LF Bioenergy

February 26, 2024

Via Electronic Submission (www.regulations.gov)

Internal Revenue Service
CC:PA:LPD:PR (REG-117631-23)
Room 5203
PO Box 7604, Ben Franklin Station
Washington, DC 20044

Re: REG-117631-23: Section 45V Credit for Production of Clean Hydrogen

To Whom it May Concern:

LF Bioenergy LLC ("LF Bioenergy"), respectfully submits these comments in response to REG-117631-23 (the "Proposed Regulations"), regarding the clean hydrogen production tax credit ("PTC") under section 45V. LF Bioenergy is an emerging leader in the development, construction and operation of renewable natural gas ("RNG") production facilities on U.S. dairy farms. The RNG from such facilities primarily will be delivered into intrastate or interstate pipelines for productive use in a variety of commercial and household applications for which fossil natural gas otherwise may be used, including in the production of hydrogen. RNG is ready to be deployed today to jumpstart clean hydrogen production. In alignment with the policy goals of the Inflation Reduction Act of 2022 (the "IRA"), the final regulations under section 45V should encourage the use of RNG to produce clean hydrogen. Accordingly, LF Bioenergy requests guidance and clarification on the following critical items arising from the Proposed Regulations:

1. Provide for updated 45VH2-GREET model pathways for RNG and the ability to input "background" data in the model that would properly incentivize greater greenhouse gas reductions.

2. Allow taxpayers to build and finance clean hydrogen projects, and to further adopt carbon intensity reduction measures during the operational period of the project by ensuring that a minimum amount of PTCs will be available for such investments. This can be accomplished by allowing the use of the version of the 45VH2-GREET model in place as of the date construction of the clean hydrogen facility begins or the model in place in any taxable year prior to the then-current taxable year.

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3. Account for avoided emissions in the lifecycle greenhouse gas ("GHG") emissions calculation of RNG.

4. Tailor the "Three Pillars" of incrementality, temporality and deliverability to take into account the realities of the RNG market.

5. Allow for monthly or quarterly calculation of the emissions rate for purposes of calculation of the section 45V credit amount to incentivize the production of clean hydrogen even where some non-qualifying hydrogen (for which the PTC would be unavailable) may need to be produced.

6. Clarify that the placed in service date for a "qualified clean hydrogen production facility" can be no earlier than January 1, 2023.

7. Permit taxpayers claiming section 45V to participate in other federal, state, or local environmental attribute regimes.

I. Background

A. The Role of RNG in Clean Hydrogen Production

U.S. agriculture accounts for about 10% of U.S. GHG emissions, a substantial portion of which comes from livestock.[1] The U.S. Environmental Protection Agency ("EPA") has urged the development of RNG projects where feasible.[2] RNG projects, such as those developed by LF Bioenergy, decrease methane emissions by capturing methane and using such methane to produce clean energy.

RNG can also be used to decarbonize hydrogen production, including steam methane reforming ("SMR"), autothermal reforming ("ATR"), or pyrolytic pathways. In addition, RNG very uniquely synergizes with carbon capture and storage ("CCS")-enabled gas reformation pathways to meaningfully reduce lifecycle GHG emissions associated with hydrogen production. The ability to store RNG allows production to match demand that may change across seasons. Crucially, RNG is available today, making it a critical and flexible component in GHG mitigation and the clean energy transition.

B. Section 45V Clean Hydrogen PTC

Section 45V provides a tax credit for producing qualified clean hydrogen. The amount of the tax credit varies based on, among other things, the "lifecycle greenhouse-gas-emissions rate"

[1] *See* EPA, Sources of Greenhouse Gas Emissions (visited Jan. 15, 2024), available at https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#agriculture.

[2] EPA, *An Overview of Renewable Natural Gas from Biogas*, at 1 (2020), *available at* https://www.epa.gov/sites/default/files/2020-07/documents/lmop_rng_document.pdf.

of the production process. Section 45V(c)(1)(B) places boundaries on this definition to only include emissions through the point of production (well-to-gate), as determined under the most recent Greenhouse gases, Regulated Emissions, and Energy use in Transportation ("GREET") model developed by Argonne National Laboratory, or a successor model. Section 45V(c)(1)(C) provides that in the case of hydrogen for which a lifecycle GHG emissions rate has not been determined, a taxpayer producing may file a petition with the Secretary for determination of the lifecycle GHG emissions rate with respect to such hydrogen.

II. Requested Guidance

LF Bioenergy appreciates the opportunity to submit comments in response to the Proposed Regulations. As detailed more fully in the comments below, Treasury and IRS should reconsider the anticipated RNG rules provided for in the Proposed Regulations to reflect the environmental benefit of using captured methane, in the form of RNG, to produce clean hydrogen and to reflect the realities of the RNG production and distribution systems in the U.S.

A. The 45VH2-GREET Model Should be Updated to Include Additional RNG Pathways

Calculation of the credit amount under section 45V requires the calculation of the emissions rate using the GREET model. The 45VH2-GREET model, released in conjunction with the Proposed Regulations, provides a pathway for landfill gas to RNG. Noticeably absent from the 45VH2-GREET model are all other RNG-based hydrogen production pathways.

Hydrogen production methods without a GREET pathway are required to file a petition for a determination of the lifecycle GHGs through a provisional emissions rate ("PER"). Thus, under the current 45VH2-GREET model, hydrogen projects using non-landfill RNG will instead be required to assess GHG emissions by filing a PER. It is unclear how long it will take for a PER to be determined, leaving hydrogen producers in a period of uncertainty. The availability and amount of the section 45V credit available for a clean hydrogen production facility is a crucial factor in making investment decisions for the development of those very capital intensive projects. Accordingly, the timely availability of the amount of the section 45V credit to developers is critical.

To provide that needed certainty, LF Bioenergy requests that the 45VH2-GREET model be updated to include additional pathways for RNG to hydrogen beyond landfill gas, including, at a minimum: (1) Biogas from Anaerobic Digestion of Animal Waste, (2) Biogas from Anaerobic Digestion of Wastewater Sludge, (3) Biogas from Anaerobic Digestion of Agricultural Waste, and (4) Biogas from Anaerobic Digestion of Municipal Solid Waste. RNG is available to support clean hydrogen production now, but clean hydrogen producers need certainty that the use of RNG will be accurately reflected in the emissions rate calculated under the 45VH2-GREET model.

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B. The 45VH2-GREET Model Should Allow for Input of "Background" Data

While the 45VH2-GREET model must include additional RNG pathways, as discussed above, the ability for a taxpayer to obtain an individualized emissions rate should be encouraged. Section 45V was enacted to encourage the production of hydrogen with low GHG emissions. Facilities that implement advanced technologies or carbon reduction practices to further reduce emissions should be entitled to a credit amount under section 45V commensurate with such reduced emissions.

Currently, the Proposed Regulations provide that certain data parameters in 45VH2-GREET will be treated as background data (with fixed values that an applicant cannot change) in the emissions value calculation. RNG projects vary based on the different technologies employed, location of project, heat recovery systems, and other factors, and such factors produce a wide range of emissions.[3] To allow for an individualized emissions rate approach, RNG inputs, regardless of the feedstock source, should be foreground data in the 45VH2-GREET model. As opposed to "background" data, "foreground" data allows the taxpayer to modify the inputs of the model. This approach would more accurately reflect the carbon intensity of the RNG being used to produce hydrogen and provide a more accurate section 45V credit value. Further, this would avoid treating taxpayers that develop clean hydrogen projects that do not actually satisfy the parameters of the background data from receiving the benefits of such assumptions, while encouraging other taxpayers to achieve the greatest amount of carbon intensity reductions possible, currently and over time even in excess of the background parameters.

C. Taxpayers Should be Permitted to Elect to Use a Consistent 45VH2-GREET Model

The Proposed Regulations provide that taxpayers must determine the applicable emissions rate provided in the most recent 45VH2-GREET model separately for each facility. The most recent 45VH2-GREET Model is defined as the latest version of the model that is publicly available on the first day of the taxable year during which the qualified clean hydrogen for which the taxpayer is claiming the section 45V credit is produced. Certainty is needed to support long-term investments in clean hydrogen production. As such, an RNG project should not be subject to potential negative annual adjustments to its emissions rate.

Thus, LF Bioenergy requests that taxpayers be permitted to elect to use the 45VH2-GREET model in place in the taxable year construction of the facility began (as determined under existing beginning of construction guidance) unless the facility undertakes a material change in operations that may affect that emissions rate. Certainty in the emissions rate findings

[3] In fact, under California's LCFS, there are currently 444 approved pathways for compressed natural gas, liquefied natural gas, or propane, each with its own unique carbon intensity ("CI") score. Those CI scores range from +93.59 gCO2/MJ to -532.74 gCO2/MJ, reflecting the various CI reduction practices that may be employed in gas production. *See* LCFS Pathway Certified Carbon Intensities, CARB, *https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities*.

would support investments and allow for financing, rather than potentially creating uncertainty regarding the hydrogen's lifecycle GHG emissions and related value of the section 45V credits.

Further LF Bioenergy requests that for any taxable year, a taxpayer be permitted to use the 45VH2-GREET model applicable for such year or any prior year. In any year, taxpayers may make additional carbon intensity reduction investments based on then-updated versions of the GREET model, but doing so will require certainty that future GREET models will not reduce or eliminate the incentives relied upon when making that additional investment. Allowing taxpayers to use prior year version of the 45VH2-GREET model will provide the needed certainty to make carbon intensity reduction investments during the operational period of a clean hydrogen facility.

D. Avoided Emissions Should be Included in Lifecycle GHG Emissions

As described above, RNG is derived from the capture, cleaning, and conditioning of surface-level emissions from organic waste streams. Methane that otherwise would have emitted into the atmosphere is refined into a clean, reliable energy resource. The GREET model has consistently included the quantification of avoided emissions benefits by various fuel pathways, including organic waste derived RNG.[4] This approach is consistent with other domestic and international regulatory programs that consider lifecycle GHG emissions, including California's Low Carbon Fuel Standard ("LCFS") and the European Union's Renewable Energy Directive II.

Therefore, LF Bioenergy requests that any modeling used for determining lifecycle GHG emissions for pathways involving RNG or biogas directly should take avoided emissions into account.

E. The Use of RNG for Hydrogen Production Should be Accounted for via Mass Balancing

The preamble to the Proposed Regulations states that Treasury and IRS are considering providing rules to address whether or how "book-and-claim systems" with sufficient tracking and verification mechanisms may be used to attribute the environmental benefits of RNG or fugitive methane to hydrogen producers in the final regulations.[5] While the chain-of-custody accounting system has been referred to as "book-and-claim,"[6] the natural gas market actually uses a "mass balance" approach to delivery and tracking the chain of custody.[7]

[4] We note that the GREET model may be conservative in estimating avoided emissions by considering a longer impact rather than the more potent short term impacts of methane emissions.

[5] 88 Fed. Reg. at 89,240.

[6] "Book-and-claim" is used in these comments for ease of reference based on the use of this term in the Proposed Regulations.

[7] A mass balance approach allows for the mixing of RNG with fossil natural gas in the pipeline system. A mass balance approach is common for products and commodities where segregation of the materials is very difficult or

Importantly, mass balance differs from book-and-claim in that it requires demonstrated physical connectivity between the production and consumption site of the energy product. RNG sources, including the locations of the captured emissions produced from landfills and animal waste, are geographically dispersed. Volumes of RNG injected are compared to volumes of natural gas withdrawn by the party using the gas on the interconnected system. Unlike EACs, where the electricity may be produced in a completely different region of the country on a completely different grid, RNG is injected into the same pipeline system from which natural gas is withdrawn. Similar to the flow of electrons on the grid, it is simply impossible to track a particular molecule of RNG through the pipeline system.

LF Bioenergy requests that forthcoming guidance allow for the use of a mass balance system to account for RNG used in the production of clean hydrogen. Similar flexible chain of custody accounting is used in EPA's renewable fuels ("RFS"), and in LCFS programs in California and Oregon. Treasury and IRS should allow the use of the regulatory frameworks under RFS or the LCFS program for establishing verification requirements for purposes of section 45V.

F. The "Three Pillars" of Incrementality, Deliverability, and Temporality Should be Modified for RNG

While LF Bioenergy understands potential concerns regarding the use of energy for increased hydrogen production, it is important to note that the RNG market operates very differently than the electricity grid, and there are no reasonably expected "induced" emissions that should be included in lifecycle GHG emissions calculations for RNG. As such, there is no scientific or legal basis to impose incrementality, deliverability, or temporality requirements on RNG to account for "induced" emissions. To the extent that Treasury and IRS retain this concept with respect to RNG in the final regulations, LF Bioenergy requests guidance account for the unique context of RNG as described below.

1. Incrementality

Under the Proposed Regulations, incrementality would generally restrict hydrogen production to "new" electricity sources. To address incrementality for RNG, Treasury anticipates requiring that "RNG used during the hydrogen production process must originate from the first productive use of the relevant methane." Productive use is generally defined as any "valuable application of biogas (including to provide heat or cooling, generate electricity, or upgraded to RNG), and specifically excludes venting to the atmosphere or capture and flaring." The "first productive use" is proposed to be "the time when a producer of that gas first begins using or selling it for productive use in the same taxable year as (or after) the relevant hydrogen production facility was placed in service."

impossible to achieve, such as in the natural gas distribution system. It is distinguishable from a traditional "book-and-claim" approach that relies on "credits" that represent sustainability claims.

The "first productive use" requirement is not statutory and would serve to exclude viable RNG projects that could support the energy needs of clean hydrogen production today. RNG facilities face uncertain and volatile markets and without proper incentives RNG projects may be compelled to commence flaring or venting methane. To balance potential concerns with Congressional intent to incentivize hydrogen production, to the extent that Treasury retains an incrementality concept for RNG (which it should not, as noted above), LF Bioenergy requests that future guidance provide a transition rule providing RNG projects placed in service prior to January 1, 2030 are deemed to have met any such "incrementality" requirement.

2. Temporality

Under the Proposed Regulations, temporality would generally require that the electricity represented in an EAC be generated in the same month (with a transition to the same hour in 2029) that the taxpayer's hydrogen production facility uses electricity to produce hydrogen. These temporal requirements are not applicable to RNG because (i) RNG production is not intermittent, and (ii) there is substantial storage infrastructure for RNG and natural gas. Where fossil natural gas is displaced by RNG that is injected into the same interconnected pipeline, utilization of current market operations is sufficient to ensure that the volume of RNG made available matches the amount of gas used by the hydrogen producer as feedstock or process energy.

Due to the operations of the natural gas market, overly stringent time-matching requirements will likely be impractical if not impossible to achieve, serving to disincentivize RNG use. The industry standard for settled gas transactions is to balance supply and demand on at least a monthly basis, and hydrogen production is often tracked on a quarterly basis. In addition, RNG is effectively "stored" much like a battery when injected into the commercial distribution pipeline where it is pressurized and can be withdrawn for use on demand. On occasions where RNG is stored and dispatched in a different month than when injected, records of gas storage can and should be provided. Therefore, to the extent that Treasury retains a temporality concept for RNG (which it should not, as noted above), LF Bioenergy requests that guidance allow for monthly time matching where RNG is used to produce hydrogen.

3. Deliverability

Deliverability generally requires that the electricity represented in the EAC be sourced from the same region as the taxpayer's hydrogen production facility. Natural gas flows in variable quantities between every geographic market in the United States on a daily basis and is balanced across multistate and multiregional pipelines. With the mass balance system, the entire natural gas pipeline system is the proper geographic scope for the section 45V tax credit. As noted above, a key benefit of RNG for accelerated deployment of clean hydrogen is that it can be distributed across the country in existing infrastructure. It is not possible to physically segregate delivery of RNG once it is intermingled with fossil gas in the pipeline system and geographic limitations are therefore unnecessary and arbitrary.

Therefore, to the extent that Treasury retains a deliverability concept for RNG (which it should not, as noted above), LF Bioenergy requests that the final regulations provide for one deliverability region in the United States for RNG used to produce hydrogen.

G. Calculation of Clean Hydrogen Production in a Year for Section 45V Credits

Given the ability to store and deliver RNG within the natural gas distribution system, and given the scale of hydrogen plants and the quantities of RNG that would be required to reduce the lifecycle GHG emissions rate of all hydrogen produced by a clean hydrogen facility in a year, LF Bioenergy requests that taxpayers be permitted to use monthly or quarterly accounting periods to calculate individual lifecycle GHG emissions scores. Such scores would then be aggregated to establish eligibility for section 45V credits within a taxable year. This approach would provide the most accurate emissions rate for purposes of calculating the amount of section 45V credit and align with the proposed temporality requirements. This methodology also would encourage taxpayer to produce clean hydrogen during the year even in situations where the carbon intensity score of the hydrogen produced may vary month-to-month, by allowing the section 45V PTC in months where the carbon intensity score allows for the credit.

H. Placed of Service Date for Clean Hydrogen Production Facility

Section 45V(c)(2)-(3) provides that a "qualified clean hydrogen production facility" is a facility that produces hydrogen with a lifecycle GHG emissions rate of not greater than 4 kg CO2e/kg of hydrogen, where such hydrogen is produced in the U.S., in the ordinary business of the taxpayer, for sale or use, and where the production and sale or use of such hydrogen is verified by an unrelated party. The production of qualified clean hydrogen prior to January 1, 2023, was impossible as no hydrogen could or would have been verified by a third party as qualified clean hydrogen prior to such date since section 45V was not effective until January 1, 2023. Thus, under the statute, no hydrogen facility properly can be treated as having been placed in service as a "qualified clean hydrogen production facility" before 2023.

Therefore, LF Bioenergy requests that the final regulations provide that the earliest a qualified clean hydrogen production facility can be treated as having been originally placed in service is January 1, 2023, to be consistent with the statute. This rule also is consistent with the policy objectives of the IRA in incentivizing taxpayers to reduce GHG emissions. Because RNG is interchangeable with fossil-based natural gas, the switch in fuel source requires no modification to the hydrogen facility. This requested clarification would incentivize hydrogen facilities using natural gas prior to 2023 that resulted in hydrogen with a higher CI to switch to an RNG fuel source to produce qualified clean hydrogen.

This request is consistent with the modification rule under section 45V(d)(4) which allows a later placed in service date for a hydrogen facility originally placed in service prior to 2023 where there are amounts paid or incurred with respect to such modification that are properly chargeable to capital account of the taxpayer. For example, where a taxpayer makes capital improvements to use a different fuel source for hydrogen production, the modification rule would apply and the placed in service date of that pre-2023 hydrogen facility for purposes of

section 45V may be later than January 1, 2023 – *i.e.*, the data such modifications are undertaken. Further, this request is also consistent with the "80/20 Rule" that allows new (*i.e.*, post-2022) hydrogen facilities to receive a new placed in service date where the fair market value of the "new" facility contains no more than 20% of "existing" property. Absent this requested clarification, section 45V will fail to incentivize the use of cleaner fuels, such as RNG, at an existing, high CI hydrogen facility.

I. Section 45V Cannot and Should Not Preclude Participation in Other Federal, State, or Local Environmental Attribute Regimes

The preamble to the Proposed Regulations anticipates that the final regulation would require that "the environmental attributes of the RNG or fugitive methane being used are not sold to other parties or used for compliance with other policies or programs." LF Bioenergy appreciates the concern regarding limiting the sale or use of the same *volume* of RNG to other parties beyond the taxpayer (*i.e.*, hydrogen facility purchasing the RNG as feedstock or as energy source). However, the final regulations should not preclude RNG used in such a manner from participation in other federal, state, or local environmental programs.

Importantly, section 45V includes no such prohibition on the sale of environmental attributes (such as those sold under RFS and LCFS regimes), despite the fact that Congress is well aware of other incentive programs.[8] LF Bioenergy requests that the final regulations permit a hydrogen facility utilizing RNG to produce clean hydrogen be eligible (1) to claim the resulting section 45V tax credit, and (2) to participate in the federal RFS or a state LCFS program, or other non-tax programs, if it qualifies under the requirements for such program. This request aligns with the realities of how the incentives programs work. EPA, for example, has long recognized that other federal and state tax incentives *support* the RFS program by promoting production and use.[9]

* * * *

[8] "Agencies may exercise only the authority granted by Congress and such authority cannot be conferred by silence." *Wash. All. of Tech. Workers v. U.S. Dep't of Homeland Sec'y*, 58 F.4th 506, 509 n.1 (D.C. Cir. 2023) (dissenting op.) (citing *Bowen v. Georgetown Univ. Hosp.*, 488 U.S. 204, 208 (1988) ("It is axiomatic that an administrative agency's power to promulgate legislative regulations is limited to the authority delegated by Congress.")); *see also Sierra Club v. EPA*, 705 F.3d 458, 469 (D.C. Cir. 2013) ("Because the statute leaves no room for exemptions, such as those at issue, granting the permit a ting authorities discretion to apply the exemption is beyond the EPA's statutory authority.").

[9] *See, e.g.*, 77 Fed. Reg. 59,458, 59,467 (Sept. 27, 2012); 88 Fed. Reg. 44,468, 44,473 (July 12, 2023).

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Please do not hesitate to contact Eric Butler at (312)-282-4696 or ebutler@lfbioenergy.com if you have any questions regarding our comments or if we can be of further assistance. We would be happy to discuss our comments in further detail. Thank you in advance for your time and consideration of issues of critical importance to LF Bioenergy.

Sincerely,

Eric Butler
Chief Financial Officer