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February 26, 2024

VIA ELECTRONIC FILING (www.regulations.gov) (REG-117631-23)

Douglas W. O'Donnell
Deputy Commissioner for Services and Enforcement
CC:PA: LPD:PR (REG–117631-23)
Room 5203
Internal Revenue Service
P.O. Box 7604
Ben Franklin Station
Washington, DC 20044

Re: Section 45V Credit for Production of Clean Hydrogen; Section 48(a)(15) Election to Treat Clean Hydrogen Production Facilities as Energy Property, Notice of Proposed Rulemaking and Notice of Public Hearing, 88 Fed. Reg. 89,220 (Dec. 26, 2023)

Dear Mr. O'Donnell:

On behalf of California Bioenergy LLC (CalBio), please find below the comments to Internal Revenue Service (IRS) Notice 2023-28359, Request for Comments to Section 45V Credit for Production of Clean Hydrogen; Section 48(a)(15) Election To Treat Clean Hydrogen Production Facilities as Energy Property, issued on December 22, 2023. CalBio appreciates the opportunity to respond to this guidance and would welcome the opportunity to participate in any stakeholder engagements to ensure renewable natural gas (RNG) from dairy digesters is included in the drive to build the nascent clean hydrogen industry.

Founded in 2006, CalBio works closely with dairy farm families, dairy co-ops and cheese producers, the California Air Resources Board (CARB), the California Department of Food and Agriculture (CDFA), the California Public Utility Commission (CPUC), the California Energy Commission (CEC), and the U.S. Environmental Protection Agency (EPA). Our mission is to reduce methane emissions and we are committed to enhancing environmental sustainability. CalBio's digester projects produce RNG and generate clean electricity, which are currently used as a vehicle fuel to power low-emission trucks, buses, and cars replacing petroleum-based fuels—diesel, gasoline, and natural gas. Our projects reduce emissions of greenhouse gases (GHGs), improve local air quality, create jobs in disadvantaged communities, and provide a new revenue stream along with other meaningful benefits to our dairy families.

CalBio writes these comments urging the U.S. Department of Treasury and the Internal Revenue Service (collectively, the IRS) to modify the provisions in the 45V Proposed Rule specifically to include RNG produced from dairy biogas reflecting the recognition of avoided methane in the GREET model. Such a step will both greatly reduce current dairy methane emissions and speed the development of economic, clean hydrogen generation to be used in critical, hard-to-abate sectors. Dairy biogas, which can be used to produce RNG or generate carbon-negative electricity, is mostly comprised of methane, that is otherwise released into the atmosphere. Capture and use of this methane produces a clean renewable fuel that displaces the use of fossil natural gas in SMR or as a clean source of electricity for electrolysis. With the incentives of 45V, biomethane from dairies would be captured and deployed to accelerate clean hydrogen production.

Methane Reductions are Imperative for Addressing Global Climate Change

Dairy manure produces methane when it decomposes in anaerobic conditions, contributing to global climate change. Methane is a powerful GHG that traps 25 times more heat in the atmosphere than carbon dioxide within a 100-year timeframe and even greater than 80 times that of carbon dioxide over a 20-year period. Dairy digesters capture methane emissions, and the methane is then used to produce electricity or natural gas. Encouraging the implementation of these practices can also provide other important co-benefits such as reducing odor and certain air pollutants like reactive organic gases or nitrogen oxides (NOx), improving the efficiency of water recycling and reuse for irrigation, and producing compost from manure solids that can be used for fertilizer and animal bedding.

The concentration of methane in the atmosphere is increasing at an alarming rate and is the second most important GHG to reduce behind carbon dioxide. It can and must be addressed quickly. The Intergovernmental Panel on Climate Change (IPCC) emphasizes the importance of methane emission reductions stating that, "reducing non-CO2 emissions such as methane more rapidly would limit peak warming levels and reduce the requirement for net negative CO2 emissions" and that, "strong, rapid and sustained reductions in methane emissions can limit near-term warming and improve air quality by reducing global surface ozone."[1] There is perhaps no more effective and immediate step we can be taking as a world community to address climate change now than to aggressively and rapidly reverse emissions of fugitive methane from dairy biogas and other sources.

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[1] 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

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The IRS Should Include RNG from Dairy Biogas as an Eligible Feedstock to Hydrogen Production in 45V

As the Proposed Rule recognizes, RNG can be used in the production of clean hydrogen. CalBio has a strong interest in the Proposed Rule because of its ability to develop, own, and operate renewable natural gas facilities and deploy RNG for hydrogen production. CalBio urges the IRS to recognize that RNG provides an avenue for clean hydrogen production today and that the final rule should facilitate its use for clean hydrogen to take advantage of the substantial decarbonization benefits that RNG can provide.

Participation in 45V will enable a substantial expansion of our success in California that we will not be able to achieve without it. To date, CalBio's projects have reduced over 1.1 million metric tons of CO2e per year from more than 50 operating digesters all on family farms. Many of these reductions have occurred thanks to California Climate Investment[2] programs including Dairy Digester Research and Development Program (DDRDP) funding from the California Department of Food and Agriculture (CDFA). 45V provides the economic incentives we need to build potentially hundreds of new digester projects on smaller dairies and achieve the State's 2030 and 2045 greenhouse reduction goals.[3] 45V will also help achieve similar dairy methane reductions across the United States.

Section 45V was intended to incentivize production and use of clean hydrogen to reduce systemwide emissions. Similarly, dairy RNG projects exist to capture and convert methane emissions for productive use. Marrying these two objectives will maximize emissions reduction and is consistent with this Administration's goals to reduce methane emissions and promote clean hydrogen production.

Creating the opportunity to use dairy RNG in the Section 45V program will enable participation in an additional market which will drive further GHG emissions reductions, as RNG will be brought on to serve this new market. More demand for RNG facilities will make more RNG feedstock sources economical to develop, allowing the capture of more methane that would otherwise be emitted to the atmosphere. Limiting access to markets will drive indirect emission effects since many projects may revert to conventional waste management practices and new projects will not be built for lack of sufficient economics. While most RNG is going to the transportation fuel market today, the need to haul goods in the U.S. will continue to grow and a diversity of clean fuels are required to meet this growing demand, which needs to include clean hydrogen to reduce both greenhouse gas emissions and criteria pollutants particularly in trucking. There is ample potential supply of RNG and limiting the use of RNG for hydrogen

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[2] https://www.caclimateinvestments.ca.gov/about-cci
[3] https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf

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production will slow the ability of the Administration to meet its clean hydrogen production goals.

45VH2-GREET Model Modifications

The statute requires the use of the GREET model (or a successor) to determine emissions rates for purposes of Section 45V. The GREET model is transparent and well-respected. Importantly, it has included dairy RNG pathways in its modeling for years, including recognizing that dairy RNG facilities avoid emissions in cases where the biogas would otherwise have been released into the atmosphere. These avoided methane emission benefits are a key part of any lifecycle analysis for RNG.

The Argonne National Laboratory has provided a GREET model targeted for the Section 45V tax credit—the 45VH2-GREET model. Unfortunately, this revised model only includes landfill gas as an input for hydrogen production, while landfills are only one source of RNG. The current R&D GREET 2023 model, by contrast, includes additional RNG pathways that we believe need to be added to the 45VH2-GREET model. CalBio is supportive of all forms of RNG being included to achieve methane reductions, however, biogas derived from the anaerobic digestion of dairy manure uniquely provides the lowest carbon-intensity per unit of fuel produced and thus the greatest opportunity to achieve necessary greenhouse gas reductions in the near term.

CalBio offers the following recommendations for how the 45VH2-GREET model can be readily modified to recognize methane avoidance in dairy biogas-to-hydrogen pathways based on the existing R&D GREET 2023 model:

1. **Counterfactual for Biogas from Anaerobic Digestion of Animal Waste**

For determining the appropriate counterfactual scenario for RNG derived from animal waste, it is important to consider the end fate of manure in the absence of an anaerobic digester. Currently the R&D GREET 2023 model recognizes the state-specific default manure management practices based on where the anaerobic digester is located. However, these default percentages reflect averages across each state and do not provide an accurate reflection of practices that occur at individual farms. It is important to recognize that the counterfactual for dairies can vary from one dairy to the next and site-specific details are important for accurately determining the potential for methane to be avoided. As a result, we believe the 45VH2-GREET worksheet should calculate the avoided emissions resulting from anerobic digestion and the associated RNG project using site-specific baseline manure management practices.

The worksheet should include a menu that enables the user to identify what fraction of the manure was handled using pre-project practices. The worksheet would allow the user to

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select from the existing R&D GREET 2023 model manure management categories (rows 739 and 740 from the "Waste" tab) manure management practices (e.g., anaerobic lagoon, solid storage, pasture, etc.) and enter the percentage of manure directed to each manure management practice. As each RNG project's emissions reduction benefit will vary significantly based on the pre-existing manure management practices, it is important to have this drop-down selection to accurately calculate the carbon intensity. Justification for alternatives to the state-specific lookup would require that the pre-project percentage of manure destined for a lagoon be subject to third party verification.

In situations where the livestock operation is new, and no pre-existing practices exist, then the applicant should provide documentation as to the prevailing manure management practices for new livestock operations in the region and use those practices as the project baseline. In situations where the livestock operation is unable to document pre-project manure handling practices, then the 45VH2-GREET worksheet should apply default based on existing practices in the state where the project is located.

2. Livestock Type

The carbon intensity of an animal waste RNG project will vary based on the type of livestock animal category from which waste is collected and the baseline treatment of that waste. A selection based on the type of livestock in a project should be integrated into the modifications. A "drop down" using the GREET model parameters that currently exist for animal waste in the R&D GREET 2023 model in RNG tab cells D29:J30 (e.g., dairy cows, swine, etc.) should be included.

3. Type of digester

The R&D GREET 2023 model provides four digester technology options: Covered Lagoon, Complete Mix, Horizontal Plug Flow, and Mixed Plug Flow, each with different assumptions with respect to biogas yield, leakage rates, energy consumption, etc. The user of the 45VH2-GREET model should select the digester technology which corresponds to the digester from which the RNG is sourced similar to the dropdown selection in cell E39 in the R&D GREET 2023 model.

RNG-to-Hydrogen Via Electrolysis

Another important consideration for modification of the 45VH2-GREET model is to include RNG as a pathway for hydrogen production via electrolysis. There are three approaches. First, biogas from an anaerobic digester that is cleaned and conditioned to RNG can be injected into a commercial distribution pipeline and then withdrawn for use in an electric generator located at an electrolytic hydrogen production plant. In this situation, the generator can use

carbon-negative RNG in lieu of fossil natural gas via book-and-claim accounting and generate electricity to produce hydrogen via electrolysis. Second, an animal manure digester can produce electricity at a co-located generator and export negative carbon electricity to the grid which can then be used elsewhere to produce clean hydrogen. Third, a digester can produce electricity at a co-located generator to power a co-located electrolytic hydrogen facility. In each case, the negative-carbon intensity electricity is used in the electrolytic hydrogen facility to achieve greater carbon reductions per kg of hydrogen produced.

Conclusion

CalBio believes that dairy RNG can play a vital role in the decarbonization of hydrogen and recognizes the importance of the hydrogen production tax credit as a strong tool to furthering the Administration's climate goals. Ensuring the participation of dairy RNG will help catalyze the clean hydrogen industry and is essential in reducing dairy methane emissions.

With gratitude,

Andrew Craig, Vice President Greenhouse Gas Programs
California Bioenergy LLC