February 26, 2024

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

The Honorable Janet Yellen
Secretary
United States Treasury
1500 Pennsylvania Avenue, N.W.
Washington, D.C. 20220

Re: Section 45V Credit for Production of Clean Hydrogen, Notice of Proposed Rulemaking, 88 Fed. Reg. 89,220 (Dec. 26, 2023)

The American Biogas Council (ABC) is submitting the following comments and recommendations related to the proposed regulations implementing section 45V of the IRS Code, and related information requests, entitled "Section 45V Credit for Production of Clean Hydrogen; Section 48(a)(15) Election to Treat Clean Hydrogen Production Facilities as Energy Property," published at 88 Fed. Reg. 89,220 (referred to as "45V Proposed Rule

The ABC is the voice of the US biogas industry, representing over 400 companies in all parts of the biogas supply chain, including investors, owners, and operators of anaerobic digesters, wastewater recovery facilities, utilities, and landfills across the country. The biogas systems our members build, own, and operate provide waste management solutions for organic material such as manure, biosolids, industrial food waste, green waste, food waste, and purpose-grown crops. Biogas systems recycle nutrients, create soil products, and produce energy (biogas) that can be converted to renewable electricity. RNG is biogas that has been further cleaned and conditioned to meet quality specifications for natural gas pipelines, and because of this, RNG has several end uses, e.g., fuel in CNG vehicles, biointermediate for the production of other fuels and also as feedstock for hydrogen production, which is the primary focus of these comments.

How Renewable Natural Gas Can Help Accelerate Hydrogen Production

As recognized by other federal agencies, RNG use as a feedstock to clean hydrogen production provides another avenue to produce zero-carbon and carbon-negative energy carrier in support of the transportation and industrial sectors.[1] Specifically, Steam methane reforming (SMR) and Autothermal reforming (ATR) account for the majority of hydrogen production processes globally. Both processes, with and without Carbon Capture and Sequestration (CCS) are included in the ANL 45VH2-GREET model. [2] Because RNG meets natural gas pipeline specifications, it can leverage existing natural gas pipeline infrastructure and be used as a drop-in feedstock at SMR and ATR hydrogen production facilities. This allows the production of low carbon, carbon neutral, or even carbon negative hydrogen today, while other, early-stage zero carbon hydrogen technologies are set to be commercialized over the next 5 years.

[1] 87 Fed. Reg. 80,582, 80,687 (Dec. 30, 2022) (U.S. Environmental Protection Agency); U.S. Department of Energy (DOE), *U.S. Department of Energy Clean Hydrogen Production Standard (CHPS) Guidance*, at 3 (2023), *available at* https://www.hydrogen.energy.gov/docs/hydrogenprogramlibraries/pdfs/clean-hydrogen-production-standard-guidance.pdf.
[2] US Department of Energy Guidelines to Determine Well-to-Gate Greenhouse Gas (GHG) Emissions of Hydrogen Production Pathways using 45VH2-GREET 2023 (energy.gov)

For these reasons, ABC member companies have a material interest in this rulemaking, and we appreciate the opportunity to submit these comments on the 45V Proposed Rule.

These comments will cover the following key topics:

- Incrementality/Additionality diversion from other productive uses.
    - First productive use overly restrictive vs. power sector which allows a 36-month look-back
    - What is the alternate ABC proposal? Are there penalties for and what are the penalties?
    - Proposed penalties for violating first productive clause would add complexity and would result in market distortions and risk for stranded gas for existing projects,
- Regionality/deliverability – no geographic restrictions needed due to physical, pipeline connectivity via the extensive US natural gas delivery system
    - Book-and-claim accounting systems should apply to all natural gas not just RNG to support an efficient use of existing infrastructure, while also encouraging further investments
    - Widely used and accepted book-and-claim practices (e.g., US EPA and CARB LCFS) are currently in use for RNG
- Temporality/time-matching – concept does not apply to pipeline delivery of natural gas and RNG, as they both can be stored, including environmental attributes through book-and-claim.

The 45VH2-GREET model and the Treasury 45V NPRM recognize natural gas and RNG feedstocks for hydrogen production via SMR and ATR processes (with or without CCS). By leveraging a) the extensive natural gas pipeline system for deliverability and b) the reforming processes at hydrogen production facilities in combination with a robust book-and-claim accounting system, RNG is in a unique position to be used as a standalone feedstock or in combination with natural gas for the production of low CI, clean hydrogen in the context of the 45V regulations.

"First Productive Use" Restrictions

In the 45V Proposed Rule, Treasury did not include any proposed regulations addressing RNG. Instead, Treasury indicated that "[t]he Treasury Department and the IRS intend [in the future] to provide rules addressing hydrogen production pathways that use renewable natural gas (RNG) or other fugitive sources of methane … for purposes of the section 45V credit. Besides imposing restrictions borrowed from renewable power (see next section), Treasury indicates that it "anticipates" creating this unique constraint for the RNG to Hydrogen pathway: "For biogas or biogas-based RNG to receive an emissions value consistent with … {RNG] and not standard natural gas, the RNG used during the hydrogen production process must originate from the **first productive use** of the relevant methane." 88 F.R. 89238 (emphasis added). "First productive use" of the relevant methane is proposed to mean "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."[3]

While Treasury provides almost no explanation of the purpose of this burdensome restriction solely imposed on the biogas to hydrogen pathway, ABC presumes that the threatened constraint seeks to address potential indirect greenhouse gas emissions triggered when an existing RNG supply is shifted to hydrogen production. However, Treasury has provided no evidence to support their implied assumption that renewable feedstocks would be replaced by fossil fuels.

To the contrary, ABC's industry data suggests that domestic production of biogas and RNG can support both new hydrogen production *and* current end uses like compressed natural gas (CNG) transportation vehicles. There were 2,415 operational biogas systems in the United States in 2023, with the potential to develop 15,000 additional systems, an over six-fold growth in biogas and RNG potential. ABC anticipates that within the

[3] 88 Fed. Reg. at 89,239.

timeframe of applicability for Section 45V, there are more than enough opportunities to serve demand in many sectors, without the assumed issue of induced emissions.

In addition, the "first productive use" requirement is not authorized by statute, overly restricts otherwise eligible biogas and RNG feedstocks that could support clean hydrogen production and ignores the fact that there are numerous reasons an existing biogas facility may switch "productive uses" including, but not limited to, the expiration of existing contracts, like power purchase agreements. These facilities require clear market signals to incentivize them to continue utilizing biogas to produce RNG, hydrogen, or other fuels. Absent clear market signals, facilities may leave biogas underutilized and may return to flaring or venting directly to atmosphere. Currently much of the RNG in the U.S. is used in the transportation sector for compliance with the Renewable Fuel Standard (RFS) and/or state clean fuel programs like the California Low Carbon Fuel Standard (LCFS). If an existing RNG supplier leaves these transportation markets, to supply RNG as a feedstock to a new hydrogen production facility, the prior end use of RNG in these program requirements will be backfilled with other compliant fuels (i.e., low carbon fuels).

Negative net indirect emissions from diverting RNG from combustion end uses to hydrogen are a distinctly different outcome than the positive indirect emissions that occur in electrolytic hydrogen This is because hydrogen can, and is intended to, replace its natural gas feedstock in legacy natural gas end use applications. This is not true for electrolytic hydrogen. Electrolytic hydrogen is not intended to replace grid electricity as an energy source.

While we believe the 45V Proposed Rule provides no scientific basis for induced emissions, the statute, at most, allows consideration of "induced emissions" as part of the GREET model analysis. Assuming that induced emissions are appropriately considered under Section 45V and, since default natural gas and RNG pipeline delivery systems are already modeled in 45V-H2 GREET, it should be feasible to perform a robust assessment of any induced emissions of redirecting RNG from its prior use to hydrogen production. We believe such consideration would not result in an increase in the emissions rate and, therefore, it need not be included due to the speculative nature of the initial premise. Alternatively, if such "induced" emissions must be shown and until they can be quantified in 45V-H2 GREET, a potential alternative to excluding these facilities is to add an indirect emission charge equal to the emissions associated with the extraction, processing, and delivery of fossil natural gas to backfill the prior demand for such gas.

For these reasons, we ask Treasury to remove the "first productive use" requirement applied to RNG as feedstock to clean hydrogen production. By doing so, Treasury allows the market to provide cost effective feedstocks to meet the needs of the emerging hydrogen production sector, regardless of its prior use.

Applying Renewable Electricity Restrictions to RNG Additionality, Temporality, and Regionality

In the 45V Proposed Rule, Treasury did not include any proposed regulations addressing RNG. Instead, Treasury indicated that "[t]he Treasury Department and the IRS intend [in the future] to provide rules addressing hydrogen production pathways that use renewable natural gas (RNG) or other fugitive sources of methane … for purposes of the section 45V credit…. Such rules would apply to all RNG used for the purposes of the section 45V credit and would provide conditions that must be met before certificates for RNG … (representations of the environmental attributes of the methane) and the GHG emissions benefits they are meant to represent may be taken into account in determining lifecycle GHG emissions rates for purposes of the section 45V credit. 88 F.R. at 89238.

Treasury stated that it intends to impose conditions on the use of RNG certificates "logically consistent with but not identical to the incrementality, temporal matching, and deliverability requirements for electricity derived" renewable electricity certificates." Ibid. In explaining how RNG restrictions would vary, Treasury stated that the rules "would be designed to reflect the ways in which additional RNG … can impact lifecycle GHG emissions and

also to address the differences between electricity and methane, including but not limited to the different sources of emissions, markets, available tracking and verification methods, and potential for perverse incentives." 88 F.R. at 89239.

With ABC members involved in all aspects of the RNG market and with deep expertise in RNG production, transportation, and end use markets, ABC would like to support Treasury to ensure that it has accurate and full information regarding the considerations listed. As a start, ABC is attaching to this letter, its responses to the questions posed by Treasury at the end of the discussion on RNG in the Preamble.

Initially, ABC is skeptical that any of these criteria proposed for renewable electricity transactions are applicable to RNG. There is no scientific, policy, or legal basis to impose the three restrictions proposed for renewable electricity, (additionality/incrementality, temporality, or regionality), which are intended to account for "induced" grid emissions. These concepts simply do not recognize the different infrastructure systems at play when gaseous feedstocks, especially those transported in natural gas commercial pipelines are used.

Additionality and Incrementality requires the RNG project, and the hydrogen production facility begin commercial operation in the same year, a requirement that is simply unworkable, even for single projects. For some, larger hydrogen production projects, the volume of RNG needed would require multiple RNG projects, further emphasizing the complexity and unlikelihood that all projects are completed at the exact same time. . The construction timeline for an RNG facility is 18-36 months, while hydrogen facilities could take 36-48 months. A likely scenario of a severe weather event which could delay the hydrogen production facility's online date. Implementing this "taxation year" restriction could prevent an otherwise qualified hydrogen production facility from qualifying for the Section 45V hydrogen tax credit is nonsensical, and unnecessarily increases the financing risk of the hydrogen and RNG projects.

A more practical set of circumstances would be to build the RNG facility once the definitive RNG off-take agreement is signed, and begin capturing methane emissions as soon as possible, receiving the benefits from existing methane emission reduction programs for a period of approximately 2-3 years until the hydrogen facility comes online. Rather than requiring the two facilities to come online in the same (or later) taxation year, the Section 45V final rule should consider how additional flexibility can be accommodated, including phasing in of feedstock supplies when they become available.

The rationales for temporal and regional matching of renewable assets with hydrogen producers turns on the unique nature of electricity and the existing power grid. Electricity must be instantaneously consumed meaning that power from intermittent renewable sources (like wind or solar) are not actually matching power consumption by a 24/7 facility. Storage can and will create more capacity to firm up renewable power but the U.S has only modest electricity storage assets. Beyond that regional transmission bottlenecks limit the practical movement of power in and out of regions in the county, as noted in the DOE study cited by Treasury as the basis for its proposed regional restrictions.

RNG delivery does not raise the same concerns. The natural gas commercial pipeline systems in the US is not segregated by regions, as is the case with the electric grid. There is no analogy to a Regional Transmission Operator (RTO) for gas infrastructure, and no unique emission profile associated with specific regions on the gas grid. Therefore, there is no need to impose regional geographic restrictions for RNG. In addition, the natural gas system in North America has the added advantage of underground, and in some cases above ground storage to help manage supply and demand. This system capability is unique to the natural gas pipeline system, and feedstocks leveraging that system to supply hydrogen production. Natural gas storage capacity in the US is around 5 trillion cubic feet (Tcf), and it is capable of delivery up to 118 billion cubic feet per day, a rate that

exceeds the highest historical average documented on the system[4]. Feedstocks, like RNG, could be produced in the summer, for example, stored for several months, then transported via a nationwide system to a hydrogen production site. This and other fundamental differences between the gas and electric grids demonstrate that temporal and regional restrictions are neither appropriate nor necessary.

Many improvements to data and tracking systems need to occur before the arguably mature electricity market can move forward with time matching renewable energy supply to demand and ultimately end use by the consumer. Broadly, applying this concept to an emerging, nascent industry unnecessarily restricts what energy supplies can be leveraged for hydrogen production, causing cost of production to increase to meet the requirements, further limiting production and the ability of federal funding to be efficiently deployed.

Natural gas markets are different from electricity markets by nature of the natural gas commercial pipeline value chain. The national pipeline system enables injected physical quantities to be accounted for and tied to equivalent quantities that can be dispensed elsewhere in the network carrying associated environmental attributes with assurance.

Under the RFS program, monthly reconciliations take place today and enable substantiation of actual end-use of the RNG and its environmental attributes; compliance with the RFS is annual. Under the California Low Carbon Fuel Standard, reconciliation occurs quarterly, and compliance is also annual. The natural gas pipeline system is resilient to temporal changes due to a number of industry safeguards and real-time monitoring of gas supply, which is heavily scrutinized by the EPA and CARB today.

The natural gas pipeline system operates on a displacement basis, where all injections are balanced with consumption and storage. Physical volumes do not necessarily move – they balance. The temporal or geographic restrictions are not experienced in the commerce of natural gas. Another fundamental difference compared to electricity is methane's unlimited storability, which is solved for in today's gas grid through dedicated storage caverns, line packing and other means. While there is no physical basis or justification for limiting temporal deliverability, we encourage Treasury to consider reasonable boundaries for program implementation that account for the storage capacity and flexibility delivery options available to RNG.

We agree that a book-and-claim system based on physical connectivity is the right answer to support an efficient use of existing infrastructure, while also encouraging further investments.

Greenhouse Gas (GHG) emission accounting and the 45V-H2 GREET Model

We appreciate the work that Argonne National Laboratories has done to provide a GREET model that directly supports the 45V tax credit and have long supported use of GREET as a transparent and well-respected lifecycle emission model that relies on the science of greenhouse gas (GHG) emissions, including the recognition of unique global warming impacts of specific GHG emissions.

The 45VH2-GREET model should include additional pathways for RNG to hydrogen beyond landfill gas, which uses flaring as counterfactual in the lifecycle assessments. Lifecycle GHG analysis of other RNG types (e.g., derived from anaerobic digestion of animal waste, etc.) often deploys the counterfactual of avoided methane emissions (CARB GREET 2024), which is also scientifically defensible, and critical to recognizing the unique global warming impacts associated with different greenhouse gas emissions, like methane.

[4] United States Department of Energy, US Natural Ga Storage Capacity and Utilization Outlook (2016), available at https://www.energy.gov/sites/prod/files/2017/01/f34/U.S.%20Natural%20Gas%20Storage%20Capacity%20and%20Utilization%20Outlook_0.pdf

Facility Modifications

Section 45V(d)(4) provides that for purposes of section 45V(a)(1), in the case of any facility that (A) was originally placed in service before January 1, 2023, and, prior to the modification described in section 45V(d)(4)(B), did not produce qualified clean hydrogen, and (B) after the date such facility was originally placed in service (i) is modified to produce qualified clean hydrogen, and (ii) amounts paid or incurred with respect to such modification are properly chargeable to the capital account of the taxpayer, such facility is deemed to have been originally placed in service as of the date the property required to complete the modification described in section 45V(d)(4)(B) is placed in service. Section 45V(d)(4) is effective for modifications made after December 31, 2022.

Proposed § 1.45V–6(a)(2) would provide that an existing facility will not be deemed to have been originally placed in service as of the date the property required to complete the modification is placed in service unless the modification is made for the purpose of enabling the facility to produce qualified clean hydrogen and the taxpayer pays or incurs an amount with respect to such modification that is properly chargeable to the taxpayer's capital account for the facility. Proposed § 1.45V–6(a)(2) would also provide that a modification is made for the purpose of enabling the facility to produce qualified clean hydrogen if the facility could not produce hydrogen with a lifecycle GHG emissions rate that is less than or equal to 4 kilograms of CO2e per kilogram hydrogen but for the modification. Proposed § 1.45V–6(a)(2) further states that changing fuel inputs to the hydrogen production process, such as switching from conventional natural gas to renewable natural gas, would not qualify as a facility modification for purposes of section 45V(d)(4)(B). ABC requests that Treasury remove this limitation proposed in § 1.45V–6(a)(2).

As mentioned above, ABC applauds the Treasury's recognition of renewable natural gas (RNG) as a tool to decarbonize hydrogen production, and emphasizes that RNG will be an indispensable, "drop-in" solution to the nation's large-scale production of low-carbon hydrogen. The restriction related to changing fuel inputs would stifle an important pathway for decarbonizing the most common form of domestic hydrogen production and would reduce critically needed investment in RNG. Also, there are existing hydrogen facilities where carbon capture investments are not economically feasible. RNG investments assist in the ability for these and other hydrogen production facilities to produce low carbon hydrogen.

RNG can be deployed today to jumpstart clean hydrogen production, and we request that the Treasury Department reconsider its threatened requirements, not only those that impact RNG as a feedstock, but also those that impose overly strict requirements, counter to the goals of the IRA. The IRA 45V provisions seek to promote domestic clean hydrogen production based on a technology neutral, carbon intensity metric with the goal to lower GHG emissions in the United States. ABC's responses to specific questions regarding renewable natural gas follow. In addition, we would welcome the opportunity to meet with representatives of the IRS and Treasury to provide information regarding the current RNG market to inform the process to develop proposed regulations addressing the biogas or RNG to hydrogen pathway.

Sincerely,

Patrick Serfass
Executive Director

About the American Biogas Council

The American Biogas Council is the voice of the US biogas industry dedicated to maximizing carbon reduction and economic growth using biogas systems. We represent more than 400 companies in all parts of the biogas supply chain who are leading the way to a better future by maximizing all the positive environmental and economic impacts biogas systems offer when they recycle organic material into renewable energy and soil products. Learn more online at www.AmericanBiogasCouncil.org, Twitter @ambiogascouncil, and LinkedIn.

RESPONSES TO SPECIFIC QUESTIONS POSED IN THE 45V PROPOSED RULE REGARDING RENEWABLE NATURAL GAS (RNG)

The American Biogas Council (ABC) provides the following comments and responses to the specific questions on which the Treasury Department and the IRS have requested additional information.

Question 1: What data sources and peer reviewed studies provide information on RNG production systems (including biogas production and reforming systems), markets, monitoring, reporting, and verification processes, and GHG emissions associated with these production systems and markets?

Response to Question #1:

ABC recommends that the often cited resources of AgStar and LMOP be used with some caution. ABC has spent several years building upon public datasets, to significantly improve industry-level data for the biogas and RNG industry. As a result, we know that those resources are now considerably out of date, and do not accurately reflect the potential of the industry to serve as an important feedstock to clean hydrogen production, nor do they reflect the investment trajectory of current and planned projects. We are working directly with these data owners within these programs to help them improve their data. Until such time as these datasets can be reconciled, we welcome Treasury to work with ABC, should they need accurate, up to date information on the biogas and RNG industry.

U.S. Department of Energy

- Argonne National Laboratory, *Renewable Natural Gas Database*, *available at* https://www.anl.gov/esia/reference/renewable-natural-gas-database. Argonne maintains a database of renewable natural gas transportation projects that are currently in operation or under construction. It was last updated in January 2022.
- National Renewable Energy Laboratory, *Biogas and Hydrogen Systems Market Assessment* (2016), *available at* https://www.nrel.gov/docs/fy16osti/63596.pdf

U.S. Environmental Protection Agency

- Regulation of Fuels and Fuel Additives: RFS Pathways II, and Technical Amendments to the RFS Standards and E15 Misfueling Mitigation Requirements, 79 Fed. Reg. 42,128 (July 18, 2014): Provides information on EPA's lifecycle analysis for CNG/LNG to qualify as cellulosic biofuel.
    - EPA Memorandum, Support for Classification of Biofuel Produced from Waste Derived Biogas as Cellulosic Biofuel and Summary of Lifecycle Analysis Assumptions and Calculations for Biofuel Produced from Waste Derived Biogas (July 1, 2014) (www.regulations.gov, EPA-HQ-OAR-2012-0401-0243)
- EPA, *RINs Generated Transactions-Generation Summary Report*, https://www.epa.gov/fuels-registration-reporting-and-compliance-help/rins-generated-transactions: EPA Generation Summary Tables report Renewable Identification Number (RIN) and ethanol equivalent gallons of renewable compressed natural gas (CNG) and renewable liquified natural gas (LNG) generated under the Renewable Fuel Standard Program. As the vast majority of RNG (although not all) goes to the transportation fuel market as CNG and LNG, this database provides information regarding production and use of RNG in the United States. RNG was approved to generate cellulosic biofuel RINs (D3) in 2014, making data from years 2015-present the most relevant. Renewable CNG and LNG can also generate advanced biofuel RINs (D5), but the vast majority of RINs are for cellulosic biofuel. EPA updates its RIN generation data monthly.

California Air Resources Board and Other State Materials

- ICF, *Michigan Renewable Natural Gas Study*, submitted to Michigan Public Service Commission (2022), *available at* https://www.michigan.gov/mpsc/-/media/Project/Websites/mpsc/workgroups/RenewableNaturalGas/MI-RNG-Study-Final-Report-9-23-22.pdf

Other Data Sources and Peer Reviewed Studies

- Anew, *North American Renewable Natural Gas Market Evaluation* (2022), *available at* https://www.rds.oeb.ca/CMWebDrawer/Record/759815/File/document (pdf pages 290-352)
- Christina Antonini, et al., *Hydrogen production from natural gas and biomethane with carbon capture and storage – A techno-environmental analysis*, Sustainable Energy Fuels, 2020, 4, 2967.
- Boston Consulting Group, *Is Renewable Natural Gas Poised for Future Growth or Doomed to Decline?* (2023), *available at* https://web-assets.bcg.com/14/3a/46fb25224f599e5c2908f1b9edb7/us-rng-article-v16.pdf
- Carbon, *North American Renewable Natural Gas Outlook 2030, Insight Report* (2024), https://www.ccarbon.info/insight/north-american-renewable-natural-gas-outlook-2030-insight-report-january-2024/
- European Biogas Association whitepaper published April 19, 2023 – Section 4.3 Reviewed methane emissions originating form anaerobic digestion plants, *available at* https://www.europeanbiogas.eu/wp-content/uploads/2023/04/Design-build-and-monitor-biogas-and-biomethane-plants-to-slash-methane-emissions.pdf
- European Biogas Association, et al., *Renewable Gas Tracking Systems* (2023). https://static1.squarespace.com/static/53a09c47e4b050b5ad5bf4f5/t/6565f9e1ab4ae045ef2b69fb/1701181923045/20231123+-+Joint+Paper+on+RG+Tracking+Systems+-+Final.pdf
- International Energy Agency, *Renewables 2023 – Analysis and forecast to 2028* (2023), *available at* https://iea.blob.core.windows.net/assets/96d66a8b-d502-476b-ba94-54ffda84cf72/Renewables_2023.pdf. See special section on biogas and biomethane on pages 131-141.
- McKinsey & Co., *Renewable natural gas: A Swiss army knife for US decarbonization?*, Nov. 21, 2023, https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/renewable-natural-gas-a-swiss-army-knife-for-us-decarbonization
- Jeffrey Reed, et al., *Environmental Attribute Credits: Analysis of Program Design Features and Impacts*, The UC Irvine Clean Energy Institute (2023), *available at* https://cleanenergy.uci.edu/PDF_White_Papers/Environmental_Attribute_Credits_Analysis_of_Program_Design_Features_and_Impacts_091523.pdf

Question 2: What conditions for the use of biogas and RNG would ensure that emissions accounting for purposes of the section 45V credit reflects and reduces the risk of indirect emissions effects from hydrogen production using biogas and RNG? How can taxpayers verify that they have met these requirements?

Response to Question #2:

The Treasury Department appears to be asking this question under the premise that incentivizing the use of RNG for hydrogen production will lead to an increase in emissions in other sectors (i.e., RNG used for hydrogen production may cause diversion from the transportation sector, e.g. use of natural gas in a CNG truck). This premise is false because virtually all RNG that has been produced to date is a result of regulatory incentive programs such as the Federal Renewable Fuel Standard and state clean fuel programs such as incentives like the RFS to displace fossil fuels.

We believe that hydrogen production via Steam Methane Reformation (SMR) or Autothermal Reforming (ATR) processes will not result in increased emissions by switching natural gas to RNG feedstock(?). This is due to the fact the emission benefits occur when fugitive methane is captured at the source (dairy digester, WWTP, landfill,

etc.) and injected into the common-carrier pipeline for any potential end use – not just directed for sale in CNG vehicles which is the most common end-use to date, thanks to the incentives put in place through regulatory programs such as the federal RFS, the California LCFS, and others. Given that the methane is immediately captured/avoided at the source, all RNG that is introduced to the pipeline displaces the equivalent volumed needed to be derived from fossil fuels regardless of whether that RNG is directed to hydrogen, transportation, or another market.

In addition, much of the RNG in the U.S. is used in the transportation sector for compliance with the Renewable Fuel Standard and/or state clean fuel programs like the California Low Carbon Fuel Standard. If an existing RNG supplier leaves this program to send its RNG to new hydrogen production, the program requirements will ensure that the lost RNG is backfilled with other compliant fuels.

Furthermore, creating the opportunity to use RNG in the IRA Section 45V program will enable participation in an additional market which will drive further reductions, as RNG will be brought on to serve this new market. This will become all the more important in the near and long term as California begins phasing out the use of RNG in transportation as contemplated in their draft LCFS rulemaking[5]. Limiting the access to markets would drive indirect emission effects as projects revert to conventional waste management practices.

To mitigate concerns around indirect emissions, the Treasury Department should recognize that RNG projects avoid methane and are reliant on incentive programs to be viable, a shift to hydrogen as a primary end-use will only incentivize further development of RNG projects to serve the growing need of methane reductions.

We refer the Treasury Department to the response to Question 3 for a discussion on how taxpayers can verify both current and planned future end use of RNG via book and claim accounting referenced above.

Question 3: How broadly available and reliable are existing electronic tracking systems for RNG certificates in book and claim systems? What developments may be required, if any, before such systems are appropriate for use with RNG certificates used to claim the section 45V credit?

Response to Question #3:

The 45V Proposed Rule states that "[t]racking and verification mechanisms for RNG ... specific to the needs of the section 45V credit are not yet available, and existing systems have limited capabilities for tracking and verifying RNG pathways, especially in the part of the production process before the methane has been reformed to RNG."[6] It further states that:

> "Existing tracking and verification systems do not clearly distinguish between inputs, verify or require verification of underlying practices claimed by RNG production sources, require proof of generator interconnection or revenue-quality metering, provide validation of generation methodology, include exclusively United States based-generation, verify generator registration, and track the vintage of generator interconnection. The Treasury Department 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." [7]

These statements do not accurately reflect how RNG is tracked and verified today.

[5] California Air Resources Board, *Staff Report: Initial Statement of Reasons,* p. 30, December 19, 2023, https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/isor.pdf
[6] 88 Fed. Reg. 89,240.
[7] *Id.*

As noted above, RNG is distributed in the natural gas pipeline system, which has long used a type of mass balance approach to account for quantities being distributed throughout the system. Here, the purchaser of the RNG that is injected into the pipeline system is the hydrogen producer versus a fuel marketer typical when RNG is used in CNG vehicles. A "book-and-claim" accounting system for natural gas and RNG can track custody so that RNG retains its environmental attributes contractually when delivered to the hydrogen producer for the production of low carbon intensity hydrogen.

The RNG industry supports a book-and-claim framework that is aligned with existing programs which have successfully supported the deployment and use of renewable natural gas in North America. RNG is traded across the United States under the EPA RFS and California LCFS program rules to ensure that any RNG claimed as transportation fuel has been reconciled for accuracy and to avoid double counting. Under these systems, the volumes of biogas processed by the RNG facility (confirmed by monitoring by the RNG facility), the volume of the RNG injected into the pipeline (confirmed by a third-party pipeline operator), and the volume of gas withdrawn for use at the hydrogen plant can all be traced (confirmed by a third-party pipeline operator). Despite being subject to rigorous audit procedures, including attest engagements and third-party verification through EPA's Quality Assurance Program (as well as by California LCFS verifiers),[8] there has been no reported fraud under these systems, and there is oversight to protect against double counting. These same verifiers under these programs could also be used to provide additional oversight over the information being provided to the hydrogen producer.

In short, the digital infrastructure designed to support book-and-claim tracking across North American natural gas pipelines already exists and is ready to be paired with hydrogen production under Section 45V as envisioned by the Treasury Department, per the following:

Most RNG by volume in North America is claimed under the RFS[9] and LCFS,[10] which have functioned successfully to date. Because systems and chain of custody tracking exists today, there should not be a requirement to create a national electronic registry system that would be mandatory for RNG used in the Section 45V program. Registries require significant resources and extended deployment time, which would limit or unduly delay the hydrogen industry if a single system was required, or if the existing chain of custody tracking was disallowed. For purposes of the IRA section 45V credit, hydrogen producers using RNG would be required to retire corresponding attribute certificates (e.g., RINs). Furthermore, EPA will need to establish a hydrogen pathway under the RFS. For hydrogen quantities used in transportation, the hydrogen producer would be the

[8] Proposed §1.45V-5(h) defines what entities can be a "qualified verifier," which, includes, among others, a verification body under the California LCFS. 88 Fed. Reg. at 89,235. Parties that utilize a Quality Assurance Provider, which must register with EPA, should also be allowed to use those same entities for purposes of the 45V tax credit.

[9] The RFS program does track RIN generation electronically through the EPA Moderated Transaction System (EMTS). Although the RNG industry has urged it to do so and petitions have been pending for years, EPA has not yet approved any hydrogen pathways. Upon approval of such pathways, RIN generation and retirement reports could be utilized. By January 1, 2025, EMTS will track pipeline injections of RNG intended for transportation fuel use. The credits generated and tracked in the EMTS are based on the strict reconciliation and chain-of-custody documentation, as well as annual attestations. Most, if not all, RNG currently under the RFS program also are subject to third-party verification by a Quality Assurance Provider pursuant to an EPA-approved plan. The necessity of automated tracking of additional items should not be required, provision of additional information by the taxpayer that would be subject to verification should be adequate.

[10] CARB operates a reporting system online called the LCFS Reporting Tool (LRT). Fuel imported or produced in California is reported in this system using quarterly reports. All parties using the system must reconcile the reports for fuel exchanged and all parties are subject to recordkeeping requirements. All fuel reported must have a valid fuel pathway with an associated carbon intensity score that is verified on an annual basis. As with the RFS, all of this reporting is based on strict chain-of-custody documentation for RNG-to-CNG and RNG-to-hydrogen crediting, which is also audited annually.

generator of the hydrogen RINs ('hRINs") based on a mass allocation of the RNG feedstock to the reformer and the amount of hydrogen used in transport.

There is one private, electronic certificate tracking system in place that already tracks RNG—M-RETS (formerly known as the Midwestern Renewable Energy Tracking System. https://www.mrets.org/). M-RETS or an analogous electronic tracking system can also be available for use, which would address concerns related to double counting, ensure transparency in volume origination, and allow integration with other regional programs and markets. M-RETS, for example, currently serves various markets, including Oregon's Clean Fuel Program,[11] utility procurement of RNG in Oregon,[12] California's renewable gas standard,[13] Washington's Clean Fuel Standard,[14] and those who voluntarily purchase renewable gas to meet sustainability goals outside of compliance programs. M-RETS currently includes data points which distinguish between inputs (including account, project, feedstock, and full or partial lifecycle carbon intensity); require proof of generator interconnection or revenue-quality metering; verify generator registration; and track vintage which can be leveraged when updating the system to meet the final 45V requirements. Parties that participate in these programs should be able to use the same tracking systems for purposes of Section 45V. More information on M-RETS is provided in Appendix B and we encourage Treasury to review separate comments submitted by M-RETS to this docket.

Although we do not believe electronic registration need be or should be required for RNG as a feedstock for hydrogen production, language similar to that provided in Proposed § 1.45V–4(d)(2)(v) to define the term "qualified EAC registry or accounting system" could also serve as a basis for providing guidance for an electronic RNG tracking system that may be utilized. While M-RETS is currently the only system that tracks RNG, and, at a minimum, should be included as a viable option for tracking and verification, we expect the number of available RNG tracking systems to grow over time in a manner that mirrors growth in renewable power as Section 45V and other programs are implemented. As such, general criteria as to what these systems should include to be allowed to verify RNG for purposes of hydrogen production should be provided.

In sum, the Treasury Department should allow a widely available tracking system that meets the functional regulatory needs of the 45V clean H2 production program to ensure competition and continued innovation. We agree that chain of custody documentation or an electronic tracking system must be used to verify the amount of RNG claimed to ensure that all volumes represented are accurate. As such, Treasury should require sufficient reconciliation between parties and systems to mitigate the potential for double counting. Moreover, any verification processes should leverage current expertise from the verification process in the California Low Carbon Fuel Standard and the quality assurance program under the Renewable Fuel Standard.

Question 4: How should RNG or fugitive methane resulting from the first productive use of methane be defined, documented, and verified? What industry best practices or alternative methods would enable such verification to be reflected in an RNG or methane certificate or other documentation? What additional information should be included in RNG certificates to help certify compliance?

Response to Question #4:

[11] Oregon Department of Environmental Quality, Clean Fuels Program Expansion 2022 - Filing 2 (Permanent Administrative Order), Pages 35 and 55. https://www.oregon.gov/deq/rulemaking/Documents/DEQ17-2022.pdf.
[12] Oregon Public Utility Commission, Order No. 20-227, OAR §860-150-0050, *available at* https://apps.puc.state.or.us/orders/2020ords/20-227.pdf.
[13] California Public Utilities (CPUC), Decision Implementing Senate Bill 1440 Biomethane Procurement Program, at 50, *available at* https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M454/K335/454335009.PDF.
[14] WAC 173-424-420.

As explained above, the first productive use concept as it is contemplated in the proposed rule oversteps the Treasury Department's authority, improperly excluding eligible RNG projects. There is no evidence that RNG-to-hydrogen pathways will result in the induced emissions that appear to underly the first productive use requirement and such emissions are not included in the GREET model, which is the only basis allowed for assessing lifecycle emissions.

Conversely, disqualifying RNG from eligibility under Section 45V will perversely increase systemwide emissions, forego opportunities for methane emission reductions, and constrain hydrogen production and use in hard to abate sectors, in direct opposition to the IRA's goals.

The RNG industry has established chain of custody best practices to document and substantiate RNG production and avoid double-counting. The environmental attributes are carried forward to its end use through the following commercial agreements, attestations, and reconciliation activities:

- Agreement and attestations for biogas and attributes with company owning asset
- Agreement and attestations for biogas cleaning and conditioning and equipment operation
- Unredacted records for biomethane amount injected
- Agreement with local utility for biomethane injection
- Agreement and attestations with local utility and pipeline authority to take biomethane injected into pipeline balance
- Records needed to substantiate hydrogen production

The above agreements and commercial activities are reviewed and audited annually by both the Renewable Fuel Standard and California Low Carbon Fuel Standard programs today.

The proposed "first productive use" requirement within the preamble would cause a significant value discrepancy for new projects creating a market distortion, greater risk of stranded gas for existing projects, added complexity, and higher prices for end-consumers. There should be no restrictions on RNG to ensure investor confidence in developing RNG supply. However, if "first productive use" is implemented, then it should be a look back of 36 months from the date of the supply agreement, not by taxable year and not based on when the RNG facility is first placed into service.

The industry will in fact incrementally grow with 45V use of RNG. Even if there is removal from the current transportation fuel market, RNG has been operating under the Renewable Fuel Standard program and, even if there was shifting from CNG/LNG under that program to hydrogen production, any "backfilling" would have to be done by cellulosic biofuels or advanced biofuels to meet the volume obligations under that program. Also, if hydrogen is used in the Renewable Fuel Standard program for fuel cell vehicles ("FCVs") (the most likely use), there is more displacement of fossil fuel displaced because of the efficiency of FCVs compared to vehicles using internal combustion engines.

Question 5. What are the emissions associated with different methods of transporting RNG or fugitive methane to hydrogen producers (for example, vehicular transport, pipeline)?

Response to Question #5:

The primary method of transporting RNG or fugitive methane to any end-user, including hydrogen producers, is through the North American natural gas pipeline system. A smaller number of projects, that do not have access to a utility interconnect onsite, will typically use vehicular transport to deliver the RNG to an interconnect location into the North American pipeline system. The R&D GREET 2023 model accounts for transportation and distribution emissions for all RNG feedstock types in the CNG and LNG pathways. Emissions associated with transportation and distribution for all RNG feedstocks are 331 gCO2e/mmBtu. Once RNG is in the North

American pipeline system, the emissions are the same as for natural gas, and therefore, the R&D GREET 2023 model already accounts for them (e.g., Animal Waste to off-site CNG can be found in RNG tab cell AF206:AF266). The R&D GREET 2023 model has a default distance of 750 miles (T&D tab cell CG112) for natural gas to refueling station that is used in the RNG calculations to account for transportation and distribution emissions. We would support the existing R&D GREET 2023 model calculations and background data to be used for delivery of RNG to a hydrogen producer.

The emissions associated with RNG transport from vehicular transportation are insignificant (e.g., less than 1 gCO2e/MJ) when compared to the total carbon intensity of an RNG or fugitive methane project. For projects that do have vehicular transportation, the emissions can be calculated in the same method as described above, with an average vehicle mileage (e.g., 30 miles one way) used to calculate the emissions. Similar calculations are in R&D GREET 2023 model for LPG transportation by truck as well as for animal waste transport by truck. A project could calculate a site-specific emissions value to be entered and verified, but given the small overall impact on carbon intensity, a simple toggle for trucking projects could be added to allow for a conservative adjustment to the emissions rate. We would propose to use these or even more conservative estimates to provide comfort to the Treasury Department that fugitive methane emissions are appropriately accounted for.

Question 6. How can the section 45V regulations reflect and mitigate indirect emissions effects from the diversion of biogas or RNG or fugitive methane from potential future productive uses? What other new uses of biogas or RNG or fugitive methane could be affected in the future if more gas from new capture and productive use of methane from these sources is used in the hydrogen production process?

Response to Question #6:

The RNG industry is concerned that the anticipated Section 45V regulations as outlined in the 45V Proposed Rule for RNG will create greater indirect emissions by prohibiting RNG pathways than by incentivizing them. Section 45V was intended to incentivize production and use of clean hydrogen to reduce systemwide emissions. Similarly, 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.

As explained above, Section 45V statutory text defines lifecycle GHG emissions as having the same meaning as in the Clean Air Act, subject to well-to-gate measurement in the most recent GREET model. This definition of lifecycle GHG emissions does not permit evaluation of indirect emissions from changes in end uses for fuels. However, if the Treasury Department is seeking to minimize the worst potential adverse effects from implementing Section 45V, the overly restrictive first productive use is not appropriate.

As also explained above, Section 45V incentivizes clean hydrogen production in the United States. One application for hydrogen is heavy duty trucks, an important sector for RNG use. As federal vehicle CO_2 emission standards continue to increase in stringency and states adopt Zero Emission Vehicle (ZEV) mandates, FCEV trucks will be phasing in overtime, replacing diesel and natural gas/RNG trucks. RNG use as feedstock for hydrogen production could continue to increase, in this case with end use remaining in the origin sector.

It is reasonable to assume that with the help of Section 45V, DOE Hydrogen Hub grants, California Advanced Clean Fleets, Advanced Clean Trucks, Advanced Clean Cars prohibition on new combustion vehicles, and CARB policy changes prohibiting new RNG to CNG pathways after 2029, that hydrogen trucks could eventually replace many CNG trucks. If existing RNG facilities are not permitted to establish pathways for a Section 45V credit, then these RNG facilities may become stranded soon as the above-mentioned policies take effect and eliminate demand for CNG in current end uses (i.e., vehicle transportation).

Question 7: How can the potential for the generation of additional emissions from the production of additional waste, waste diversion from lower-emitting disposal methods, and changes in waste management practices be limited through emissions accounting or rules for biogas and RNG use established for purposes of the section 45V credit?

Response to Question #7:

The RNG industry is confident that the Section 45V credit will not incentivize the generation of additional waste that result in a net increase in emissions. To the contrary, a robust and broad application of eligibility under 45v encourages any new waste generated to be quickly and efficiently managed in waste to energy recycling systems, like RNG production to Hydrogen production pathways. A diverse suite of market incentives for bioenergy to hydrogen, coupled with State level policies for waste minimization and diversion provide a cohesive strategy to mitigate any perceived perverse incentives, while maintaining economic development. Organic wastes contribute greenhouse gas emissions to the atmosphere today, and RNG facilities are a mature, scalable path to manage these wastes more efficiently, while reducing those emissions. These improvements are costly, and markets for RNG continue to develop across many sectors of the economy, helping to encourage these systems to achieve higher penetration across the waste management sector. The more policies that encourage these systems to be built, the better outcomes for emission reduction, overall. Lastly, increasing the amount of waste does impact project-level economics, in terms of infrastructure and land capacity, In other words, there are costs that trickle down from increases in wastes that would be reflected both in the RNG cost of production but also the cost of providing that RNG as a feedstock to hydrogen production. Any increase in cost would be born by the fuel producers, and could eventually overtake the incentive entirely. The notion that waste can increase, unchecked, while continuing to be incentivized is unrealistic. The RNG industry believes that project economics, and existing accounting frameworks are sufficient to document emission reduction and mitigate risk of incentivizing waste production.

Additionally, no documented cases exist where biogas or RNG production drove the production of additional waste or the fraudulent claiming of non-waste commodities as waste streams under either the Renewable Fuel Standard or the California Low Carbon Fuel Standard programs. The safeguards against perverse incentives in the biogas and RNG industry are hard-wired into life-cycle analysis models: if a waste stream would be disposed of through lower-emitting means in the counterfactual scenario, these indirect emissions would be applied to the carbon intensity of the RNG, making it unviable for the creation of qualified clean hydrogen under the Section 45V program.

We highlight that the approach referred to above (counterfactual scenario analysis – that is answering the question of what would have happened to the waste stream in the absence of RNG production) is used in the 45VH2-GREET model published alongside the proposed regulations. In the current version of 45VH2-GREET, the counterfactual scenario of landfill gas-based RNG production is the capture and flaring of biogas. Accordingly, landfill gas receives a “flaring credit” for the flaring emissions avoided through the reforming process for hydrogen production.

Question 8: To limit the additional production of waste, should the final regulations limit eligibility to methane sources that existed as of a certain date or waste or waste streams that were produced before a certain date, such as the date that the IRA was enacted? If so, how can that be documented or verified? How should any changes in volumes of waste and waste capacity at existing methane sources be documented and treated for purposes of the section 45V credit? How should additional capture of existing waste or waste streams be documented and treated?

Response to Question #8:

The RNG industry does not believe that the final regulation should contain a limitation on the eligibility of qualifying methane sources. It is also difficult to reconcile the concept of perverse incentives with the first productive use requirements.

Freezing waste streams at pre-IRA levels would be virtually impossible due to a lack of monitoring data. Waste streams are not static. Headcounts of farms fluctuate, and the organics collected at materials recovery systems (MRFs) change in quantity over time. Trying to define “pre-existing” waste quantities is very challenging and would end up being arbitrary. It also directly contradicts methane abatement commitments made by the federal government. There is no good justification for not abating a cubic foot of methane because it occurred at a greenfield farm/facility that started in or after 2024.

Any such provision would also hardwire the program to incentivize inefficiency given the methane abatement development potential between waste sources is not equal. On the one hand, IRS intends to disqualify any low-carbon gas infrastructure built prior to the H2 facility, and this provision would limit 45V-facing methane abatement buildout to pre-existing waste sources. Since biogas and RNG development (like any other investment decision) tends to prioritize lower-hanging fruits, the program would effectively force developers to allocate investments to waste streams with a higher $/tCH4 abated cost profile since the more efficient development opportunities from pre-existing waste streams were already acted upon.

One of the most perverse outcomes would materialize if existing RNG facilities are disqualified from Section 45V feedstock eligibility. California CNG serves as a major market for livestock RNG facilities, which are methane abatement projects. As noted above, changes to policy in California that favor ZEV and ultra-low cost hydrogen will likely accelerate end of life for many CNG trucks. If existing RNG facilities are not permitted to transition to hydrogen end use in coordination with the policies that are designed to compel this end use transition, then Section 45V will be responsible for increased methane venting directly to atmosphere at existing RNG facilities that shut down when their only end use is displaced by hydrogen.

We observe that the Treasury Department’s requests for comment regarding RNG numbered (7) and (8) regarding how to evaluate potential effects of RNG production on waste streams are analogous with some recent stakeholder debates centered around at the potential effect on the centralization of farms and that recognizing the science-based methane avoidance benefits of manure-derived RNG could be perceived as skewing the value drivers of dairy and swine operations. Many of these debates take place in connection with California’s Low Carbon Fuel Standard program, which has demonstrated how the recognition of avoided emissions can catalyze large-scale methane abatement at farms. Recently, EPA faced similar arguments with respect claims that incentives for biogas-derived fuels under the RFS program promoted use of concentrated animal feeding operations. EPA found:

The RFS may, along with the CARB LCFS and other programs, incentivize the use of digesters at concentrated animal feeding operations (CAFOs) for the utilization of renewable biofuels, ***however, it does not drive the proliferation of CAFOs.*** The use of manure management systems such as digesters can be a useful tool in nutrient management, if utilized properly. Water quality issues on animal farms often stem from runoff that is high in phosphorus and nitrogen due to manure. Digesters allow for the collection of manure and concentration of this nutrient-rich runoff into a single effluent stream, making it easily treatable. However, some farms may not utilize this secondary treatment technology. This decision-making is largely based on state and local regulations.[15] ...

There is little substantive evidence to support beliefs that the RFS program is driving consolidation or expansion of large animal feeding operations, or that the proposed volumes were likely to do so. While it is clear that larger facilities are of the size and scale required to economically support processing biogas into RNG and establishing a pipeline interconnect, this does not mean that the RFS program is a driver of the expansion of large scale animal agriculture that has taken place in the U.S. There are a host of other factors much more likely to dictate facility sizing.[16]

As EPA found, no link between the centralization and growth of farms has been established to date. Detailed reviews of the farming industry data and their potential connection with RNG value recognition also were unable to identify any connection between RNG production and changes in farming buildout or operations, although industry trends of centralization and efficiency improvements have been present over the past 30 years.[17]

Several producer members of the RNG Coalition work closely with swine and dairy farmers and can attest to their farmer partners' commitment to sustainability and improvement of waste management practices. However, our members' direct experience shows that decisions around development and operations in the dairy and swine sectors are firmly driven by strategic intent to maximize current and future value in the meat and milk markets, while maintaining strong environmental stewardship – but not by the intent of increasing RNG value or incurring additional waste production.

While the EPA's Greenhouse Gas Reporting Program (GHGRP) is a valuable tool for tracking the country's emissions based on data reported by industry, its incomplete coverage of RNG waste streams makes it inappropriate to apply to a waste source eligibility determination. For example, the GHGRP relies on reporting through voluntary programs such as AgSTAR and the Landfill Methane Outreach Program (LMOP) that acknowledge that their databases are not exhaustive and may not include data for every anaerobic digester.

Question 9. Are geographic or temporal deliverability requirements needed to reflect and reduce the risk of indirect emissions effects from biogas and RNG or fugitive methane use in the hydrogen production process? If so, what should these requirements be and are electronic tracking systems able to capture these details?

Response to Question #9:

[15] EPA, *Renewable Fuel Standard (RFS) Program: Standards for 2023-2025 and Other Changes: Response to Comments*, at 206 (2023), *available at* https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1017OKN.pdf.
[16] *Id.* at 386.
[17] *See, e.g.,* Aaron Smith, *Are Manure Subsidies Causing Farmers to Milk More Cows?*, Ag Data News, Apr. 8, 2023, https://agdatanews.substack.com/p/are-manure-subsidies-causing-farmers; William Hohenstein, USDA Office of the Chief Economist, *Dairy production and manure management trends in the United States*, CARB Workshop Presentation, Mar. 29, 2022, *available at* https://ww2.arb.ca.gov/sites/default/files/2022-04/dairy-ws-session-2-USDA.pdf. We have also attached to these comments a letter from RNG Coalition to EPA regarding claims that biogas projects somehow promote concentrated animal feeding operations, which, as noted above, EPA agreed was not occurring. [ATTACH COALITION LETTER FROM 2022 to EPA REGARDING CAFOS]

Natural gas markets are different from electricity markets by nature of the natural gas commercial pipeline value chain. The commercial pipeline system enables injected physical quantities to be accounted for and tied to equivalent quantities that can be dispensed elsewhere in the network carrying associated environmental attributes with assurance.

Under the RFS program, monthly reconciliations take place today and enable substantiation of actual end-use of the RNG and its environmental attributes. Under the California Low Carbon Fuel Standard, reconciliation occurs quarterly. The natural gas pipeline system is resilient to temporal changes due to a number of industry safeguards and real-time monitoring of gas supply, which is heavily scrutinized by the EPA and CARB today.

The natural gas commercial pipeline system operates on a displacement basis, where all injections are balanced with consumption and storage. Physical volumes do not necessarily move – they balance. The temporal or geographic restrictions are not experienced in the commerce of natural gas.

Another fundamental difference compared to electricity is methane's unlimited storability, which is solved for in today's gas grid through dedicated storage caverns, line packing and other means. While there is no physical basis or justification for limiting temporal deliverability, we recognize that reasonable boundaries are warranted for program implementation. Any MMBtu that is pipeline injected in calendar year "A" should be freely book-and-claim deliverable in calendar years "A" and "A+1."

Question 10. How should variation in methane leakage across the existing natural gas pipeline system be taken into account in estimating the emissions from the transportation of RNG or fugitive methane or establishing rules for RNG or fugitive methane use? How should methane leakage rates be estimated based on factors such as the location where RNG or fugitive methane is injected and withdrawn, the distance between the locations where RNG or fugitive methane is injected and withdrawn, season of year, age of pipelines, or other factors? Are data or analysis available to support this?

Response to Question #10:

As described in the Response to Question #5 above, there are GREET model assumptions for methane leakage in existing natural gas pipelines that are already counted (e.g. transportation and distribution emissions), and we propose to continue to use existing GREET model emissions for RNG or fugitive methane as the default. As pipeline data is outside the RNG or fugitive methane producer and hydrogen developer control, the US average is appropriate to use.

Question 11: What counterfactual assumptions and data should be used to assess the lifecycle GHG emissions of hydrogen production pathways that rely on RNG? Is venting an appropriate counterfactual assumption for some pathways? If not, what other factors should be considered?

Response to Question #11:

As discussed above, the 45VH2-GREET Model must include different types of RNG projects, not just landfill gas, as it currently does. These pathways should include, at a minimum, biogas from the anaerobic digestion of animal waste, wastewater sludge, and municipal solid waste (MSW). The counterfactual assumptions are provided below for RNG projects, as well as for each feedstock:

1. Counterfactuals for All RNG Projects

Energy inputs (e.g., natural gas and electricity usage) and carbon capture counterfactuals should be incorporated into the 45VH2-GREET Model for all RNG projects. Every RNG project is unique and developers who strive to reduce a facility's energy intensity or reduce carbon emissions should be able to account for it in

the lifecycle accounting of their project. We would support the same input system that exists in the 45VH2 GREET calculator for the hydrogen producer.

2. Counterfactual for Biogas from Anaerobic Digestion of Animal Waste

For biogas produced from livestock manure, the counterfactual should be that methane would continue venting from manure handling facilities until such time as that venting is no longer permissible by law or regulation. This counterfactual is similar to the landfill gas industry, where once regulations are in place that require landfill gas to be captured and destroyed, then the counterfactual becomes flaring.

The counterfactual for dairies can vary drastically from one dairy to the next and venting from a lagoon is very much an appropriate assumption. The question is not whether all gas is vented, but how the fraction of manure is managed aerobically vs anaerobically. When dairy RNG is selected, the site-specific percentage of each baseline manure management system should be entered in the R&D GREET model. Entering the appropriate fraction of these pre-project manure management practices allows for the correct counterfactuals to be measured by the R&D GREET model, accurately quantifying baseline emissions that are prevented by the project.

3. Counterfactual for Biogas from Anaerobic Digestion of Wastewater Sludge

We believe the presumptions that: a) most wastewater treatment plants have operational biogas/anaerobic digester systems; and b) operational biogas systems are flaring their gas, to both be incorrect based on the American Biogas Council's (ABC's) database of wastewater facilities which we maintain under a memorandum of understanding with the Water Environment Federation (WEF).

Currently, the US has more than 16,000 publicly owned wastewater treatment systems.[18] Of those 16,000 wastewater systems, according to ABC's and WEF's database, only 1,160 (7.3%) have operational biogas systems anaerobically digesting the biosolids filtered out by the wastewater facility. The remaining 92.7% wastewater systems can be assumed to be landfilling or land applying their biosolids since they are not being treated by anaerobic digestion, each having unique emission profiles.

Of the 1,160 wastewater systems with operating digester systems, only 13, or ~1%, of operational wastewater biogas systems, or 0.08% of *all* wastewater systems, are currently known to flare all or most of the biogas they produce. The vast majority of operational digester systems at wastewater plants are beneficially using their biogas to produce renewable electricity, RNG, or heat, offsetting fossil fuel use and their related emissions.

The work to update this database is ongoing, with a team of our staff calling every facility to obtain the best information on biogas facilities at wastewater plants. We would be happy to share updated statistics in the future if requested to do so.

A counterfactual for Wastewater sludge, that assumes digesters and flaring represent the current conditions, should be reconsidered, especially given the relevance of counterfactuals to "new" RNG supplies. Those new supplies would originate from the 92.7% of systems that currently lack digester infrastructure and are managing solids outside digesters, necessitating a more granular assessment of emissions from those current biosolid disposition pathways.

4. Counterfactual for Biogas from Anaerobic Digestion of MSW

[18] https://www.cisa.gov/topics/critical-infrastructure-security-and-resilience/critical-infrastructure-sectors/water-and-wastewater-sector#:~:text=Overview,systems%20in%20the%20United%20States

The counterfactual of avoided venting/fugitive emissions at landfills from organics diversion is incorporated into the GREET model. The venting/fugitive methane emissions occur without regulations requiring diversion or an economic incentive to cause the diversion. For purposes of calculating the emissions rate for RNG from MSW digesters, the 45VH2-GREET model must utilize the correct and latest scientific data from EPA showing the national average landfill methane capture rate is 39%. No national regulation banning organic waste in landfills exists, and additionally the actual national average of landfill methane release should be utilized for scientific accuracy and incentivizing national policy to reduce organic waste in landfills over time.

Additional Suggested Modifications to 45V H2 GREET Model

Similar to what currently exists in the 45V H2-GREET model, the production of RNG requires its own energy input parameters (e.g., natural gas and electricity usage) and should have inputs available for site specific energy usage. RNG projects will have unique energy requirements based on the different technologies employed, location of project, heat recovery systems, and other factors that need to be accounted for. Site specific parameters will incentivize efficient engineering and operations. These site-specific parameters can be verified based on engineering load design or actual energy usage.

Another consideration for an improvement to the 45V H2 GREET Model is to allow for RNG blending to be assessed over a period of time shorter than one year. The proposed rule provides that, to claim a Section 45V credit, a taxpayer must determine the lifecycle GHG emissions rate for all hydrogen produced at a qualified clean hydrogen production facility during the taxable year. This requires that there be a single GHG emissions rate calculated for an entire year of production. The Treasury Department should consider permitting taxpayers to conduct assessments of the lifecycle GHG emissions rate for hydrogen produced using shorter periods of time than entire year (for instance monthly or quarterly). Given the threshold nature of the Section 45V credits, if there is a facility disruption, supply disruption, or other operating reason that interferes with the production of clean hydrogen meeting a certain GHG emissions threshold, taxpayers should not be penalized for valid production of clean hydrogen in other periods of a year.

Another modification we believe is necessary in the 45V H2-GREET 2023 model is to allow the user to input RNG from multiple sources. Steam Methane Reforming (SMR) and Autothermal Reforming (ATR) units and other hydrogen facilities require significant amounts of methane and may need to contract multiple sources of gas feedstock to ensure hydrogen can be produced at the lowest levels of carbon emission per kg of hydrogen produced. Hydrogen producers must be able to aggregate RNG production facilities across the pipeline grid. The Treasury Department should allow hydrogen producers with the ability to include various RNG sources, each with different lifecycle emission profiles, and factor into the modeling of their hydrogen products aggregated emissions. As stated above, to the extent that a blend of RNG with varying carbon intensities can be accommodated within the 45VH2-GREET model, fewer projects will require a filing following the PER process.

Question 12: What criteria should be used in assessing biogas and RNG-based PERs? What practices should be put in place to reduce the risk of unintended consequences (for example, gaming)? Should conservative default parameters and counterfactuals be used unless proven otherwise by a third party?

The suggestions provided in the response to Question #11 address how the 45VH2-GREET Model should be modified to recognize the site-specific factors which drive the avoided methane value and accurate carbon intensity accounting. Using these site specific RNG CI scores as calculated in R&D GREET 2023 model or allowing these specific site modifications in the 45V H2 GREET 2023 model will reduce the need for project to seek PERs, reducing the burden placed on the Federal Government, which will allow clean hydrogen project development to occur faster without sacrificing quality or risking gaming. We recommend that these site-specific inputs be verified by a third-party, a practice that is already common in our industry.

In addition, RNG-based PERs should be considered for RNG facilities that submit third-party validated claims to material improvements to site-specific emissions based on site-specific engineering, technology, or equipment improvements. Emissions weighted incentives like 45V will drive emissions reducing innovation across the hydrogen supply chain. As such innovation becomes commercially viable and common in the industry, they should be incorporated into the most recent 45VH2-GREET model.

APPENDIX B

Response to Question 3 – Additional Information Regarding Electronic Tracking

More information on the M-RETS electronic tracking system as it applies to RNG is provided below.

The M-RETS tracking system currently serves several existing compliance and voluntary markets. M-RETS, and systems like M-RETS, are experienced working with state and federal regulators to ensure that their product meets or exceeds the requirements laid out in statute or rules. In the case of M-RETS, a not-for-profit 501(c)(4) that also owns and manages its own platform, a Board of Directors that includes state regulators and stakeholders help facilitate the process through both corporate oversight as well as oversight over the Operating Procedures.[19] The Operating Procedures are a public document which serve as the foundation for the software as well as govern the administrative functions required.

The foundation of this system includes data points which distinguish between inputs (including account, project, feedstock, and full or partial lifecycle carbon intensity); require proof of generator interconnection or revenue-quality metering; verify generator registration; and track vintage. The foundation of this system includes data points which distinguish between inputs (including account, project, feedstock, and full or partial lifecycle carbon intensity); require proof of generator interconnection or revenue-quality metering; verify generator registration; and track vintage. The Operating Procedures, in Section 4.3.1 require the System Administrator verify all data submitted to M-RETS before generator approval and certificate issuance. If Treasury would like M-RETS or any other registry to change or update their verification procedures and/or the data verified prior to certificate issuance, this rulemaking would be an ideal location for that. For example, in the existing registration process M-RETS requires every generator to submit an engineering report signed by a licensed engineer in the state or province where the generator is located attesting to all of the information submitted to M-RETS regarding the operations of the facility. This includes data points like feedstock inputs (and under 4.3.4 in the case of multi-feedstock generators for example anaerobic co-digestion a project must submit engineering documentation supporting the ability to use different feedstocks and only if it is possible to determine the gas output per feedstock which then must be reported in the correct proportions each month).

Under 4.4.2 M-RETS requires the use of a revenue quality meter, including verification of this. M-RETS does leave open the possibility to register without one, however, as in the REC system the Operating Procedures require this to be clearly noted on all public reports and/or the actual certificate.

While M-RETS will track generation across North America, the state or province are always listed on both the certificate. Section 4.5.2 includes the information listed on certificates, which can be updated at the request of regulators and/or market participants. These fields currently are:

a. Serial Number(s)
b. Account
c. ID
d. Generator Feedstock Type
e. Generator Resource Type
f. Vintage Date
g. Location
h. Quantity (in Dth)
i. Eligibilities (if applicable)
j. Carbon Intensity (if applicable)

Within the above fields, other data may exist as part of the certificate. For example, M-RETS lists the version of the lifecycle analysis model used to provide the carbon intensity (e.g. the version of GREET).

M-RETS requires generator applications to provide the commenced operation date, which should be consistent with generator interconnection and this data lives as part of the generator data in the registry. M-

[19] The M-RETS Renewable Thermal Tracking System Operating Procedures document is available at https://www.mrets.org/wp-content/uploads/2021/06/M-RETS-Thermal-Tracking-System-6-2021.pdf

RETS verifies this information with the supporting documentation. While this data does not currently live on the certificate, that is another data point that M-RETS or another approved registry could easily include.

A benefit of an electronic registry platform is that it can support the demands—including conflicting demands of different programs—without complicating the experience for the user and regulators. For example, one state compliance program may allow for the use of revenue quality meters while another does not. An electronic registry can then decide the best way to control for that difference. In this example, the registry can require a generator to show proof of a revenue quality meter and include that as a data point on the certificate itself, and/or as an eligibility flag that represents the use of and verification by the System Administrator of the use of a revenue quality meter, and/or create a separate eligibility flag for the specific program and require as a precondition to receiving that eligibility a verification process that the generator in fact uses a revenue quality meter.

Rule 4.3.1 suggests that generator applicants provide an interconnection agreement, however, that is not a requirement at this time. M-RETS could easily make this a requirement at the request of the Treasury Department as in most circumstances the System Administrator will ask for it whenever it is not included in the application.

- The M-RETS system itself is not a third-party verifier and, similar to other systems of tracking, would rely on third-party auditors to verify underlying practices claimed by RNG production sources and to validate generation methodology. Furthermore, that M-RETS has capability to track non-US-based generation should not be viewed as a double-counting risk given existing verification practices. That M-RETS itself is not a verifier should not be characterized as a lack of capability on the part of existing electronic tracking for RNG.