25% is Needed to Address Current Oversupply Issues. This Level of Ambition Should also be Implemented in Q3 or Q4 of 2024, if Administratively Possible.

Based on the ICF work, we believe that it is appropriate to increase the program's benchmarks to set at least a 25% CI reduction below the 2010 Baseline in 2025. This should be sufficient to begin to draw down the credit bank, reestablish a demand for additional expansion in low carbon fuel supply, and

therefore drive the necessary long-run amount of additional greenhouse gas abatement to reach the state's overall transportation decarbonization goals.

Further, starting this step down as soon as possible and avoiding unnecessary bank build is crucial. We recommend that CARB target the step down to occur on 7/1/2024 to a level of 25% below the 2010 baseline and maintain that level through 12/31/2025 (assuming CARB elects to retain the updated 2010 diesel baseline value and that the necessary administrative steps can be accomplished on this timeline).

1.3 A 2030 Target of 30% can be Achieved with a Lower Credit Price Trajectory than Predicted in CARB's Modeling of the Primary ISOR Scenario

ICF's work shows significantly different LCFS credit price outcomes than CARB's ISOR analysis of the primary scenario. We believe that ICF's outlook is better informed by the true near-term supply outlook across all low carbon fuels, deeper analysis of production costs, and a better understanding of the potential other areas of public policy support (e.g., federal biofuel and clean vehicle policy). Given that this deeper understanding demonstrates that it is possible to achieve greater mid-term reductions, we recommend that CARB continue to target at least a 30% CI reduction by 2030 and adjust their credit price forecasting to reflect ICF's input.

1.4 2030 Targets in the Range of 41-44% are Achievable. Additional Enhancement of the Program to Support all Low Carbon Fuels is In Line with Statewide Goals.

The ICF work also demonstrates that greater ambition is achievable in the 2030 timeframe—if additional adjustments are made to maximize opportunities for greenhouse gas reductions across RNG and all other types of the low carbon fuel. We note that CARB's primary Scoping Plan scenario targeted a 48% economy-wide reduction in greenhouse gases by 2030[2] and at least a 40% reduction is required by law.[3]

Since transportation remains the largest sector of greenhouse gas (GHG) emissions in California, and clearly additional low carbon fuel supply is feasible, we believe CARB should continue to try to expand the ambition of LCFS program targets and match the LCFS more closely to economy-wide goals.

1.5 Changes to Fossil Diesel Baseline Significantly Change the Relative Stringency of Program Targets

Per ICF's analysis, the Proposed Rule's decision to increase the CI of Ultra Low Sulfur Diesel from 100.45 g CO_2e/MJ to 105.76 g CO_2e/MJ has major unarticulated consequences. This change—especially without at least some analogous change for the N_2O performance of Renewable Diesel pathways—has a material impact on the program's ambition, when expressed as a percentage of that baseline.

ICF analysis suggests that this will yield substantially more credit generation than previously forecast. CARB should better justify this change in diesel fuel baseline—with respect to alignment between tailpipe emissions performance of vehicles using both conventional and renewable diesel—or be sure to correct for this factor more transparently during final target setting.

[2] https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf
[3] California Code, Health and Safety Code § 38566.

2 Additional RNG-Related Changes Are Needed to Improve Investor Confidence and Increase the Pace of Methane Emissions Abatement

Despite CARB staff's stated support for RNG throughout the informal workshop process (and in the ISOR) investors remain concerned about how the Proposed Rule shifts the LCFS's RNG crediting framework. The simple fact is that many anaerobic digestion (AD) RNG projects in planning and construction across North America currently rely on LCFS revenues to be built and operated. Without clear rational for RNG programmatic changes—and consistency in concepts between draft regulatory text, material presented in workshop slides, modeling tools, and statements by all levels of CARB staff—investors do not fully know how to respond to regulatory signals sent by CARB's Proposed Rule.

It took an almost decade-long history of LCFS credit being awarded to RNG projects, clear recognition of the methane reduction benefits across a variety of feedstocks, and consistent positive statements from CARB leaders before investors begin to seriously rely on this program to construct RNG projects. If CARB truly wants methane abatement from sources such as agricultural wastes to continue, and for new sources of RNG activity such as organic waste diversion from the municipal waste stream to develop they must reconvince the clean fuel investment community that RNG will remain a viable and important contributor to the LCFS framework.

2.1 CARB Correctly Continues to Acknowledge the Importance of Methane Reduction to Addressing Global Climate Change and the Benefits of RNG in Promoting Methane Reductions, Regardless of Location or End Use

Methane is a highly potent greenhouse gas with impacts greater than 80 times that of carbon dioxide over a 20-year period. The critical need to address methane as a potent short lived climate pollutant was well stated in CARB's 2017 Short Lived Climate Pollutant (SLCP) Reduction Strategy and echoed by many other leading authorities.[4]

The concentration of methane in the atmosphere is increasing at an alarming rate.[5] It is the second most important GHG, behind carbon dioxide, and it can and must be addressed quickly. There is no more effective and immediate step we can be taking as a planet to address climate change now than to aggressively and rapidly reverse emissions of fugitive methane from all sectors, including society's organic waste streams.

The Intergovernmental Panel on Climate Change (IPCC) continues to emphasize the importance of methane capture stating that, "reducing non-CO_2 emissions such as methane more rapidly would limit peak warming levels and reduce the requirement for net negative CO_2 emissions" and that, "strong,

[4] See our December 9, 2022, workshop comments for a more comprehensive list of expert bodies calling for near-term action on methane.

[5] See "Increase in atmospheric methane set another record during 2021", National Oceanic and Atmospheric Administration, Press Release, April 7, 2022. http://noaa.gov/news-release/increase-in-atmospheric-methane-set-another-record-during-2021.

rapid and sustained reductions in methane emissions can limit near-term warming and improve air quality by reducing global surface ozone."[6]

As shown in Figure 1, the IPCC lists at least four key GHG mitigation options that relate directly to RNG production and use, including reducing methane and N_2O in agriculture, reduce methane from waste/wastewater, bioelectricty (including bioenergy with carbon capture and sequestration) and—most importantly for LCFS discussions—biofuels for transport.

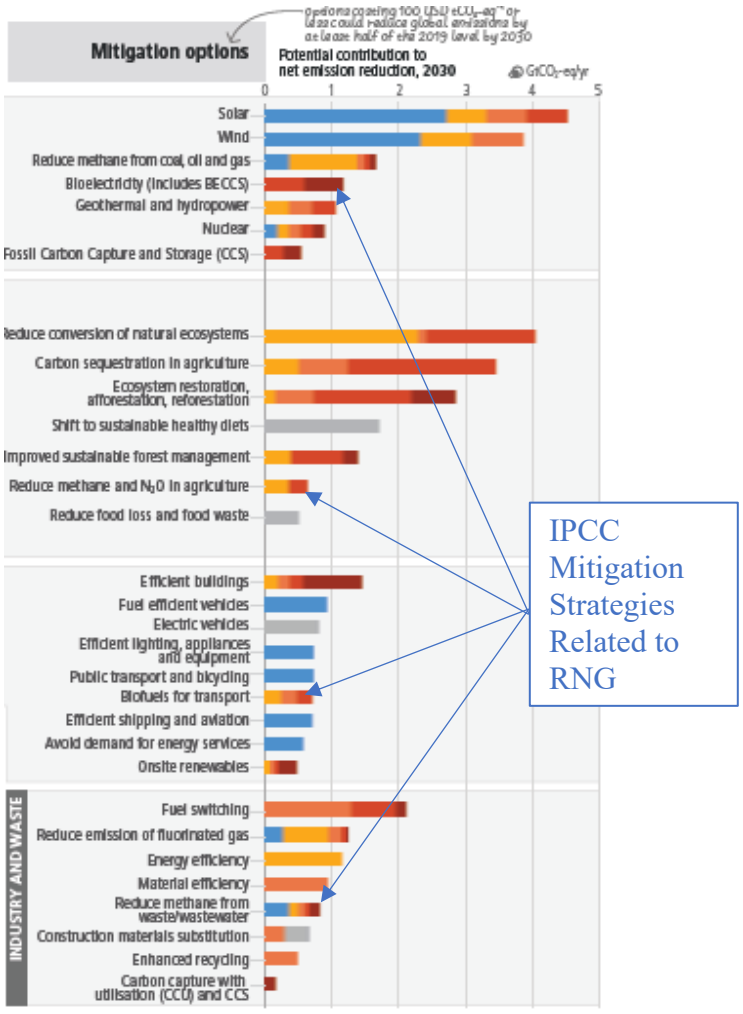

Figure 1. The IPCC Recommends Many Mitigation Options Related to RNG[7]

Further, last year—for the first time—the International Energy Agency (IEA) included a special section on Biogas and Biomethane in their *Renewables 2023 Analysis and Forecast to 2028* report.[8] Renewables

[6] IPCC, 2023: *Summary for Policymakers. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf

[7] Ibid. See Figure SPM.7: Multiple Opportunities for Scaling Up Climate Action.

[8] International Energy Agency, *Renewables 2023: Analysis and Forecasts to 2028* https://iea.blob.core.windows.net/assets/96d66a8b-d502-476b-ba94-54ffda84cf72/Renewables_2023.pdf

2023 is the IEA's primary analysis on the Renewables sector, based on current policies and market developments. It forecasts the deployment of renewable energy technologies in electricity, transport, and heat to 2028 while also exploring key challenges to the industry and identifying barriers to faster growth.

In the special section[9] on biogas and biomethane, IEA states that, "in view of the urgent need to limit global temperature rise to 1.5°C, countries have begun to view biogas as a ready-to-use technology that can help accelerate decarbonisation in the short term, and they are therefore developing specific policies that include biogas as a key component in their energy transition strategies." The IEA also finds that, "using biogas and biomethane helps build a circular economy around residue and waste valorisation, contributes to rural economic development and creates employment. Plus, producing natural fertilisers as a co-product of biogas and biomethane production can augment farmers' income and help reestablish soil health by eliminating certain environmental impacts related to untreated manure use." The report also finds that:

> "In the United States, biomethane development has historically been driven by the transport sector and support schemes such as the Renewable Fuel Standard (RFS) and California's Low Carbon Fuels Standard (LCFS) applicable to fuels sold in California."

These findings are not new, but if CARB wants to build on this global recognition for smart LCFS policy design and expand influence in clean fuel conversations, they must continue to follow fact-based analysis from a science- and data-driven perspective. RNG remains a well-recognized global strategy to reduce emissions from organic waste sectors that can work in conjunction with other strategies—like waste reduction.

The United States Environmental Protection Agency (US EPA) has been tracking and attempting to incentivize anaerobic digesters with productive energy use since the inception of the AgStar program in 1994.[10] California efforts to install dairy digesters dates back (at least) to 2002 and the first round of funding for the California Energy Commission's Dairy Power Production Program.[11] Twenty to thirty years since the initial serious US exploration of this approach, while biogas recovery systems are technically feasible for over 8,000 *existing*[12] large dairy and hog operations across the US, AgSTAR estimates that still only 343 manure-based anaerobic digestion systems are installed and reducing methane emissions.[13] The LCFS needs to remain a key tool to help accelerate the critically needed action to reduce methane from these sources.

[9] https://www.iea.org/reports/renewables-2023/special-section-biogas-and-biomethane
[10] https://www.epa.gov/agstar
[11] https://calepa.ca.gov/history/
[12] We emphasize EPA's assessment of the number of existing farms that can support digesters to avoid triggering concerns that avoided methane crediting somehow leads to expansion or consolidation of farms. As discussed in more detail below, incentivizing anaerobic digestion as a clean fuel and manure management method does not incentivize manure production by dairy farmers or increases in herd size.
[13] https://www.epa.gov/agstar/agstar-data-and-trends

2.1.1 Avoided Methane Crediting Makes Agricultural RNG Projects Possible, Incentivizes Maximum Greenhouse Gas Capture During RNG Production

A fixed-year phase-out of avoided methane crediting—as included in the Proposed Rule—is simply not smart policy. Agricultural and organic waste diversion projects are heavily dependent on LCFS revenue for profitability, driven by the avoided methane components of their CI scores. During the informal workshop period of this rulemaking, many of our members have, on a confidential basis, individually supplied CARB with detailed economics for the development of dairy RNG facilities that clearly demonstrate that avoided methane crediting is critical to meet capital repayment requirements for new projects.

At current LCFS credit prices, a framework without avoided methane crediting does not even cover operating costs for existing agricultural projects in some instances. For projects where that is true—absent some new market that covers the cost of operations—existing digesters will not continue operating after their avoided methane crediting periods expire, potentially reversing progress made by the program.

2.1.2 Recognition of Avoided Methane is the Industry Standard in Europe

Opponents of recognizing RNG for avoided methane benefits often portray the CA LCFS's lifecycle analysis framework for methane from organic waste as if it is outside of the norm, or out of step with clean fuel policy in other leading jurisdictions. However, this is not the case. In fact, similar accounting was first pioneered in the European Union's Renewable Energy Directive (RED).

The Renewable Energy Directive is the legal framework for the development of clean energy across all sectors of the EU economy. The EU has found[14] that there is a clear need to scale-up RNG (biomethane) by 2030, as outlined in the *REPowerEU Plan* published in May of 2022.[15] Under that plan, the EU's biomethane production, either as biogas or its upgraded version as RNG, is targeted to reach 35 billion cubic meters per year by 2030.

Within the RED framework,[16] Annex VI provides Default GHG emission values and calculation rules for gaseous biomass fuels and their fossil fuel comparators.[17] As can be seen in Table 1, reproduced from that RED Annex, RNG from dairy manure for use as a transport fuel has carbon negative performance (e.g., achieves emission reductions greater than 100% relative to the emissions of the fossil fuel displaced).

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[14] https://energy.ec.europa.eu/topics/renewable-energy/bioenergy/biomethane_en#:~:text=EU's%20biomethane%20production%20needs%20to,amounts%20to%20%E2%82%AC37%20billion.&text=This%20is%20a%20modal%20window.&text=Beginning%20of%20dialog%20window.,cancel%20and%20close%20the%20window.

[15] https://eur-lex.europa.eu/resource.html?uri=cellar:fc930f14-d7ae-11ec-a95f-01aa75ed71a1.0001.02/DOC_1&format=PDF

[16] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02018L2001-20231120

[17] https://joint-research-centre.ec.europa.eu/welcome-jec-website/reference-regulatory-framework/renewable-energy-recast-2030-red-ii_en

Table 1. The EU RED Framework Continues to Recognize the Carbon-Negative Performance of Manure to RNG Transportation Pathways

BIOMETHANE FOR TRANSPORT (*)			
Biomethane production system	Technological options	Greenhouse gas emissions savings – typical value	Greenhouse gas emissions savings – default value
Wet manure	Open digestate, no off-gas combustion	117 %	72 %
	Open digestate, off-gas combustion	133 %	94 %
	Close digestate, no off-gas combustion	190 %	179 %
	Close digestate, off-gas combustion	206 %	202 %

Despite ongoing analogous scrutiny in Europe of anaerobic digestion of animal wastes—from similar voices as those active in California—the EU has found it is appropriate to continue this framework in the amending Directive EU/2023/2413, entered into force on November of 2023.[18] Embracing the true GHG performance of RNG projects has been a recipe for successful RNG project buildout in both the CA LCFS and EU cases. CARB should continue to coordinate with European leaders on this important topic.

2.1.3 Avoided Methane Crediting Should Continue in LCFS Unless and Until a Realistic and Proven Replacement Policy is Implemented

Given the importance of the LCFS crediting in project viability, is unwise and irresponsible to propose an arbitrary (tied to a fixed year) phase-out of avoided methane crediting without a detailed plan for developing a supporting replacement policy. Because of this fact, although better than prior proposals discussed during the workshop period, the Proposed Rule's treatment of avoided methane would still lead to significant project uncertainty and increases the potential for stranded assets—an issue correctly cited by CARB during the workshops as a key signal to be avoided.[19]

A California-only mandate for dairy manure methane control would likely drive "economic leakage" (unless LCFS support continued as well). Economic leakage in the environmental context occurs when a regulatory environment in one jurisdiction drives the migration of a key business sector to another region without similar regulations. This can lead to simply shifting the pollution location without any global reduction in GHGs. This is particularly likely to occur in markets with the demand for the product is steadily increasing, such as the market for milk products.[20]

[18] https://energy.ec.europa.eu/topics/renewable-energy/renewable-energy-directive-targets-and-rules/renewable-energy-directive_en#the-revised-directive

[19] See CARB's Presentation at the February 22, 2023, LCFS Workshop, slide 31. https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/lcfs_meetings/LCFSpresentation_02222023.pdf

[20] Office of Environmental Farming and Innovation, California Department of Food and Agriculture, March 29th 2022 Workshop Presentation, Slide 3, Dr. Amrith Gunasekara, Manager. https://ww2.arb.ca.gov/sites/default/files/2022-04/dairy-ws-session-2-CDFA.pdf

Although demand for liquid beverage milk is declining, and milk substitutes have emerged, US supply and demand for total milk products (both per capita and in aggregate) continues to grow.[21,22] These facts make it challenging for individual states, even a large dairy state such as California, to require control of manure methane unilaterally. However, it is possible that a federal requirement, or a mandate developed by a coalition of like-minded dairy states could be effective. We advise proponents of such a shift from "carrots" to "sticks" that, for such a transition to be effective it will require the cooperation of both the California dairy and RNG industries.

The current LCFS rule already contemplates an appropriate phase-out of avoided methane crediting once mandatory control requirements are in place. Section § 95488.9(f)(3)(B) of the Current Rule states that:

> "…in the event that any law, regulation, or legally binding mandate requiring either greenhouse gas emission reductions from manure methane emissions from livestock and dairy projects or diversion of organic material from landfill disposal, comes into effect in California during a project's crediting period, then the project is only eligible to continue to receive LCFS credits for those greenhouse gas emission reductions for the remainder of the project's current crediting period. The project may not request any subsequent crediting periods."

It is possible that a federal mandate to control manure methane could be developed, promulgated, and in effect in the 2040 timeframe. RNG Coalition would consider supporting such federal action if it treated anerobic digestion with productive energy use as best available control technology. However, we currently see no signs that such a federal effort is on the horizon.[23] We continue to support CARB requiring phase-out of avoided methane crediting once replacement policies are in place. However, we do not support the Proposed Rule's required phase-out of avoided methane crediting *without* a suitable replacement policy.

If CARB staff continues to treat RNG as a temporary solution that might be arbitrarily phased out—without regard to scientific analysis of ongoing emission benefits or development of a replacement strategy—investors will view RNG as a permanently "at risk" fuel, less favored by regulators and therefore not worthy of investment.

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[21] USDA, *Dairy Products: Per Capita Consumption, United States (Annual)*, last updated 9/30/22. https://www.ers.usda.gov/webdocs/DataFiles/48685/pcconsp_1_.xlsx?v=4825

[22] USDA, *US Milk Production and Related Data*, last updated 8/15/22. https://www.ers.usda.gov/webdocs/DataFiles/48685/quarterlymilkfactors_1_.xlsx?v=4825

[23] Multiple states are moving to adopt LCFS policies that could provide a regional framework for addressing these emissions. Beyond expansion of LCFS-style policy no other serious state-level collaboration on manure management methane emissions has yet been proposed.

2.1.4 The Underlying Facts that Justify Avoided Methane Crediting to Ag RNG Projects Have Not Changed, CARB Should Rely on Extensive Prior Public Process and Leave the Current Framework in Place

While we always support additional stakeholder dialog around AD and RNG issues, we note that the facts on these issues have not changed and CARB has held extensive stakeholder outreach on these topics over the last decade, as required by Senate Bills (SB) 605 (Lara, 2014)[24] and SB 1383 (Lara, 2016).[25]

Senate Bill 605 required that CARB complete a comprehensive strategy to reduce emissions of short-lived climate pollutants (SLCP) in the state and hold at least one public workshop during the development of the strategy. CARB did so, developing the *Short Lived Climate Pollutant Reduction Strategy*[26] (SLCP Strategy) in March of 2017 with input from, "state and local agencies, academic experts, a working group of agricultural experts and farmers convened by the California Department of Food and Agriculture (CDFA), businesses, and other interested stakeholders in an open and public process".[27] Throughout this process, CARB "sought advice from academic, industry, and environmental justice representatives".[28] The SLCP Strategy contained extensive economic analysis of agricultural RNG projects[29] and found that:

> "The LCFS and the federal Renewable Fuel Standard (RFS) incentivize the use of renewable natural gas as a transportation fuel, creating large revenue potential within the dairy manure and organic diversion measures. These programs in particular can help support cost-effective projects to reduce methane from the dairy and waste sectors. Without the LCFS or RFS programs, additional sources for financial incentives and funding may be needed."[30]

SB 1383 further required that CARB provide a forum for public engagement on these issues by holding at least three public meetings in geographically diverse locations throughout the state where dairy operations and livestock operations are present. CARB went above and beyond this requirement and conducted almost two years of stakeholder engagement on these topics through a Dairy and Livestock Greenhouse Gas Reduction Working Group (Working Group).[31]

The three subgroups of the Working Group held 28 meetings that were open to the public for in-person and remote attendance and participation. The subgroup meetings typically included "information presented by subject matter experts and representatives from academia, industry, and non-governmental organizations, including environmental justice advocates" and environmental justice experts served on the subgroups.[32] The full Working Group—composed of the principals at CARB, the California Department of Food and Agriculture (CDFA), the California Energy Commission (CEC), and the

[24] https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB605
[25] https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB1383
[26] https://ww2.arb.ca.gov/sites/default/files/2020-07/final_SLCP_strategy.pdf
[27] CARB SLCP Strategy, p. 25.
[28] Ibid.
[29] CARB SLCP Strategy, *Appendix F: Supporting Documentation for the Economic Assessment of Measures in the SLCP Strategy*. https://ww2.arb.ca.gov/sites/default/files/2021-01/appendixF-SLCP-Final-2017.pdf
[30] CARB SLCP Strategy, p. 107.
[31] *Recommendations to the State of California's Dairy and Livestock Greenhouse Gas Reduction Working Group* https://ww2.arb.ca.gov/sites/default/files/2020-11/dairy-subgroup-recs-112618.pdf
[32] Ibid., p. 3.

California Public Utilities Commission (CPUC)—held three public meetings. This led to a set of recommendations that helped inform the Current Rule.[33]

In March of 2022 CARB held another extensive public discussion of these topics, conducting an all-day workshop on *Methane, Dairies and Livestock, and Renewable Natural Gas in California*.[34] This workshop contained an in-depth presentation from CARB on LCFS mechanics.[35] In the same month CARB released an *Analysis of Progress toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions Target*[36] after taking extensive public input[37] on a draft of that analysis. In the *Analysis of Progress* document CARB provided further analysis of LCFS and RFS environmental credit prices on ag AD project economics and continued to support AD as a primary means to reduce dairy manure methane emissions.

2.1.5 External Academic Analysis Shows that CARB's Strategy is Working

Realistically, if California wants to continue to lead globally on critical reductions in this SLCP from dairy and swine operations they cannot consider significantly upending their approach every few years, especially if the existing framework continues to demonstrate success. Recent UC Davis analysis shows continued implementation of California's incentive-based dairy methane reduction efforts will, by 2030, achieve the full SB 1383 40% reduction goal.[38]

This is a powerful and important finding. California's dairy industry, with support from the LCFS and other key programs (e.g., CDFA grants and the federal Renewable Fuel Standard), is on a course to meet the methane reduction challenge required by California law. In terms of both emission reduction and cost effectiveness, these are some of the state's most successful climate protection activities.[39]

Any further changes to the treatment of avoided methane crediting for agricultural AD in the LCFS would likely directly contradict the state's prior existing emissions reduction strategy for dairy manure methane, ignore the extensive stakeholder engagement work conducted by state agencies on these topics detailed above, discourage a new RNG industry that has been coalesced primarily to reduce greenhouse gas emissions, and most importantly disincentivize investment in one of the most effective methods of methane abatement that the state fundamentally needs to use to reach its statutory goals.

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[33] Including a recommendation to stabilize LCFS price support to ag RNG projects through a pilot financial mechanism that was never acted upon. Had such a provision been added projects would not be facing the current negative impacts of low prices.

[34] https://ww2.arb.ca.gov/our-work/programs/slcp/meetings

[35] https://ww2.arb.ca.gov/sites/default/files/2022-04/dairy-ws-session-9-CARB.pdf

[36] California Air Resources Board, *Analysis of Progress Toward Achieving the 230 Dairy and Livestock Sector Methane Emissions Target,* p. 22, March 2022, https://ww2.arb.ca.gov/sites/default/files/2022-03/final-dairy-livestock-SB1383-analysis.pdf.

[37] https://www.arb.ca.gov/lispub/comm2/bccommlog.php?listname=draft-dl-analysis-ws

[38] Kebreab, Mitloehner and Sumner, *Meeting the Call: How California is Pioneering a Pathway to Significant Dairy Sector Methane Reduction*, December 2022, https://clear.ucdavis.edu/news/new-report-california-pioneering-pathway-significant-dairy-methane-reduction

[39] CARB, *Analysis of Progress Toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions Target*, p. 17, Table 3.

2.1.6 There is No Evidence of a Perverse Incentive to Increase Farm Size from LCFS

LCFS credits from biomethane production does *not* incentivize manure production by increasing herd size. Even skeptical academic experts studying this issue[40] have found no empirical evidence to support the "perverse incentive" claims that underly some of the comments that continue to be made by uninformed anti-dairy voices.

Dairy RNG, at current transportation GHG market prices, generates only a small fraction of the gross revenue that is created by milk-sales. What is more, only a small share of that revenue goes to the farmer—the majority will be distributed to cover the costs of the digester developers, the gas marketer, the credit broker, end users (e.g., fleets adopting clean vehicles), the investors, and the banks. Meaning that the farmer does not make enough additional revenue from RNG to justify increasing herd size. However, the additional LCFS revenue from RNG production *is* critical to help defray the cost of an anaerobic digestor and encourage the transition toward a model of sustainable agriculture.

Even at higher prices, the LCFS incentive is unlikely to shift farm behavior. Dairy farmers are in the business of milk production and not RNG production. Agricultural voices that run dairy farms provided oral comment to this effect at the informal workshops and public meetings in direct response to questions from CARB Staff. RNG production at farms is usually handled by third-party project developers who constitute a large share of RNG Coalition's membership. These firms take substantial financial risk on these projects, historically because of explicit direction to do so from CARB and other California leaders.

Agricultural RNG projects are also a clear example that tests the thesis that investments based primarily on LCFS revenue—and GHG emission reduction benefits in general—is a feasible business model. Agricultural RNG development is one of the first major low carbon fuel industry built primarily around the LCFS program and it has only been successful because it was stood up by CARB based on the extensive public process described above. Major changes to this framework—without substantive new information—would undermine prior efforts to convince investors to make long-term capital deployment decisions based on LCFS credit value specifically, and California's climate strategies more generally.[41] Therefore, CARB should leave the current avoided methane crediting framework in place.

2.2 A Full Credit True-up Remains Necessary to Properly Recognize the True Environmental Performance of RNG Pathways

We support the Proposed Amendment's inclusion of a "Credit True Up" after Annual Verification. When implemented properly, such a concept can ensure that the LCFS program correctly accounts for the full GHG benefits all fuel pathways produce. However, we believe the Proposed Amendment's true up language may be mis-drafted as it appears to *not* allow true ups during the temporary pathway period.

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[40] Smith, Aaron, *"Are Manure subsidies Causing Farmers to Milk More Cows?"* April 8, 2023. https://agdatanews.substack.com/p/are-manure-subsidies-causing-farmers?r=i2qe&utm_campaign=post&utm_medium=web

[41] For the initial years of the LCFS, prospective low carbon fuel producers included anticipated credit revenue in financial models and the investors would ignore or heavily discount the LCFS line item, due to perceived change in law risk (colloquially called "stroke of the pen" risk).

This is confusing because, at both October 2020 and August 2022 LCFS Workshops, CARB Staff proposed providing a credit true up to correct for under crediting to pathway holders *only* during the period where a project is using temporary CI scores at the outset of their credit generation. At the time, CARB workshop material stated that such a limited true up would help reduce the pressure on CARB from developers to process LCFS applications quickly.

We continue to support a full true up to verified actual CI performance for all pathways (temporary, provisional, and fully certified).[42] Dairy Manure Digesters (and other biological systems) experience substantial increases and decreases in gas production due to weather, livestock herd changes, and other factors that are not present in other fuel pathways. Because the carbon intensity of the gas from these systems is calculated against a quantity of avoided methane emissions, these variations in biogas production necessarily result in outsized changes in the digesters' carbon intensity (CI) scores every year. Under the current structure of the LCFS (prior to the changes proposed in this rulemaking), <u>all</u> dairy digesters pathways experience the following negative impacts:

1. Substantial underestimation of greenhouse gas benefit (and associated lost revenue) during the temporary CI period.
2. Substantial risk of underestimation of greenhouse gas benefit (and lost revenue) each year during annual verification.
3. Substantial risk of LCFS enforcement, including risks of fines or potential pathway cancellation, due to no fault of the pathway holder.

These consequences are an unavoidable outcome of CARB's overly conservative approach under the Current Rule to dairy digester pathways (and some other pathways with biological feedstocks). As we will describe below, no amount of careful management, conservative pathway assumptions, or other actions can fully protect a digester under the Current Rule—and the Proposed Rule's changes alleviate some, but not all, of these concerns.

All three of the current negative impacts can be substantially mitigated or even eliminated with one simple policy change. Namely, if pathways were allowed to fully "true up" their LCFS credit generation to their actual CI score, once that score was knowable <u>based on actual greenhouse gas performance data</u>, all the problems are resolved.

The current LCFS regulation requires an annual verification to determine the true CI score, relative to the certified CI score. But the result of that annual verification is that pathway holders can only give up credits if their actual CI score goes up—they cannot also gain credits if their verified CI score goes down. We believe that, absent some manipulation or misrepresentation, the exchange should go both ways. With proper safeguards around the timing of the true up and potentially some requirement to hold credits in reserve, this policy can serve to encourage very low carbon pathways whereas the current policy discourages very low carbon fuels in favor of less variable fuels. We describe in detail the justification for correctly addressing each of these impacts below.

[42] See our comment letters dated January 7, 2022, August 8, 2022, and September 18, 2022, submitted during the informal workshop period.

2.2.1 Analysis of Impact #1: Additional Changes to the Proposed Rule are Needed to Address Understatement of GHG Reductions During the Temporary CI Period

New dairy digesters in California must apply to CARB staff for pathways to generate LCFS credits. Assuming no major problems with the application, it currently takes a new digester startup 24-27 months to receive from CARB a provisionally certified LCFS pathway due, primarily, to CARB pathway processing timelines.

Most dairy digester provisionally certified Carbon Intensity (CI) scores are between -250 and -425 grams CO_2 equivalent per MJ. During the period where the applicant is waiting to receive its site-specific, provisionally certified score, CARB will usually allow the project to generate credits under a Temporary Fuel Pathway Code (TFPC) at a score of -150. That TFPC code allows a digester project to generate .219 LCFS credits per MMBTU of injected biomethane, which is substantially less than the 0.401 credits that a typical California -350 CI dairy pathway would create.

A digester must usually share the first block of credits generated (regardless of CI) with the dispensing natural gas vehicle fueling station that creates the vehicle fuel. So, the net credits per MMBTU of gas that a digester can create with a TFPC is severely discounted as compared to a provisionally certified pathway. As shown in the Table 2 below, a digester operating under a TFPC makes only 46% as much LCFS revenue as compared to one operating under a provisionally certified pathway. In effect, the two-year delay in processing the application forces the digester to receive 54% less credit (and thus less revenue) than the actual value of greenhouse gas reductions that the project has generated, according to the CA GREET model.

The reductions are real, and calculated according to CARB's requirements, but the delay in processing the application means that the project is not recognized for the reductions it generates. Even once the site-specific score (e.g., -350) is known based on actual data, the LCFS regulation does not allow the project to go back and create credits at the score for the period where it used the -150 TFPC. During the startup period for a typical 3,000-cow California digester, this undercounting incorrectly misses over 16 thousand metric tons CO_2e of emissions benefits driven by the LCFS. This also translates to lost revenues equal to approximately $1,310,400 for the project, assuming an LCFS credit price of $80/credit.

Table 2. Dairy Digester Pathways Lose Significant Value When Using a Temporary Pathway

	CI Score	Credits/MBTU	Dispensing Cost	Credits to Digester	MMBTU/ quarter	Net Credits/quarter	$/Credit	$/quarter	Quarters awaiting Pathway	
Temporary Pathway	-150	0.219	-0.063	0.156	11,250	1,755	$80	$ 140,400	8	$ 1,123,200
Certified Pathay	-350	0.401	-0.063	0.338	11,250	3,803	$80	$ 304,200	8	$ 2,433,600
									Lost Revenue	**$ 1,310,400**

In some cases, it is possible to store the RNG by not dispensing it as CNG while awaiting LCFS pathway certification. But RNG may only be stored for three quarters under the LCFS, while pathway certification takes 8-9 quarters. So even with perfect foresight, a digester can only store a minor fraction of its gas pending certification. Furthermore, storage is expensive, and it prevents the digester from realizing any revenue, which is needed in the early stages of a project lifespan for operations, maintenance, and debt service.

True Up Solution: CARB's existing policy is to allow the project to generate credits at a -150 TFPC, followed by eventual provisional certification of a project-specific CI score. This initially conservative

policy is sound. However, after 24-27 months, the CI analysis nearly always reveals that the project has generated substantially more greenhouse gas reductions than the -150 score at which the project generated temporary credits. An easy fix would be for CARB to allow the project to "true up", at the time of provisional pathway certification, and generate additional credits for all prior reporting periods where it used the -150 TFPC.

As described above, CARB staff previously workshopped the option of making such a limited true up to address the temporary period. However, the ISOR proposal is unclear on how and when a true up would occur during this period. We recommend that this uncertainty be corrected, or that CARB otherwise justify—in response to this comment in the Final Statement of Reasons—why dairy derived RNG and other clean fuels are not being recognized for their true greenhouse gas performance in the program during the temporary period.

2.2.2 Analysis of Impact #2: The Proposed Rule Correctly Addresses Substantial Lost Revenue by Allowing for a True Up Each Year During Annual Verification.

Once a new dairy digester has secured a provisionally certified LCFS pathway, the project can generate credits each quarter using that CI score. At the end of every year, the project must perform an annual verification to see whether its actual CI score over the prior 24 months was higher or lower than the provisionally certified CI score.

The need for annual verification is a proven tool to ensure accuracy of GHG performance in the LCFS (and similar programs), but the policy implementation of verified actual values under the current rule is lopsided (especially in the case of highly variable CI feedstocks such as manure used in anaerobic digesters). These projects cannot control the weather, which greatly impacts the CI modeling of baseline methane emissions via the Methane Conversion Factor. As shown on Table A.5 from the *Proposed Tier 1 Simplified Calculator for Biomethane from Anaerobic Digestion of Dairy and Swine Manure (Proposed Dairy Tier 1 Calculator)*,[43] methane conversion factors can vary by as much as 10x across the temperature range.

Nor can the project control the number and type of livestock present at the host site, which greatly impacts both the baseline calculation and the amount of biogas produced by the project. Table 3 below (labeled A.1 and A.2 in the *Proposed Dairy Tier 1 Calculator*) shows the variability of volatile solids production and biogas production potential, among animal types.

[43] https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/ca-greet/t1_biomethane_ad_dairy_swine_manure_simplified_calculator_v12192023.xlsm

Table 3. Various Animal Types Have Different Volatile Solids and Biogas Production Potential

Table A.1 and A.2: Typical Average Mass ($Mass_L$), Volatile Solids, and Maximum Methane Potential of all Livestock Category

Livestock Category (L)	Livestock Typical Average Mass (TAM) in kg	VS_L (kg/day per 1,000 kg mass)	$B_{o,L}$ (m^3 CH_4/kg VS added)
Dairy cows (on feed)	680	11.41	0.24
Non-milking dairy cows (on feed)	684	5.56	0.24
Heifers (on feed)	407	8.44	0.17
Bulls (grazing)	874	6.04	0.17
Calves (grazing)	118	7.70	0.17
Heifers (grazing)	351.5	13.96	0.17
Cows (grazing)	582.5	8.89	0.17
Nursery swine	12.5	8.89	0.48
Grow/finish swine	70	5.36	0.48
Breeding swine	198	2.71	0.35

Most other LCFS fuel pathways have much more control over their CI inputs. Liquid fuel production CIs are not as impacted from weather and seasonal feedstock animal population. Even leaving aside all other operational variables that might apply to digesters, these two components are sufficient to cause the CI of a manure digester project to vary by over 100 points from year to year.

If the annual verification reveals that the actual CI score was lower (more negative) than the provisionally certified score, the project should be eligible to claim credits for the difference, but is not eligible to do so under the Current Rule. Just like during the temporary CI period described above, the project will have created more greenhouse gas reductions than it will receive revenue for.

On the other hand, if the annual verification reveals that the actual CI score was higher (less negative) than the provisionally certified CI score, the project already has to pay back credits to CARB under the current rule (and would have to pay back 4 credits for every one credit exceeded under the Proposed Rule). The CI of a dairy digester changes every year. Thus, each year the project will either under or over perform the CI that was verified the previous year. So, digesters essentially pay a “variability penalty”. Table 4 below shows a digester where the actual score—as determined by CA-GREET and verified by a third party—averages out to -350 over 10 years. However, the CI score available to the project over the first ten years (either certified or TFPC) averages to a -306. But since the project is in each year forced to generate credits at its worst performance level, the project is actually paid at a -285 CI under the Current Rule.

Table 4. Under the Current Rule Ag Digesters are Subject to a "Variability Penalty"

Year	TFPC or Certified Score	Actual (Verified) Score	Monetized Score*
1	-150	-350	-150
2	-150	-365	-150
3	-350	-260	-260
4	-260	-310	-260
5	-310	-405	-310
6	-405	-295	-295
7	-295	-375	-295
8	-375	-385	-375
9	-385	-380	-380
10	-380	-375	-375
AVG	**-306**	**-350**	**-285**

The net result of this policy is that highly negative CI pathways receive substantially fewer LCFS credits than the greenhouse gas benefits they actually create. Thus, project developers are incentivized to develop less carbon negative pathways that are more stable, because more negative pathways must pay a "variability penalty" under the Current Rule.

We Support Components of the ISOR Proposed True Up Solution, We Don't Support 4-to-1 Penalty: We support the provisions in the proposed rule where, if the verified CI is lower than the certified pathway, the project will generate additional credits based on the incrementally lower verified score using backward-looking actual performance.

This true up process should be automated by CARB in the LRT-CBTS system for all fuels. In this situation, because of the true up, the total credits awarded would be equal to the true value of greenhouse gas emissions reductions, which is historically the stated intention of the LCFS program. Consequently, highly variable CI scores would not pay a variability penalty (assuming they adopt an appropriate margin of safety), and project developers would be encouraged to seek lower CI scores rather than methods of ensuring steady/less-variable CI scores.

However, we do not support the Proposed Rule's approach to the case where a verified CI is higher than the certified CI. The Proposed Rule requires that the quantity of deficits generated by CI exceedance be assessed as four times the difference between the verified operational fuel pathway CI and the reported CI (multiplied by the quantity of fuel reported using that fuel pathway during the applicable year).[44] Therefore, if over crediting occurs by one ton the pathway holder must "pay back" four credits. This is overly punitive and unsymmetrical. We recommend that, instead, if the verified CI is higher than the certified CI, the project should simply repay CARB for any excess credits claimed, and not be subject to any further enforcement liability (see next section) unless there is malfeasance or other such cause.

[44] See proposed text in § 95486.1(g).

2.2.3 Analysis of Impact #3: The Proposed Rule Addresses Risk of Unwarranted LCFS Enforcement Resulting in Fines or Pathway Cancellation, but 4-to-1 Penalties are Unnecessary and Arbitrary

As we've described above—and highlighted since at least 2020 for CARB in informal workshop feedback—a dairy digester pathway's CI will go up or down every year. So, each year during annual pathway verification when the actual CI performance from the previous 24 months is determined, if a project selects it's true initial CI based on historical data, there is a 50% chance that the next year will be higher than that mark, and a 50% chance that it will be lower. Thus 50% of the years, under the Current Rule a given CI pathway will be vulnerable to potential CARB enforcement action—including penalties and possible loss of pathway—due to no fault or malfeasance by the pathway holder. This situation presents a risk that no digester developer can quantify, and that gives pause to investors who are funding the expansion of dairy digesters and the resulting reduction of methane emissions.

But what tools exists to mitigate this risk? The only tool available in the Current Rule is to input a "margin of safety" in the CI score. So, for example, if the digester owner shown in Table 2 above expects that over the course of 10 years it's verified CI will fluctuate between -405 and -260, then the digester owner should set the margin of safety input (available in the CI calculator tool) each year so that they claim credits at a -250. Assuming the owner has calculated properly, and assuming no surprises occur, this digester can make it through 10 years without exceeding that CI. However, this digester was truly achieving -350 average verified reductions, and only being paid for an average score of -285 (due to TFPC effects). With this added "margin of safety" the average CI score the digester will achieve over 10 years is now -230. See Table 5 below.

Table 5. Dairy Pathway Holders Must be Overly Conservative to Avoid Enforcement Risks Under the Current Rule

Year	TFPC or Certified Score	Actual (Verified) Score	Monetized Score*	Monetized Score to Avoid NOV
1	-150	-350	-150	-150
2	-150	-365	-150	-150
3	-350	-260	-260	-250
4	-260	-310	-260	-250
5	-310	-405	-310	-250
6	-405	-295	-295	-250
7	-295	-375	-295	-250
8	-375	-385	-375	-250
9	-385	-380	-380	-250
10	-380	-375	-375	-250
AVG	**-306**	**-350**	**-285**	**-230**

So, enforcement risk is avoided by accepting an even larger "variability penalty" The project is receiving credits at an average score of -230 when it's GREET verified score is -350. Under these circumstances, it makes less economic sense for business to attempt to create ultra-low carbon fuel pathways, if a third of that benefit can never be monetized.

We Support the Proposed Rule True Up Solution to Address Unwarranted Enforcement Risk: We support how the Proposed Rule helps address this issue as it retains the margin of safety framework but allows for a true up to verified CI performance.

We note that CARB still retains all its enforcement tools to intervene if a pathway holder is engaging in misrepresentation, delayed or incorrect reporting, or does not meet strict verification obligations. But in cases where the pathway holder has done nothing other than fully comply with CARB's requirements, and operated using best practices, yet later finds the CIs have naturally changed, enforcement action (and underreporting of environmental benefit) is not beneficial.

2.3 Deliverability Language Creates a Barrier to Imports, Should Not be Adopted in the LCFS

The Proposed Rule's deliverability requirements are still problematic for RNG development. The ISOR suggests that CARB staff is patterning these changes on concepts from California's Renewable Portfolio Standard (RPS) requirements. Stating that:[45]

> "For projects that break ground after Dec 31, 2029, staff is proposing to require deliverability starting January 1, 2041 for pathways that include biomethane used in CNG vehicles or starting January 1, 2046 for biomethane used as an input to hydrogen production. In particular, staff proposes to align with the deliverability policy for biomethane in the California Energy Commission's Renewables Portfolio Standard (RPS) program (Public Utilities Code section 399.12.6) and the California Public Utilities Commission 1440 program. Specifically, the concept is to require demonstration that eligible biomethane is carried through common carrier pipelines that physically flow within California or toward end use in California. Such pipelines must flow toward California 50% of the time on an annual basis, as defined by the current RPS eligibility guidebook."

This language is not an improvement in reporting that would somehow provide greater accuracy, or certainty that imported RNG molecules can be traced to California Natural Gas Vehicle (NGV) fuel tanks. As described in more detail below, it is simply an arbitrary requirement—with no additional environmental benefit or grounding in the physical gas system.

Such a requirement might, in practice, prohibit *all* imported RNG from being used in California for LCFS, due to cost and administrative complexity. The existing RPS approach includes a set of complex tests that essentially serve to ensure that no imports can meet the requirements. The factual record from the RPS clearly demonstrates that this language creates a barrier to imports in practice. As shown in Figure 2,[46] no new importing facilities were built to serve the CA RPS, after the deliverability language was imposed through Assembly Bill 2196 (Chesbro) in 2012, despite in-state project development continuing.

[45] See ISOR page 31.

[46] Figure derived from California Energy Commission RPS data available here: https://rps.energy.ca.gov/Pages/Search/SearchApplications.aspx

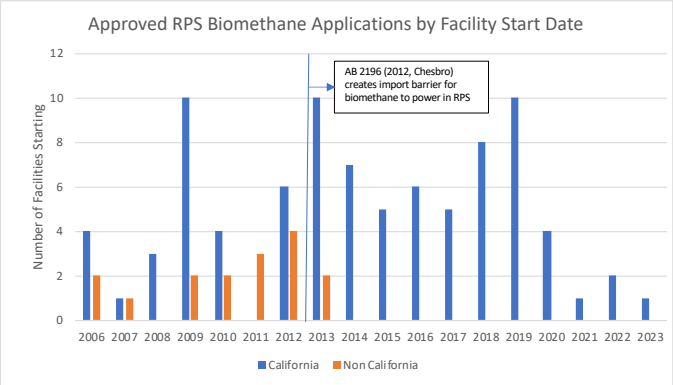

Figure 2. No New Importing Facilities Have Been Built to Serve the California RPS Since AB 2196 Deliverability Language was Established

Protectionist language in portions of the RPS program design—including the de-facto ban on imported RNG—have not succeeded in creating a well-functioning California-only electric grid, able to function entirely using only in-state renewable energy and without imports and exports. Instead, the California Independent System Operator is *currently trying to expand electricity markets regionally* to make it easier to adopt more renewables.[47] We encourage CARB to learn from this example, continue current LCFS practice, and not to close our boarders to imported RNG supply. Harmonizing RNG markets rules with other US states—just as California is now attempting to do to maximize the use of renewable electricity—is a better outcome both for the climate and for California fuel consumers.

Unlike the RPS, the LCFS has been a strong driver of both in-state and out-of-state RNG project development. Because in-state projects have also historically been receiving support through grant programs,[48] the amount of in-state RNG production has been increasing rapidly in California over the past few years and now enjoys a greater proportionate domestic (in-California) market share than many other types of energy. For example, we believe we import more than 90% of our conventional gas in California but only ~77% of our RNG.[49]

Given that California clearly benefits from broad North American and global energy markets for other types of energy—and the recent trend toward significant increases of the in-state supply of RNG—we question why CARB would propose eliminating imported RNG eligibility from any portion of the North American gas system. In the next section we describe how the gas system functions and how the Current Rule's "book and claim" provisions for RNG fit well with the realities of the gas system.

[47] The California Independent System Operator is "continually pursuing strategies to manage higher amounts of renewable energy into the electricity system. Studies by the ISO show that expanding the energy market across the western US region would accelerate California's efforts to meet the state's ambitious clean energy goals, while saving costs, lowering emissions, and promoting economic growth." See: http://www.caiso.com/informed/Pages/RegionalSolutions.aspx

[48] For example, see: https://www.cdfa.ca.gov/oefi/ddrdp/ and https://calrecycle.ca.gov/climate/grantsloans/organics/

[49] See our December 9, 2022, comments for more details on how this estimate was derived. We encourage CARB to publish import share of RNG using the LCFS data as they do for liquid biofuels in the LCFS Data Dashboard.

2.3.1 Because it is Physically Interchangeable with Fossil Natural Gas, Renewable Natural Gas can be Distributed in the Same, Longstanding Natural Gas Pipeline System that has Served California for Decades

Natural gas currently flows throughout the United States depending on shifts in production, demand, weather, export pricing, and natural gas balancing. All major North American gas pipelines are interconnected, sharing gas flow and balancing, which can be contrasted with the power sector that is currently a more balkanized system, with some limits on wheeling between regions—despite the efforts mentioned above to increase interconnection of the power grid.

When RPS limitations were developed, gas was just beginning to come from all over the country to California. The map in Figure 3 below shows cross-country flows, dating back to 2011, illustrating the interconnectedness of the natural gas pipeline system in the United States at that time.[50]

Natural gas has long been distributed through these pipeline systems tracking volumes being injected and withdrawn throughout the entire system. These volumes are carefully tracked, as the pipeline system has state and federal regulatory oversight and third-party pipelines have metering throughout the system. Not only does this create a robust and liquid market for physical gas delivery across North America, that market already optimizes moving gas from supply to demand in a least cost (and lowest GHG)[51] fashion.

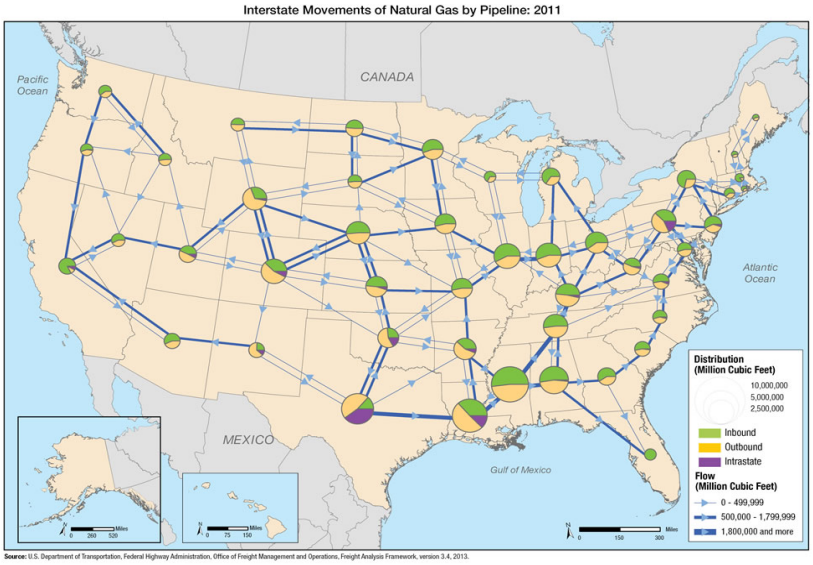

Figure 3. The Natural Gas System Has Interconnected Flows Across North America

[50] U.S. Department of Transportation Federal Highway Administration, *Interstate Movements of Natural Gas by Pipeline: 2011 Map*, https://ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/interstatenatgas2011.htm (last modified Mar. 23, 2020).

[51] Moving gas requires additional energy and emissions from compression stations and potential methane leakage. These factors are already correctly accounted for in the LCFS CI modeling, which assumes physical gas flow from source to sink, regardless of the ability to trace actual molecule path. This provides a fair and appropriate disincentive that recognizes GHG disbenefits of moving gas from projects located farther from California, all else equal.

The conventional gas market did away with point-to-point service long ago and created trading hubs and flexible receipt and delivery points to give suppliers a variety of options for getting gas to market. Generally, price signals are sent, and liquid trading occurs where the gas is produced, traded, and consumed without having to track individual gas sources throughout the value chain.

2.3.2 This System Can Move Gas Bidirectionally Across North America, therefore, a 50% Flow Requirement is Arbitrary and Unjustified.

Since the RPS provisions were developed, North American pipelines have evolved even further toward one unified system. For example, natural gas can now flow from the Northeast region to all areas of the United States, from Texas to California, and from the Rockies to California. The entire pipeline system in the United States is interconnected and in many cases is now bidirectionally flowing. Examples are provided below.

According to EIA,[52] the Appalachian Basin's large shale formations—which were developed after the RPS proposal was implemented—have dramatically changed gas flows. The Appalachian Marcellus and Utica formations:

- Accounted for 34% of all U.S. dry natural gas production in 2021. On its own, the Appalachian Basin would have been the third-largest natural gas producer in the world in the first half of 2021, behind only Russia and the rest of the United States.
- Since the development of these formations (which cover parts of Kentucky, Maryland, New York, Ohio, Pennsylvania, Virginia and West Virginia) there has been an increase in natural gas flows and pipeline infrastructure from the Mid-Atlantic and Ohio regions to the West and other regions.
- From 2008 to 2020, total pipeline takeaway capacity from the Northeast increased from 4.5 Bcf/d to 24.5 Bcf/d. Most of the increase in takeaway capacity happened between 2014 and 2020, when pipeline capacity increased by 16.5 Bcf/d.

In January 2022, for the first time in its history, the Rocky Mountain Express (REX) natural gas pipeline—which moves bidirectionally from Ohio to Wyoming—had larger gas flows westward than eastward, indicating growth in supply in the eastern U.S. and use to serve demand in the western U.S.[53] Ruby Pipeline interconnects with the Rockies Express Pipeline to bring Appalachian natural gas to the West Coast.[54]

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[52] EIA, *Natural Gas Weekly Update* (for the week ending Sept. 1, 2021), https://www.eia.gov/naturalgas/weekly/archivenew_ngwu/2021/09_02/#itn-tabs-1.

[53] Jon Bowman, *Rex Flows Into the Rockies in January – a Fluke or a Sign of Things to Come?* FACTSET, Feb. 23, 2022, https://insight.factset.com/rex-flows-into-the-rockies-in-january-a-fluke-or-a-sign-of-things-to-come.

[54] Sheetal Nasta, *Ruby, Ruby, When Will You be Mine-Tallgrass Bid Breathes New Purpose into Languishing Ruby Pipeline*, Jan. 8, 2023, https://rbnenergy.com/ruby-ruby-will-you-be-mine-tallgrass-bid-breathes-new-purpose-into-languishing-ruby-pipeline.

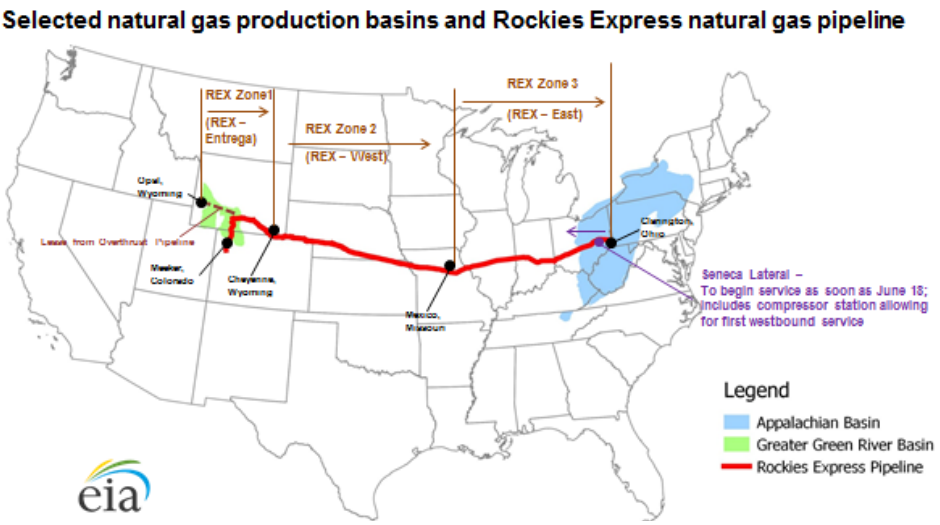

Figure 4. Rocky Mountain Express Pipeline Flows Bidirectionally and Can Bring Gas from East to West[55]

Any successful framework for RNG must build off existing gas system realities, but it does not need to assume that the gas system is static or that RNG supply should be limited to regions that currently supply most of the conventional gas to California. Repurposing existing natural gas infrastructure to rapidly deliver a blend of low-carbon fuels, including RNG, across North America will complement initiatives to cut demand for gas through expanding energy efficiency and electrification.

As demonstrated above, gas system flow can shift over time. Fossil gas demand reduction and RNG supply growth will surely also create large changes in the gas system and the map of the system today is unlikely to match the map of the system in 2040. However, RNG is still a nascent market and cannot be expected to dramatically impact gas flows immediately, unless and until fossil gas use also declines. Therefore, pipes that currently supply less than 50% flow toward California may eventually be adjusted to be capable of supplying more than this percentage. Conversely, prevailing flows may shift over time and pipes that currently serve California with more than 50% of their flow may not do so in perpetuity. Given this uncertainty, RNG developers could not invest in a long-lived (e.g., 20-year) asset, based on the LCFS value, if the program has such a 50% flow test. The prevailing flows in gas pipelines are completely outside of the control of any one developer and thus represents an unacceptable risk unless the facility is sited in California.

Finally, the 50% flow concept is not applied to limit delivery of any other fuels in either the Current or Proposed Rule. Analogous non-sensical requirements could certainly be conceived for other fuels. For example, the majority of rail traffic on a given line could be required to move in the direction for California (perhaps even when not specifically carrying ethanol, to create a full analogy).

Alternatively, will California stop accepting fossil gas deliveries through pipelines that do not flow toward California 50% of the time? Imagine how catastrophic such a limit would be when supply crunches occur, such as the one that occurred in Southern California in late 2022.[56]

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[55] Figure Source: EIA, *Today in Energy: First westbound natural gas flows begin on Rockies Express Pipeline*, June 18, 2014, https://www.eia.gov/todayinenergy/detail.php?id=16751

[56] U.S. Energy Information Administration, *Daily Natural Gas Spot Prices in Western United States Exceed $50.00/MMBtu in December*, January 24, 2023. https://www.eia.gov/todayinenergy/detail.php?id=55279

While RNG opponents may desire to create administrative complexities to artificially increase costs or impose barriers to RNG use, CARB should not be swayed by such arguments. The existing CA RPS language is simply a canard to disincentivize out-of-state RNG development, distract from the legitimacy of RNG's environmental benefits, and turn a key advantage of RNG (it's compatibility with the existing gas system) into a perceived weakness. We strongly recommend that CARB avoid implementing arbitrary RNG deliverability requirements—and treating fossil gas preferentially to RNG—simply because RNG must currently share the gas system with fossil gas.

2.3.3 Guarantee of Origin Systems (Book-and-Claim) are the Industry Standard in Europe

As described above, because it is not possible to physically segregate delivery of renewable gas once it is intermingled with fossil gas in the pipeline system, other chain of custody methods must be utilized. "Book and claim" is a guarantee of origin concept that was pioneered in the European Union's renewable fuel policies. A key advantage is that such accounting lowers administrative barriers and facilitates matching sources of renewable fuel production to demand centers.

Given the physics of how gases quickly intermix in pipeline systems, no feasible alternative exists to book and claim accounting for RNG. Requiring redundant RNG-only pipeline infrastructure and/or physically segregated trucking/rail of gas would clearly increase GHG emissions and the non-climate environmental impact of RNG delivery. Requiring an RNG developer to hold long-term firm pipeline capacity from production source to end use does not ensure that the renewable molecules flow in that path. Instead, it only adds an extra layer of cost because it does not allow market participants to take advantage of liquid supply trading hubs and pipeline displacement, which can bring transportation costs down significantly.

The renewable gas strategies of leading European countries, such as Denmark[57] which currently have around 40% RNG in their gas system (and expect to reach 100% by 2034), should be more closely studied by CARB as it relates to these issues. Denmark's Green Gas Strategy[58] prioritizes free trade of green gases across borders and states that:

> "When a biogas plant feeds biogas into the gas system, it is mixed with other gas. In the gas system, both biogas and natural gas are mixed to form a uniform gas. In order for the gas supplier to prove the origin of the gas supplied to the final customer, guarantees of origin are used. Energinet issues guarantees of origin, thereby ensuring that it can be documented that a consumed volume of gas is matched by an equivalent production of green gas. This system prevents double counting of renewable energy, allowing companies and other consumers to pay for green gas."

There are now ongoing efforts to move from national RNG registries to a European-wide registry to track RNG volumes using the book-and-claim concept. The European Renewable Gas Registry (ERGaR) was established as an independent documentation scheme for tracking RNG and other renewable gases distributed along the European gas network.[59] Recently there was also a €3 million EU-funded project

[57] https://ens.dk/sites/ens.dk/files/Naturgas/groen_gasstrategi_en.pdf

[58] Ibid.

[59] https://www.ergar.org/abous-us/

known as REGATRACE[60] to develop an efficient trading system based on the issuance and trading of Guarantees of Origin (GO) for RNG.[61] The final report[62] from this process contains the following statements:

> "The European Renewable Gas Registry (ERGaR) was started by and continues to be composed of long-established registries and stakeholders of the biomethane and renewable gas industry. A growing imbalance between biomethane production and consumption in several countries necessitated crossborder transfers. Individual bilateral solutions were established, but in most cases member states refused to grant any benefits to imported biomethane. As such, it has been in its best interest to create a system in which the cross-border transfer of gas certificates could be both technically facilitated and recognised in the target country.
>
> GOs serve only for consumer disclosure, which means that the "green gas" attribute is separated from the gas physical volume. This model is called "book and claim" and is useful for setting the path to the European biomethane market because the GOs help document the volumes being produced, distributed and consumed."

2.3.4 CARB Should Promote a Unified North American RNG Registry System

Given that Europe is expanding RNG trade, built on a clear guarantee of origin system (book and claim), one centralized registry, and the same conceptual principles that CA LCFS currently uses, we think North America can achieve the same objective if leading jurisdictions, such as California, continue to support such a framework.

It is a better outcome for the climate if we start by setting up one well-functioning North American system for RNG, rather than create unnecessary delays with balkanized programs (that likely must be consolidated at some point in the future, in line with the European experience).

The RNG Coalition continues to support development of one North American registry for tracking RNG production and end use to ensure no double counting of RNG volumes. The leading registry system tracking RNG and other forms of renewable thermal energy is the Midwest Renewable Energy Tracking System (M-RETS).[63] The use of M-RETS to supplement LCFS reporting would reduce administrative burden on CARB staff and offer California a chance to harmonize the design of such systems with other jurisdictions who are now undertaking similar RNG-supportive policies. Use of M-RETS aligns well with the existing RNG accounting methods in the LCFS.

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[60] https://www.regatrace.eu/

[61] Given the recent gas crisis in Europe, the EU now plans to increase biomethane deployment to displace 17 bcm of gas imports in the short-term (approximately equivalent to all natural gas demand for power production in California). https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/repowereu-affordable-secure-and-sustainable-energy-europe_en

[62] https://www.europeanbiogas.eu/wp-content/uploads/2022/11/EN_Renewable-GAs-TRAde-Center-in-Europe_WEB.pdf

[63] https://www.mrets.org/m-rets-renewable-thermal-tracking-system/

2.3.5 The Current LCFS RNG Framework Aligns with Fuel Use Reporting in the US Renewable Fuels Standard and with State-level Partners. This Alignment Should be Enhanced, not Dismantled.

A key market reality today is that most RNG projects need both LCFS and RIN credits to be viable. Currently only NGV end uses offer full alignment between both programs, which is why that end use has been so popular for RNG thus far. Unlike California's RPS, the US EPA's Renewable Fuel Standard has consistently created a strong framework for RNG growth and is a much better model for CARB's LCFS to continue to align with.

Deliverability rules in the RFS program have long recognized that once RNG and fossil gas is co-mingled there is no way to ensure deliverability of just the subset of renewable molecules. For a recent example of EPA's analysis of this issue, the preamble[64] for the RFS "Set" rulemaking explicitly stated that:

> "When RNG moves through a pipeline system for distribution, the RNG is mixed with a much larger proportion of fossil natural gas using the same system. The two natural gases—one derived from renewable sources, the other from fossil sources—are fungible at that point. Consequently, by the time the natural gas is used to fuel a vehicle, there is no meaningful way to identify which molecules of methane were originally sourced from biogas and which came from fossil sources. As discussed above, and in light of this dynamic, when EPA introduced RNG as a transportation fuel in the RFS program in the Pathways II rule, we set up a system whereby the demonstration that RNG was used as transportation fuel relied on accounting protocols, recordkeeping requirements, and requirements for contracts and affidavits attesting that a specific volume of RNG was used as transportation fuel, and for no other purpose."

EPA correctly recognized that efforts to trace deliverability (e.g., based on securing gas transmission rights or tracing prevailing pipeline physical flows) still cannot guarantee that the RNG molecules flow along preferred paths (or separate paths from fossil molecules). Therefore, any attempts to impose such tests simply increases compliance costs for parties creating and using RNG without achieving any additional environmental benefit.

The current LCFS's book-and-claim rules allow for consistent claims in RNG volume across the RFS and the LCFS. Deviating from this approach for imports will inherently create misalignment in claims, administrative confusion at both reporting entities and CARB, and fewer financially viable projects. The US EPA may also eventually enhance the incentive for the biogas/RNG resource to be sent toward electricity generation for electric vehicle use (eRINs), use in hydrogen production, and as a bio-intermediate to producing liquid fuels. We recommend that CARB consider even further alignment between the LCFS and RFS, especially with respect to matching biogas/RNG electricity pathways to EV fleets and hydrogen pathways, if they wish to see these end uses for RNG grow.

Following US EPA and California's currently positive example, book-and-claim accounting has emerged as the preferred method to track RNG in all analogous North American Clean Fuel programs. For example, the Canadian Clean Fuel Standard, the Oregon Clean Fuel Standard, and the Washington Clean

[64] US EPA, Federal Register, Vol. 87, No. 250, Friday, December 30, 2022, Proposed Rules. See page 80637. https://www.govinfo.gov/content/pkg/FR-2022-12-30/pdf/2022-26499.pdf

Fuel Standard all use book and claim for RNG projects as well as for electricity and hydrogen. Gas utility procurement programs for RNG use similar concepts.

Given that the California LCFS pioneered such reporting in North America, it should not abandon it now. The fact that analogous programs are close to being established in other states reduces the likelihood of California being overly reliant on imported RNG in the long term. Each new state that adopts an LCFS-style policy creates a new demand center, which regional supply will likely consider serving first before California (assuming similar credit pricing).

Finally, in summary, many fuels in the LCFS have a relatively high import market share and all fuel categories credited by the LCFS involve lifecycle emissions (and emission reductions) that occur outside of California. For example, a significant share of California's grid mix of electricity (~44%)[65] is produced from conventional natural gas, over 90% of which is imported.[66] Reducing *all* GHG emissions (including the upstream emissions performance) of *all* fuels (including imports) continues to be a critical advantage of the lifecycle approach taken by the LCFS. RNG imports should not be singled out from other fuels for different treatment, especially considering the critical importance of reducing methane to mitigate the effects of near-term warming.

3 The Auto Acceleration Mechanism Should Be Able to Trigger Earlier, if Needed to Address Current Oversupply

CARB should adopt an Automatic Accelerator Mechanism (AAM) feature that dynamically responds in the event of future sustained and significant CI reductions by tightening programmatic stringency. The RNG Coalition supports the creation of credit-price-band mechanisms in tradeable environmental credit markets—both generally and as conceptually discussed in the Proposed Rule. Such features can increase investor certainty in credit markets.

CARB's proposed timeline for implementing the AAM is currently that 2028 will be the first year for which the AAM can amend CI reduction targets. We recommend that 2025's performance should be able to trigger the AAM. As we understand the AAM proposal, a 2025 data-year triggering would be able to impact CI targets in 2027, or one year prior to when the ISOR currently proposes. We recommend adjusting the implementation timeline accordingly. Essentially, the AAM should be allowed to trigger as early as possible, to guard against the case where the step down in not sufficient to address the current oversupply.

4 Improvements in Pathway Processing and Updates to Tier 1 Calculators and CA-GREET

4.1 We Support the Revised Tier 1 Calculators and Focusing on Improving Pathway Processing Times

We were pleased to see CARB staff's efforts to improve Tier 1 calculators for this rulemaking. We support the majority of RNG pathways being Tier 1 in the future and we remain committed to working

[65] See Table 1-2 of CARB's 2023 *Carbon Intensity Values for California Average Grid Electricity Used as a Transportation Fuel in California and Electricity Supplied Under the Smart Charging or Smart Electrolysis Provision* *https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/comments/tier2/2023_elec_update.pdf?_ga=2.5711222.418438686.1678413739-188703561.1626734718*

[66] https://www.energy.ca.gov/data-reports/energy-almanac/californias-natural-gas-market/supply-and-demand-natural-gas-california

with CARB to help improve processing times and reduce administrative complexity for RNG pathways. We also note that simplification of pathway processing is critical for other jurisdictions to adopt LCFS analogs.

4.2 Recognition of Methane Benefits of RNG Projects Diverting Organic Material from Landfills Should be Revisited and Expanded

Both CARB and US EPA have mandatory emission control requirements for landfills that help reduce methane emissions, yet research literature suggests that many landfills still contribute methane emissions at rates that are much higher than previously estimated.[67] A 2019 study by NASA JPL estimates that landfills' contribution to the state's methane emissions is double current estimates – approximately 41% of all methane point source emissions in California.[68] RNG Coalition and a wide swath of other stakeholders have been raising these issues with CARB for more than three years.[69]

LCFS can help address methane from organic waste handling through better recognition of the benefits of RNG projects that divert organics from landfills and into dedicated digesters. Better quantification of the methane benefits of avoided landfilling and incenting such reductions in the LCFS should be a key focus for CARB, rather than considering arbitrary dates for eventual sunsetting of avoided methane crediting.

We support and appreciate the change for years 1-3 in the *Tier 1 Calculator Biomethane from Anaerobic Digestion of Organic Waste* acknowledging the fact that significant methane emissions occur from the open face of the landfill. However, maintaining the average 75% assumed capture rate for the remaining years is inaccurate and does not align with current science, most notably EPA's October 2023 EPA findings that 61% of methane from landfilled food waste escapes to atmosphere (39% capture rate).[70]

Given that EPA was the source for prior capture rate assumptions (with the 75% capture coming from a 1997 EPA study), EPA's much more robust and up-to-date results should be immediately adopted and the 2023 EPA findings of 39% capture rate incorporated into the Tier 1 calculator.

4.3 The Ability to Increase Methane Capture Rates and Reduce Flaring Through Landfill RNG Projects Should be Recognized

[67] This fact should be noted by those that believe a mandate to control is the sole solution that should be employed for other sources of fugitive methane, such as agricultural manure methane emissions.

[68] Duren, R.M., Thorpe, A.K., Foster, K.T. et al. California's methane super-emitters. Nature 575, 180–184 (2019). https://doi.org/10.1038/s41586-019-1720-3

[69] See our LCFS Workshop comment letter dated November 5, 2020 and Anaergia's LCFS Workshop comments dated September 19, 2022 for examples.

[70] United States Environmental Protection Agency, Office of Research and Development, October 2023, *Food Waste Management: Quantifying Methane Emissions from Landfilled Food Waste* https://www.epa.gov/system/files/documents/2023-10/food-waste-landfill-methane-10-8-23-final_508-compliant.pdf

LCFS recognition of projects that improve methane capture efficiency at landfills beyond regulatory requirements could help improve capture efficiencies of the methane that results from the waste in place at existing landfills.[71,72]

As CARB has workshopped preliminary concepts for potential improvements to the Landfill Methane Regulations CARB staff analysis found that approximately two-thirds of landfill gas collected statewide is currently flared and identified an additional 30 to 50 Californian landfills that could capture sufficient methane each year to cost-effectively utilize gas for energy generation.[73] We are disappointed to see that no effort has been made, thus far, to better incentivize productive use of landfill gas under the LCFS framework in this rulemaking.

4.4 Assuming One Annual Lagoon Cleanout for Dairy and Swine Manure Pathways is an Understandable Simplification, however it Will Significantly Harm Many RNG Pathway CIs

We note that the Draft Rule's changes to the *Proposed Tier 1 CI Calculator for Dairy and Swine Manure Biomethane* includes a simplifying default assumption related to lagoon cleanouts (a factor that impacts baseline methane emissions). Under this change, it appears that all projects would be required to assume at least one cleanout would have occurred annually in September, even if this does not match the actual historical practice of the farm in question.

Many dairies have a series of lagoons large enough that annual clean outs of accumulated solids are not necessary. This can take several forms, for example, when one or more lagoons are full the farm stops filling them and begin filling others, leaving the full one(s) to dry out (via evaporation in hot weather) which often takes 1-4 years after the lagoons have ceased receiving fresh manure. During this time one or more other lagoons may be in use. When the unused lagoon(s) are sufficiently dry the remaining solids would be hauled out with loaders and/or excavators. Such practices should not be modeled as a cleanout since the volatile solids have all degraded by the time the dried solids are removed. This baseline practice of no lagoon cleanouts is most likely to occur in regions with warmer and more arid conditions primarily storing manure in thin, liquid forms, including California and other parts of the Southwestern US.

Assuming one lagoon cleanout annually in the base case will reduce methane avoidance and thus increase the CI for these projects. This will, in turn, reduce the credits issued to many dairy and swine RNG projects—in some cases significantly.

We understand CARB staff is proposing this change primarily to respond to calls from anti-dairy voices to be more conservative in CI scoring, and to improve administrative simplicity of evaluating baseline

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[71] Page 234 of the 2022 CARB Scoping Plan States that, "While reducing organic waste disposal is the most effective means of achieving reductions in waste sector methane, strategies to reduce emissions from waste already in place in landfills also will play a role in achieving near-term reductions." https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf

[72] For an example protocol evaluating the installation of an automated collection system that can increases landfill gas collection efficiency above that obtained with standard collection methods see: https://americancarbonregistry.org/carbon-accounting/standards-methodologies/landfill-gas-destruction-and-beneficial-use-projects

[73] CARB, *Preliminary Concepts for Potential Improvements to Landfill Methane Regulation Public Workshop Slides*, May 18, 2023, https://ww2.arb.ca.gov/sites/default/files/2023-05/LMR-workshop_05-18-2023.pdf

conditions for these projects. We support the goals of improved administrative simplicity, especially if it can lead to increased pathway processing times. However, modeling lagoon cleanouts where they do not truly occur will lead to an underestimation of avoided methane emissions benefits and, therefore, cause a barrier to investment in livestock-manure-to-RNG projects. On the other hand, ignoring lagoon cleanout could result in overestimating the baseline methane emissions, which we understand that CARB staff feels they must avoid at all costs.

In summary, this simplifying assumption on lagoon cleanout practices will make a material impact on CI scores for many RNG projects to the detriment of their total crediting. While we accept this change for the sake of simplicity, we urge CARB to avoid any further pushes to be overly conservative. We also believe that this example of enhanced conservativeness in the avoided methane calculations of the Tier 1 calculator makes it even more critical that the true up concepts discussed above are also implemented in this rulemaking to correct another source of under crediting. RNG pathways simply will not remain economically viable if subjected to additional arbitrary and unjustified "haircuts" that fail to recognize the true GHG benefits of this fuel.

4.5 Fix the Default Electricity Emissions Regional Refactoring Issue in the Tier 1 Models Identified by U.S. Venture

We support addressing the issue raised in U.S. Venture Inc.'s February 12, 2024, comment letter. U.S. Venture points out that default electricity emission factors within CARB's Tier 1 calculators, which are derived from the CA-GREET model, may be off by a significant amount. As CARB adjusts the National GREET calculator, which uses a NERC region map (11 regions) to determine electricity emission profiles, to one that uses the eGRID subregions (27 regions), there appears to be an error in this refactoring that needs to be corrected.

4.6 Renewable Natural Gas Facilities Need Flexibility to Source Renewable Power as an Input to RNG Production

The Proposed Rule should continue to introduce flexibility to experiment and find the optimal mix of inputs and outputs in all forms of low carbon fuel production. A significant share of energy demand at many RNG facilities is electricity used to power gas cleanup equipment. It is not always possible to have low-CI electricity sources that are directly connected to the RNG production facility "behind the meter", as required in Section 95488.8(h)(1)(B) of the current rule.

The challenge of generating one's own renewable power is heightened by the cost and risk multipliers that are triggered when one must simultaneously develop both an RNG production facility and a renewable power project capable of matching the load of the RNG plant. We recommend that flexibility be added to allow RNG to source low-CI electricity—either under specific Power Purchase Agreements (PPAs) or Book-and-Claim renewable energy certificates (REC) purchases.

4.7 All Biomethane Pathways Should Include the Option to Model Power Generation Matched with Electric Vehicle Use as a Finished Fuel

We continue to recommend that all Tier 1 calculators allow electricity generation as a finished fuel to facilitate matching with electric vehicle (EV) use. Alternatively, CARB could develop a Tier 1 calculator that takes a RNG pathway as an input and converts it to electricity for use in EVs. This would create a strong analog with the approach taken for hydrogen. CARB has expressed a desire to see the

biogas/RNG resource utilized outside of natural gas vehicle applications (including into fuel cells and other power generation equipment), creating appropriate Tier 1 calculators would help to facilitate this.

4.8 Liquid Fuel Production and Electricity Production Needs Flexibility to Be Able to Source RNG as an Input

Under existing LCFS provisions, Low-CI electricity supplied as a transportation fuel, e.g., used to power EVs, can be sourced flexibly using RECs or via a qualifying Green Tariff program. Similarly, we recommend that an accounting system be developed to allow both liquid fuel production facilities and pipeline-connected gas-fired electric generation (matched to EV use) to source RNG as a method to reduce CI scores for these fuels.

As CARB explores the implementation of more stringent carbon reduction targets, the use of book-and-claim accounting for inputs like RNG and electricity will likely prove invaluable for its success. This is particularly true if opportunities for renewable gases as an input for transportation fuels like sustainable aviation fuel (SAF) and renewable diesel (RD) are expanded.

With CARB's proposal to obligate fossil jet fuel to generate deficits within the LCFS, the demand for low carbon fuels across different feedstocks and end uses will inevitably increase, with SAF as an end use being a priority for certain airlines. Currently, there are no provisions in the regulation allowing book-and-claim accounting for offsite biomethane used as feedstock for SAF and RD production. We believe that allowing the book-and-claim of RNG to SAF/RD will not only accelerate reaching these targets, but it will also help to reach the roughly 800 million gallons of SAF required to meet Governor Newsom's 20% clean fuels adoption target, 1.5 billion gallons in 2030 to meet the AB 1322 (Rivas) goal, and 3.2 billion gallons by 2045 to meet the 2022 Scoping Plan target.

5 Other Minor Suggested Edits and Clean Up

§ 95501(h) – Less Intensive Verification - The Proposed rule allows for less intensive verification for electricity Quarterly Fuel Transaction Reports (QFTR) only, which we support. However, site visits for *all* QRTF are generally unnecessary. Verification site visits for a QFTR are primarily comprised of a visit to an entity's headquarters or other location of central data management and comprises reviewing electronic records. The site visit can easily be done virtually—as was approved, observed by CARB LCFS Staff, and successfully completed during COVID. Alternatively, CARB could rely upon the discretion on the third-party verification body to determine if a visit is required, if they deem a less intensive verification will not suffice. By allowing less intensive verifications for QFTRs, there will be a reduction in required travel and the associated GHG emissions from them. Therefore, LCFS should allow for less intensive verifications for all QFTR reports.

- § 95488.9(b) – Table 8. The temporary fuel pathway codes for hydrogen derived from RNG seem unnecessarily high. For example, compressed or liquified hydrogen derived from dairy or swine manure has a temporary CI of 40, yet registered pathways under the Current Rule producing hydrogen from such RNG are often highly carbon negative. We request that CARB clarify this discrepancy in the Final Statement of Reasons, and we note the connection between this issue and the need for the full true up described above.

- § 95491.2(b)(2)(C) – Force Majeure Events. If a site has a force majeure event and shuts down for months, the CI score will be heavily impacted, and at that point it will be too late to add an

additional margin of safety to the score. We ask CARB to clarify how such situations will be addressed in the Final Statement of Reasons. The types of events CARB are implying might occur in this section may already be captured in shutdown logs provided to the verification body along with the data captured during the events (typically null or zero values). Thus, it seems unnecessary and unduly burdensome to require special reporting for such events within 90 days, given the remote nature and geographic location of many alternative fuel facilities and especially given that production during these events is minimal to zero, which is readily captured in the reported dataset(s).

- § 95501(13)(A) - Review of Missing Data Substitution. CARB, like many regulatory bodies, has previously recognized the use of "reasonable temporary methods" to address data gaps, noting operational realities result in varying gaps that can be reliably filled in reasonable ways that consider the context of each situation. RNG Coalition urges CARB to continue to allow those participating in the LCFS to be able to use "a reasonable temporary method," rather than prescribing the limited data substitution tactics specified under 95491.2(b)(2)(B)'s Table 13 unless such additional flexibility is already allowed under the use of an "Executive Office approved alternate method".

6 Conclusion

RNG Coalition appreciates the opportunity for continued engagement on these topics. CARB has an opportunity to provide clarity and investment certainty through additional changes to the Proposed Rule, leveraging renewable gas production to help reduce methane emissions, improve organic waste management, and decarbonize California's transportation sector—or any other sector that CARB deems appropriate. We thank CARB for your continued work toward this end and look forward to the conclusion of a robust and effective LCFS rulemaking.