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U.S. Department of Treasury
Internal Revenue Service
CC:PA:LPD:PR (REG–117631–23)
Room 5203
P.O. Box 7604
Ben Franklin Station
Washington, DC 20044

Re: Comments — Notice of Proposed Rulemaking (REG–117631–23) regarding Section 45V Credit for Production of Clean Hydrogen

To whom it may concern:

EQT Corporation ("EQT") appreciates the efforts of the U.S. Department of the Treasury ("Treasury") and the Internal Revenue Service ("IRS") to provide guidance concerning the production tax credit ("PTC") for qualified clean hydrogen under Internal Revenue Code Section 45V (REG–117631–23, published in the *Federal Register* on December 26, 2023) ("Proposed Regulations"). If finalized without changes, these Proposed Regulations severely limit the opportunity for responsibly sourced natural gas ("RSG")[1] to serve as a feedstock for the production of 45V qualified clean hydrogen. This is incongruent with the intent of Section 45V and will make it difficult, if not impossible, for the United States to scale the production of qualified clean hydrogen at the rate required to achieve the country's greenhouse gas ("GHG") emissions reduction goals.[2]

I. INTRODUCTION

A. EQT

EQT is one of the largest producers of natural gas in the United States and has an evolutionary focus on America's energy future. With operations in Pennsylvania, West Virginia, and Ohio, EQT has nearly 900 permanent employees and a contractor base in excess of 13,000 workers. Since 2019, EQT—which already had world-leading emissions performance—has been on a mission to make its energy cleaner and

[1] RSG is natural gas that has been produced responsibly with a low carbon intensity, measured, and verified using credible informed standards. This high-fidelity data is certified by producers to the EPA. Accredited independent third parties further verify the high-fidelity data associated with specific molecules of natural gas and create certificates and recognized registries to ensure integrity around proper accounting of the RSG. The MiQ Certification program is an example of such a program which now certifies over 20% of US production and has been operational for 3+ years.

[2] *See* United Nations Framework Convention on Climate Change, *The United States of America Nationally Determined Contribution* (Apr. 15, 2021) https://unfccc.int/sites/default/files/NDC/2022-06/United%20States%20NDC%20April%2021%202021%20Final.pdf. *See also* United States Department of State Office of the President, *The Long Term Strategy of the United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050* (November 2021) https://www.whitehouse.gov/wp-content/uploads/2021/10/US-Long-Term-Strategy.pdf. (Highlighting hydrogen for transportation, industrial decarbonization and other applications).

has successfully cut methane intensity by roughly 70%. EQT has taken actions to enhance operational efficiencies (translating directly to lower emissions), electrify operations (replacing diesel consumption to lower emissions) and remove the biggest source of methane emissions (pneumatic devices). EQT expects to be the first traditional energy company of scale in the world to achieve net zero on scope 1 and 2 emissions, which it expects to occur by the end of 2024. EQT is also gold certified in emissions monitoring and management under the United Nations Environment Programme's Oil & Gas Methane Partnership ("OGMP 2.0").[3]

B. The Appalachian Low Carbon Energy Complex

Consistent with the U.S. National Clean Hydrogen Strategy and Roadmap[4] published by the Department of Energy ("DOE"), which seeks to achieve decarbonization and grow clean energy through the production of zero- and low-carbon hydrogen from a variety of acceptable sources, EQT developed a process to produce clean hydrogen from RSG (CH_4). EQT's planned Low Carbon Energy Complex in Appalachia[5] is an integrated facility that will utilize autothermal reforming ("ATR") of RSG, with carbon capture utilization and sequestration ("CCUS"), to produce qualified clean hydrogen and other products such as low-carbon aviation fuel ("LCAF"). EQT has partnered with private companies and state governments to establish a clean hydrogen hub—the Appalachian Regional Clean Hydrogen Hub—in the northern Appalachian region where clean hydrogen will be produced from RSG. EQT is a founding member of the Appalachian Methane Initiative to enhance methane monitoring and facilitate methane emissions reductions in the region.[6]

It is well understood that natural gas may serve as a feedstock for aviation fuel using the Fischer-Tropsch ("FT") process. The FT process is a collection of chemical reactions that converts a mixture of hydrogen and carbon monoxide ("syngas") into liquid hydrocarbons. EQT is targeting the production of hydrogen and LCAF, along with naphtha, base oils, lubricants and waxes, using qualified clean hydrogen produced from RSG through a novel combination of ATR technology, FT catalyst improvements, and carbon capture. EQT's Low Carbon Energy Complex will produce clean hydrogen in three categories: (1) hydrogen that will be contained in syngas from the ATR and utilized as a feedstock in the FT process to produce LCAF and other products; (2) hydrogen that will be contained in syngas from the ATR that will be separated out into a pure hydrogen stream that is sold to third parties or utilized in the production of LCAF and other products; and (3) hydrogen contained in purge gases utilized to power and optimize the process. The DOE has approved EQT's Low Carbon Energy Complex project (including the FT process) to proceed to Phase 1 of the hydrogen hub grant process, pursuant to its ongoing review of the eligibility of the projects included in ARCH2.[7]

EQT seeks Section 45V eligibility for all hydrogen produced and used at the Low Carbon Energy Complex, including the hydrogen that is contained in the syngas of their novel process, which is fed

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[3] According to the UNEP website, OGMP 2.0 is UNEP's "flagship oil and gas reporting and mitigation programme. OGMP 2.0 is the only comprehensive, measurement-based reporting framework for the oil and gas industry that improves the accuracy and transparency of methane emissions reporting."

[4] Issued by DOE (June 2023) https://www.hydrogen.energy.gov/library/roadmaps-vision/clean-hydrogen-strategy-roadmap.

[5] The White House, *Biden- Harris Administration Announces Regional Clean Hydrogen Hubs to Drive Clean Manufacturing and Jobs* (Oct. 13, 2023) https://www.whitehouse.gov/briefing-room/statements-releases/2023/10/13/biden-harris-administration-announces-regional-clean-hydrogen-hubs-to-drive-clean-manufacturing-and-jobs/. The Appalachian Regional Clean Hydrogen Hub, known as ARCH2, is one of the seven teams selected by DOE to receive part of the $7 billion from the Bipartisan Infrastructure Law to "accelerate the domestic market for low-cost, clean hydrogen."

[6] Colorado State University: Energy Institute, *Appalachian Methane Initiative (AMI)* (Oct. 14, 2022) https://energy.colostate.edu/appalachian-methane-initiative-ami/.

[7] https://www.energy.gov/oced/regional-clean-hydrogen-hubs-selections-award-negotiations.

directly, without the need to separate or purify the hydrogen, to the liquid fuels production steps. Likewise, EQT seeks 45V eligibility for hydrogen in recovered purge gasses to help run the process as it is a cost-optimal and commercially accepted way to generate the main hydrogen product. Indeed, separation of hydrogen would result in a process that markedly reduces efficiency and increases costs. The reason for this is because the carbon required to generate the LCAF inherently exists as part of the hydrogen produced by the ATR process.

For the Biden administration to achieve its climate goals over the next decade, it must incentivize innovative, integrated designs like the EQT facility and assure a pathway for 45V eligible hydrogen from RSG to significantly reduce emissions in the power generation, transportation, and other energy-intensive sectors. For example, EPA's proposal to impose limitations on GHG emissions from fossil fuel fired power plants relies heavily on "low GHG hydrogen co-firing" as a "cost effective control technology," which EPA recognizes is dependent on the 45V PTC.[8] EQT respectfully encourages Treasury and the IRS to consider the following changes and clarifications.

II. SUMMARY OF RECOMMENDATIONS

Amongst the other recommendations listed below, the most important item is EQT's request of Treasury and the IRS to reconsider its proposal to treat the "upstream methane loss rate" as a "background" or fixed assumption in determining well-to-gate lifecycle GHG emissions under the most recent GREET[9] model for purposes of Section 45V. As demonstrated with high fidelity, verifiable data, EQT deploys best-in-class practices and systems throughout the supply chain to minimize GHG emissions including sourcing, transportation, and processing. It also employs the best available systems to detect, monitor, measure, verify and report on each step. Assumptions in the 45VH_2-GREET 2023 that negate these efforts are inconsistent with the purposes behind the Inflation Reduction Act of 2022 ("IRA").[10]

While debate continues across the regulated and environmental communities on the accuracy of certain background data in 45VH_2-GREET 2023, there is one background data value that is especially problematic to upholding the underlying purposes of the IRA. According to the latest 45VH_2-GREET 2023 user manual, GREET assumes that methane leakage during the natural gas recovery process and subsequent gas processing and transmission sums to ~0.9% of methane consumed by the reformer.[11] As presented in Appendix A, this assumption inflates EQT's actual upstream methane loss rate for the Appalachian Basin by 600%[12] (while letting producers with worse rates off-the-hook for their higher than the national average methane loss rates). Essentially, Treasury is relying on a GREET model that fails to

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[8] https://www.epa.gov/stationary-sources-air-pollution/greenhouse-gas-standards-and-guidelines-fossil-fuel-fired-power; *See* Proposed Rule at 88 Fed. Reg. 33240 (July 24, 2023).

[9] The Greenhouse gases, Regulated Emissions, and Energy use in Transportation model, referred to as the "GREET model," was developed by Argonne National Laboratory ("ANL"). Specifically, Prop. Treas. Reg. §§1.45V-1(a)(8)(ii) would provide that the term "most recent GREET model" means the latest version of 45VH_2-GREET developed by ANL that is publicly available on the first day of the taxpayer's taxable year in which the qualified clean hydrogen for which the taxpayer is claiming the Section 45V credit was produced. The latest version of the model 45VH_2-GREET 2023 and its corresponding manual is available at: https://www.energy.gov/eere/greet.

[10] 136 Stat. 1818, Pub. Law 117–169 (Aug. 16, 2022).

[11] Department of Energy, *Guidelines to Determine Well-to-Gate Greenhouse Gas (GHG) Emissions of Hydrogen Production Pathways using 45VH_2-GREET 2023* (Dec. 2023) https://www.energy.gov/sites/default/files/2023-12/greet-manual_2023-12-20.pdf. GREET used a hybrid approach for methane leakage estimation. According to Table 4 in the cited paper *Updated Natural Gas Pathways in GREET 2022*, the total methane leakage under DOE's approach (which is the column with the label Hybrid Conventional GREET 1 2022 using the "Distribution (station pathway)" row) amounts to 206.6 g CH4/MMBTU NG, which when converted, equals to 206.6/22,380.5 x 100% = 0.9% leakage by mass (1 MMBTu = 22,380.5 g NG).

[12] EQT's upstream methane emission rate is 0.15. This may be substantiated through data certified to EPA under EPA's GHG reporting rules. Please see Appendix A attached, which provides Treasury, the IRS and DOE with our calculations supporting this 0.15 value.

differentiate between the wide carbon intensity ("CI") variability among sources of natural gas. The proposed background value will limit severely the amount of Section 45V credit available to qualified clean hydrogen projects, undermining proactive stakeholder investments in decarbonizing the natural gas supply, environmental stewardship, and motivation to participate in the 45V credit program to accelerate the new clean hydrogen economy.

With respect to this "background data" issue, EQT respectfully requests that Treasury and the IRS:

i. Ensure the Section 45V regulations are consistent with the Clean Air Act's technology-neutral definition of lifecycle GHG emissions by modifying Prop. Treas. Reg. §1.45V-1(a)(8) to add a provision that enables clean energy leaders who demonstrate with high-fidelity data, certified to the Environmental Protection Agency ("EPA"), to qualify for credits based on well-to-gate lifecycle GHG emissions calculations that aren't limited by the background assumptions of the 45VH_2-GREET model.

   - Specifically, EQT requests Treasury to enable such taxpayers to input actual, verified lifecycle GHG emissions data in the "foreground" of the GREET-45VH_2 for upstream methane loss rate instead of universal reliance on the assigned "background" value. Data certified by the taxpayer to the EPA should serve as the primary source of data to support a facility's calculation of actual upstream methane loss rate of the RSG feedstock.

   - Accredited independent standards certification bodies and registries such as MiQ can play an integral role as a supplemental source for the independent verification of high-fidelity methane emissions rate data associated with the specific RSG assigned to the production of qualified clean hydrogen. Certificates and recognized registries may be utilized to ensure integrity around accounting and claims associated with the Section 45V credit.

   - In the alternative, determine that clean hydrogen produced from RSG feedstock is distinct from the hydrogen production pathways utilizing natural gas (including ATR) that already are included in the most recent GREET model. Simultaneously, expressly confirm that producers utilizing RSG feedstock may petition the Secretary for a provisional emissions rate ("PER") determination that considers the upstream methane loss rate reflected in their EPA-certified data. Expanding access to the PER process in this way could serve as an interim measure until DOE updates 45VH_2-GREET to make the upstream methane loss rate "foreground data."

Separate from the "background data" issue, EQT respectfully requests Treasury and the IRS to:

ii. Confirm that the definition of "facility" accommodates the entire production processes for qualified hydrogen that may include functionally interdependent components that synergistically utilize hydrogen and carbon oxides in the production of co-products such as LCAF. In other words, recognize that the hydrogen may be an intermediate product but not the end product of a "single production line." Recognizing this interdependency as part of a "single production line" will yield a single carbon intensity factor for the full hydrogen production facility. This will enable producers to maximize carbon utilization, energy efficiencies, and CCUS while measurably reducing the carbon intensity of all products along the value chain beyond that which two disconnected processes can provide. Treasury could enable this by including an example of such co-production pursuant to Prop. Treas. Reg. §1.45V-1(a)(7)(iv).

iii. Recognize that carbon in the syngas generated by the ATR is either captured and stored at a rate of 95%+ when making hydrogen for sale, or synergistically utilized as CO in the FT process. The

CO used in the FT process is not released into the atmosphere during the process but is instead embodied within a commercially proven fuel that has a carbon intensity below that of the incumbent fuel production methods which would otherwise emit larger quantities of CO_2. Following the requirements for utilization in Section 45Q, carbon oxides that are displacing carbon that would otherwise be procured and emitted may be utilized to qualify for the credit, and the same principles should apply with Section 45V for pathways integrating carbon capture *and utilization*.

iv. Confirm that qualified clean hydrogen, which is contained in process waste streams and otherwise would be vented to the atmosphere, that is used to power functionally interdependent components to enable the production of additional hydrogen and low-carbon energy products such as LCAF is an acceptable "use" under Section 45V(c)(2)(B)(i)(III) of qualified clean hydrogen.

III. CONTEXT FOR SECTION 45V RECOMMENDATIONS

Congress enacted Section 45V, the clean hydrogen PTC, as part of the IRA to reduce the cost of clean energy to the consumer, ensuring that clean hydrogen can be adopted quickly and at scale while supporting production pathways from a variety of energy feedstocks, including natural gas. Lawmakers intended for Section 45V—which is only available for 10 years[13]—to jumpstart the hydrogen economy and inspire innovation to reduce carbon emissions.

By foreclosing the opportunity for blue hydrogen to receive proper incentive from the PTC, the Proposed Regulations threaten to increase the price of hydrogen, miss huge GHG reduction opportunities, and frustrate the intent of Congress. Prop. Treas. Reg. §1.45V-4 would base the amount of the PTC off the lifecycle GHG emissions rate of all hydrogen produced at a hydrogen production facility from well-to-gate, *as determined under the most recent GREET model*. The so-called "background" assumptions for upstream methane loss rate in the most recent GREET model—45VH_2-GREET—is locked and based on a default national average value. This removes the incentive for continued investment and improvement in lowering upstream methane loss rates below the default rates. Failure to recognize and distinguish among the wide range of CI rates associated with natural gas will enable high CI natural gas to enter the clean hydrogen market illegitimately despite actual upstream methane loss rates that otherwise would preclude it from serving as feedstock for qualified clean hydrogen. In other words, producers of the lowest CI gas, many of whom have expended tens of millions of dollars or more to abate upstream methane leakage from gas production, would be penalized by placing the most carbon intensive producers in the industry on the same playing field. This outcome is at odds with the intent of the IRA and 45V.

The Proposed Regulations go beyond what is provided in the statute to force producers to defer to the embedded "background" values in the GREET model for calculating the carbon intensity of their hydrogen production. In particular, the GREET model's assumptions regarding upstream methane loss rates fail to account for innovative technologies and practices that EQT employs across its entire operations. EQT's systems minimize and track upstream methane loss and deploy best practices to reduce its overall GHG emissions.

Rather than picking winners and losers in a way that will have the harmful effect of undermining the environmental safeguards the statute was designed to protect, Treasury and the IRS should reward those producers who are making the capital investments required for producing RSG. It is inequitable to magnify the GREET model's weaknesses by forcing producers to rely on background values for purposes of simplifying the calculation of a project's lifecycle GHG emissions. The statute gives Treasury and the

[13] 26 U.S. Code § 45V(a)(1). A U.S. qualified clean hydrogen production facility is eligible for the credit for its first 10 years in service.

IRS regulatory authority to specify a mechanism that will ensure the Section 45V regulations properly credit producers for critical climate change mitigation efforts in producing hydrogen with low lifecycle GHG emission rates.

IV. CLEAN ENERGY LEADER DEMONSTRATION OF QUALIFIED CLEAN HYDROGEN

The most recent version of 45VH_2-GREET is not sufficiently flexible to enable producers of hydrogen from RSG feedstock that meets the most stringent carbon intensity thresholds in the IRA to avail themselves of anything but possibly the lowest tier of benefit from the corresponding PTC. This is in direct contravention with the technology-neutral wording in the Clean Air Act and IRA, the intent of Congress,[14] and the current state of "independently verifiable with high fidelity" data and mechanisms tracking upstream methane loss rates for RSG. Treasury and the IRS likely are aware of this given that they welcomed comment on "the readiness of verification mechanisms that could be utilized for certain background data in 45VH_2-GREET if it were reverted to foreground data in future releases"[15] and given that they specifically requested "conditions, if any, under which the methane loss rate may in future releases become foreground data (such as certificates that verifiably demonstrate different methane loss rates for natural gas feedstocks, sometimes described as responsibly sourced natural gas)."[16]

A. The IRA and Clean Air Act Are Technology-Neutral.

The statute only requires that the well-to-gate system boundary be tied to the GREET model.[17] The lifecycle GHG emissions definition in the Clean Air Act, [18] which is cross-referenced and limited for GREET model purposes in Section 45V of the IRA,[19] is technology-neutral. These provisions are designed to spur innovation to decarbonize the United States through performance-based incentives without placing limitations on hydrogen feedstock-type or production processes.

A technology neutral statute to meet eligible life cycle GHG emissions rates should be adopted for evaluation of the privilege to earn the applicable PTC. Congress did not direct Treasury and the IRS to delegate authority to DOE and Argonne National Laboratory to make policy determinations that undermine the use of RSG as a feedstock for qualified clean hydrogen by assigning default averages in the GREET model that fail to recognize the significant, verifiable decarbonization efforts of RSG producers. Treasury and the IRS's broader reliance on a GREET model that incorporates critical

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[14] *See* United States Senate Committee on Environment & Public Works: Chairman Tom Carper, *Carper Statement on Treasury's Proposed Guidance for Clean Hydrogen Tax Credit* (Dec. 22, 2023) https://www.epw.senate.gov/public/index.cfm/2023/12/carper-statement-on-treasury-s-proposed-guidance-for-clean-hydrogen-tax-credit.

[15] Section 45V Credit for Production of Clean Hydrogen; Section 48(a)(15) Election To Treat Clean Hydrogen Production Facilities as Energy Property (REG-117631-23) IRS-2023-0066 (Dec. 26, 2023) https://www.federalregister.gov/documents/2023/12/26/2023-28359/section-45v-credit-for-production-of-clean-hydrogen-section-48a15-election-to-treat-clean-hydrogen.

[16] *Id*.

[17] Section 45V(c)(1) states that the term "lifecycle greenhouse gas emissions" has the same meaning given such term under subparagraph (H) of section 211(o)(1) of the Clean Air Act (42 U.S.C. 7545(o)(1)), as in effect on the date of enactment of this section. However, the term shall only include "emissions through the point of production (well-to-gate), as determined under the most recent [GREET model]". Section 45V(c)(1) does not authorize Treasury and the IRS to disregard the actual emissions rate nor does it direct all taxpayers to accept whatever rate the GREET model calculates for them for purposes of calculating the amount of their Section 45V credit.

[18] 42 U.S.C. §7545(o)(1)(H). The IRA relies on the Clean Air Act to define lifecycle GHG emissions. Section 45V's reference to the GREET model is, by the plain language of the statute, limited to determining the system boundary for well-to-gate, which is a subset of the EPA definition.

[19] 26 U.S.C. § 45V(c)(1).

distinguishing variables as fixed "background" values is improper and will result in the unintended negative consequence of impeding the nation's decarbonization strategy and global energy leadership.

B. Congress Did Not Intend to Exclude RSG from Qualified Clean Hydrogen Production.

Congress never intended for Section 45V and the GREET model to exclude RSG as a feedstock for qualified clean hydrogen.[20] To better reflect Congressional intent and policy considerations, Treasury and the IRS should provide an opportunity for clean energy leaders—those who can demonstrate the production of qualified clean hydrogen through high-fidelity, verifiable data—to unlock the background data for upstream methane loss rate in the most recent GREET model to determine the accurate lifecycle GHG emissions rate for the assignment of the appropriate PTC. If the United States is truly committed to bending down the carbon intensity curve of our energy sector, it is critical to implement incentives programs like the hydrogen PTC equitably, which involves the use of the best available facility data in GREET.

C. Methane Data Currently Certified to EPA Is Independently Verifiable with High-Fidelity Mechanisms and Independent Integrity Assurance Standards.

Importantly, EQT's recommended approach recognizes that gas producers today collect critical upstream methane loss rate data, the veracity of which is certified to the EPA in satisfaction of the approach laid out in the preamble to the Proposed Regulations—namely, that such data be "independently verifiable with high fidelity."[21] Furthermore, programs that ascribe to a set of certification principles (like those developed by MiQ) apply transparent, robust, measurement-informed standards for accounting for methane emissions with high degrees of confidence. The assumption by Treasury and the IRS that current verification mechanisms are inadequate fails to recognize the EPA's entire methane control regime or all the progress innovators like EQT have made in recent years. There are robust standards currently in place today (involving measurement inputs through emissions factors and verified outputs) that have been established to provide for traceability and third-party audits. Independent firms measure and report such amounts to the strict standards required by the EPA under its *Greenhouse Gas Reporting Program*[22] and *Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review*.[23] In addition, new EPA rules regarding the IRA's waste emissions charge (the so-called methane fee) will add to the universe of robust, detailed data that integrated energy companies like EQT will certify to the U.S. Government.[24]

EQT already provides comprehensive and relevant robust data to the EPA as a source category for 40 CFR Part 98, subpart W of the *Greenhouse Gas Reporting Program*. EQT certifies this data as true and

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[20] H.S Rep No.118-61, at 11 (Jul. 13, 2023) (noting that the Committee is concerned that the Department of the Treasury is considering imposing additional limitations or restrictions that are not authorized by Section 45V of the Internal Revenue Code to qualify for the clean hydrogen production tax credit).

[21] For example, EQT submits comprehensive data to EPA under 40 C.F.R. Part 98, Subpart W, including for source categories onshore petroleum and natural gas production and onshore petroleum and natural gas gathering and boosting.

[22] *See generally* Environmental Protection Agency, *Greenhouse Gas Reporting Program: Emission Calculation Methodologies* (2017) https://www.epa.gov/sites/default/files/2017-12/documents/ghgrp_methodology_factsheet.pdf.

[23] 40 C.F.R. Part 60, finalized in Dec. 2023. https://www.epa.gov/system/files/documents/2023-12/eo12866_oil-and-gas-nsps-eg-climate-review-2060-av16-final-rule-20231130.pdf.

[24] *See* proposed rules for *Waste Emission Charge for Petroleum and Natural Gas Systems*, 89 Fed. Reg. 5318 (Jan. 26, 2024). https://www.federalregister.gov/documents/2024/01/26/2024-00938/waste-emissions-charge-for-petroleum-and-natural-gas-systems.

correct subject to criminal penalty for false or fraudulent statements.[25] As such, this data should be allowed as an input to override the background upstream methane loss rate assumption in the current 45VH_2-GREET model.

Third parties such as the MiQ Registry provide a secondary level of integrity assurance.[26] According to MiQ, each certificate issued by the MiQ Registry contains detailed information unique to the MMBtu gas generated or handled, including (1) unique identification numbers, (2) geographical information including the state and geologic basin, name, and operator of the facility, (3) timestamp to the month of generation, (4) raw emissions information including CH_4, CO_2, and N_2O intensities, and (5) additional attributes such as ESG certifications including the Equitable Origin certification and performance grade. This information is granular down to the very wells that will supply RSG to EQT's integrated hydrogen production facility. This information can all be referenced in bilateral contracts and single trade agreements to ensure sufficient coupling with the physical gas as needed. All verified facilities and the valid period of their verification status may be found on a transparent dashboard on the MiQ Registry, complete with unique details and geographical information so that any user or purchaser of certificates can cross reference properly their information and retire certificates accordingly.

D. Treasury Must Consider Available Certified and Verifiable Emissions Data in Lieu of "Background" Values in Determining LCA GHG Emissions Rate for the PTC.

It is not enough to assume that this problem potentially could be resolved in the future if DOE were to update the 45VH_2-GREET model to convert the upstream methane loss rate to a foreground variable. This is an existential issue for EQT, because its upstream methane loss rate is only about 0.15%— a factor of six (6) lower than the 0.9% assumed as background data in the 45VH_2-GREET model. Treasury should afford taxpayers that meet the following conditions (so-called "clean energy leaders") the ability to utilize site-specific data to establish an approved adjustment to the upstream methane loss rate (and for other background values, as supported by certified, verifiable data) otherwise provided for in the GREET model. Such an adjustment, which would be in accordance with guidance published in the Internal Revenue Bulletin, would only be available to taxpayers that:

1. Demonstrate through data certified to EPA under the *Greenhouse Gas Reporting Program*[27] an actual upstream methane loss rate that changes the "applicable percentage" under Section 45V(b)(2) for the production of "qualified clean hydrogen";

2. Substantiate the actual upstream methane loss rate through secondary integrity assurance certification programs, which require, at a minimum, the assignment of a unique registry ID number to each MMBtu of gas generated or handled; geographic, geologic, and facility information; monthly production data; and raw emissions intensity information including for CO_2, CH_4, and N_2O. The data is subject to independent validation and verification prior to certificate generation and listing on a qualified registry. Such certificates shall serve as an approved method to substantiate the facility-specific lifecycle GHG emissions rate for production of qualified clean hydrogen.

[25] *See* https://ghgdata.epa.gov/ghgp/service/html/2022?id=1010233&et=undefined for an example of a report filed by EQT for 2022. The 2023 report will be filed in March of 2024.

[26] The MiQ Registry has been in operation since 2021; MiQ claims to have issued certificates for over 20% of the natural gas market.

[27] 40 CFR Part 98, Subpart W.

This limited opportunity for clean energy leaders to override the GREET model's background value for upstream methane loss rate with site-specific data will provide an opportunity for RSG meeting rigorous criteria to serve as a feedstock to enable certain blue hydrogen producers to qualify for the full clean hydrogen PTC as Congress intended.[28]

Failure to affirmatively incorporate the opportunity described above into the final regulations would harm clean hydrogen producers—such as EQT—who have and continue to invest enormous sums of money on technologies to reduce their upstream methane emissions and, correspondingly, the carbon intensity of all its products. Such a change to the final regulations would provide companies like EQT the certainty that they require. Failure to enable otherwise qualified hydrogen producers to account for these critical differences not only will limit the impact of the PTC but also it will discourage investment in the production of environmentally responsible, low-cost U.S. hydrogen sources of energy and miss out on significant decarbonization opportunities including in the power sector pursuant to EPA's proposed approach.

V. EXPAND AVAILABILITY OF THE PER PROCESS

Although the concerns regarding the Proposed Regulations' creation of a custom GREET model that inappropriately prevents RSG attributes to be factored into lifecycle calculations are best served by providing an opportunity for clean energy leaders to incorporate site-specific, verifiable and certified data into their well-to-gate emissions calculations, in the alternative, Treasury and the IRS could open up the PER process for RSG feedstock, as it differs from the hydrogen production pathways currently included in the 45VH_2-GREET model. Treasury should expand the Proposed Regulations' narrow approach to the PER process such that its availability would not be limited to only those situations where either the facility's specific feedstock or the facility's specific hydrogen production technology is not represented in the current GREET model. Since expanding the availability of PER determinations has the potential to place additional burden on the IRS's limited resources, it is understandable that Treasury and the IRS would be interested in limiting this avenue for access to the credit. However, an approach of exclusively embracing a GREET model that treats a critical variable as background data necessitates a countervailing alternative that offers equitable relief to ensure that performance-based thresholds are applied consistently with the law and its underlying policy considerations. An interim solution may be to utilize the PER process rather than being locked out of a credit in contravention of the statute.

Specifically, EQT respectfully requests Treasury and the IRS to change the current language in Prop. Treas. Reg. §1.45V-4(c)(2) which reads:

> a taxpayer may not file a petition for a PER unless a lifecycle GHG emissions rate has not been determined under the most recent GREET model with respect to hydrogen produced by the taxpayer at a hydrogen production facility. A lifecycle GHG emissions rate has not been determined under the most recent GREET model with respect to hydrogen produced by the taxpayer at a hydrogen production facility if either the feedstock used by such facility or the facility's hydrogen production technology is not included in the most recent GREET model. A facility's hydrogen production pathway is not included in the most recent GREET model if the feedstock used by such facility or the facility's

[28] *See generally* Honoring the Dedication of the Ball Family, Congressional Record (describing ways the 45V rules should be applied broadly), 168 Cong. Rec. [S4166] (2022). *See also* Joe Manchin, *Manchin: Administration Kneecapping Hydrogen Projects* (Dec. 22, 2023), https://www.manchin.senate.gov/newsroom/press-releases/manchin-administration-kneecapping-hydrogen-projects.

> hydrogen production technology is not included in the most recent GREET model.[29]

Instead, EQT respectfully requests Treasury and the IRS to make the PER process available in the final regulations explicitly for qualified clean hydrogen produced from RSG feedstock, until such time as the 45VH$_2$-GREET model is amended to accommodate site-specific upstream methane loss rate data.

VI. CONFIRM THE DEFINITION OF FACILITY INCLUDES INTEGRATED PROCESSES THAT PRODUCE QUALIFIED CLEAN HYDROGEN AND UTILIZE HYDROGEN WITH CARBON OXIDES TO PRODUCE CO-PRODUCTS

A. Components that Create Energy Efficiencies and Reduce Carbon Intensity, Thereby Enabling Economic Viability of a Project, May Be Included as Part of the "Facility," even if such Components are Mechanically Distinguishable from the Hydrogen Production.

EQT respectfully requests Treasury and the IRS clarify that its proposed definition of "facility" in Prop. Treas. Reg. §1.45V-1(a)(7) encompasses an entire integrated clean energy production facility, including interdependent components for carbon oxides captured and utilized with hydrogen to produce "co-products," such as LCAF. EQT has designed its Low Carbon Energy Complex holistically. The CI reductions from each component are dependent on the placing-in-service of each of the other components when viewing placement-in-service from a perspective relating to the specifically intended function of the complex as a whole, rather than an isolated engineering perspective for each component. This will result in a lower lifecycle CI across all products along the entire value chain produced at the facility, including hydrogen-dependent products such as LCAF.

EQT supports Treasury's proposal providing that "components that have a purpose in addition to the production of qualified hydrogen may be part of a facility if such components function interdependently with other components to produce qualified clean hydrogen." Treasury defines the term "facility" for purposes of the definition of qualified clean hydrogen production facility at Section 45V(c)(3) to mean:

> a single production line that is used to produce qualified clean hydrogen. A single production line includes all components of property that function interdependently to produce qualified clean hydrogen. Components of property function interdependently to produce qualified clean hydrogen if the placing in service of each component is dependent upon the placing in service of each of the other components to produce qualified clean hydrogen. Prop. Treas. Reg. §1.45V-1(a)(7).

EQT's Low Carbon Energy Complex is premised on interdependency of systems that integrate best-available energy efficiency and carbon capture utilization and sequestration technologies. These interdependent—in the context of producing qualified clean hydrogen—components and processes are instrumental in reducing EQT's facility-wide CI for hydrogen, LCAF, and the other products. While theoretically, the hydrogen process may be distinguishable from the gas to liquids production, such a compartmentalization would create huge inefficiencies, increasing energy demand and leading to higher CI for all product streams.

[29] EQT also requests that the following corresponding language in the preamble be retracted to reflect that change: "A taxpayer may not use the PER process if its feedstock and hydrogen production technology are represented in 45VH2-GREET, even if the taxpayer disagrees with the underlying assumptions (that is, background data) or calculation approach used by the most recent 45VH2-GREET." 88 Fed. Reg. 89226.

As noted above, the carbon required to generate the LCAF inherently exists as part of the hydrogen production step in the ATR product syngas. Carbon and hydrogen in this syngas exist in near ideal proportions for maximizing the efficiency of the subsequent FT steps. If pure hydrogen was produced prior to generating LCAF, the carbonaceous feedstock required by the FT process must instead be generated external to the hydrogen production process, in a separate process unable to leverage the synergy provided by the integrated EQT process. Such an alternative approach would be highly inefficient and increase the carbon intensity for all products compared to the EQT process. This is counter to the intent of Section 45V and the goals of the Biden administration. In addition, first purifying hydrogen also results in reduced process efficiency and increased LCAF production costs over EQT's fully integrated and interdependent process.

EQT respectfully requests Treasury and the IRS to clarify that components that are functionally interdependent (leading to increased energy efficiency and reduced carbon intensity, and thus overall economic viability) may be included in the definition of "facility" even if those components may be distinguishable from the hydrogen production from an engineering and mechanical perspective, such as the FT process or the hydrocracker unit (as described in the example suggested below). Without such a clarification, the Proposed Regulations may prevent a facility from maximizing the GHG reduction potential associated with the production of qualified clean hydrogen.

Treasury could enable this by adding an example of such co-production at Prop. Treas. Reg §1.45V-1(a)(7)(v) along the following lines:

> The following example illustrates the definition of facility provided in this subsection, (a)(7). A qualified hydrogen production facility may include functionally interdependent processes including the production of hydrogen and the use of a portion of such hydrogen to produce co-products such as low carbon aviation fuel. The facility utilizes natural gas in an Auto Thermal Reactor to produce syngas which is comprised of hydrogen and carbon monoxide. A portion of the syngas enters a Water Gas Shift Reactor and Pressure Swing Absorption unit where pure hydrogen is produced for sale or use. A portion of the syngas enters a Fischer Tropsch unit where the syngas is utilized to produce liquids that are then processed in a Hydrocracker to produce certain co-products including low carbon aviation fuel, naphtha, base oils, lubricants, and waxes. Remaining CO_2 generated by the process is captured and permanently sequestered at a rate of 95%+. Production of qualified clean hydrogen with a well-to-gate GHG emissions rate within the range specified in Section 45V(b)(2)(C) is dependent on the placing in service of the Fischer Tropsch unit and the Hydrocracker components, along with the carbon capture equipment. Because the Fischer Tropsch unit, the Hydrocracker, and the carbon capture equipment are functionally interdependent with other components of property to produce qualified clean hydrogen within the meaning of paragraph (a)(9)(i) of this section, the Fischer Tropsch unit, the Hydrocracker components, and the carbon capture equipment are part of the qualified hydrogen production facility for purposes of Section 45V(c)(3) and the regulations in this part under Section 45V, along with all other components of property that function interdependently to produce qualified clean hydrogen.

B. The Definition of Facility Should Include Components that Utilize Carbon Oxides from the Hydrogen Production Process to Reduce the Lifecycle GHG Rate.

EQT plans to capture and utilize carbon oxides from the hydrogen production process that it is not sequestering. EQT respectfully requests that Treasury confirm that (i) the definition of "facility" includes components that utilize carbon oxides from the hydrogen production process to reduce the lifecycle GHG rate and use hydrogen from the facility to produce co-products such as LCAF or that (ii) the GHG reductions associated with such utilization are otherwise allowed as an input into the GREET model. Currently, the GREET model only allows for carbon capture equipment that permanently sequesters the captured carbon oxides and does not contain a mechanism to handle utilization. The regulations should speak expressly to utilization of the carbon, although the potential for carbon capture equipment that leads to utilization of the captured carbon is mentioned in Prop. Treas. Reg. § 1.45V-6(c)(3).

Further, if EQT simply captured and sequestered (and did not utilize) the carbon from the hydrogen production equipment, then it would need to procure additional carbon from a separate source to produce the LCAF and other co-products being produced at its Low Carbon Energy Complex. Thus, at EQT's facility, the captured and utilized carbon oxide molecules will be displacing carbon oxides that otherwise would be procured and emitted. This is consistent with the framework of eligibility for such equipment under Section 45Q of the IRS Code. EQT respectfully requests that Treasury recognize that the utilization of CO_2 that is captured off the hydrogen production process should be deducted from the lifecycle GHG emissions rate as these carbon oxides are not emitted into the atmosphere by the hydrogen producer. The taxpayer could account for this as a foreground data input in the GREET model similar to the treatment of capture for permanent storage.

VII. USE OF WASTE HYDROGEN TO POWER PRODUCTION OF HYDROGEN AND CO-PRODUCTS IS A QUALIFIED USE

The Proposed Regulations include an anti-abuse provision that "the section 45V credit is not allowable if the primary purpose of the production and sale or use of qualified clean hydrogen is to obtain the benefit of the section 45V credit in a manner that is wasteful, such as the production of qualified clean hydrogen that the taxpayer knows or has reason to know will be vented, flared, or used to produce hydrogen".[30] EQT respectfully requests Treasury and the IRA to make clear that this anti-abuse provision is not meant to preclude the PTC for use of qualified clean hydrogen which otherwise would be emitted as waste gas, to serve as decarbonized fuel to power other components of its facility, which, in the case of EQT's Low Carbon Energy Complex, includes use to power the ATR, the FT and the hydrocrackers producing co-products such as LCAF, naptha, base oils, etc.

At the EQT Low Carbon Energy Complex, it would be wasteful to not utilize waste heat and fuel (which may contain hydrogen) as part of the fuel stream to generate on-site power. This use of a small portion of the hydrogen is not wasteful or being undertaken for the primary purpose to generate more Section 45V credits. EQT's facility configuration is designed specifically to create efficiencies across the value chain and eliminate the wasteful production of hydrogen and emissions of carbon oxides, including for the qualified clean hydrogen to be sold, used in the syngas as input to the FT process to produce liquids, or recovered from a waste stream to help produce energy for facility components. While Treasury's proposal appears to be assuming electrolysis will be used for hydrogen generation, in which case using hydrogen to generate power would indeed be wasteful, EQT respectfully requests that Treasury and the IRS clarify that its rules were intended to restrict abusive uses of qualified clean hydrogen and that such use, as described above, is acceptable. EQT welcomes the opportunity to work with Treasury and IRS to design

[30] *See* Proposed Regulation Section 1.45V-2(b)(1); *see also* 88 Fed. Reg. 89234 (describing the proposed anti-abuse rule in the preamble).

additional safeguards that prevent abusive Section 45V credit generation schemes, such as establishing guidelines on the qualified clean hydrogen produced which may be used for generating on-site power.

VIII. COAL MINE METHANE

A. Treasury and the IRS intend to provide rules addressing hydrogen production pathways that use RNG or other fugitive sources of methane (for example, from coal mine operations) for purposes of the Section 45V credit.[31]

EQT continues to explore the potential to utilize coal mine methane ("CMM") as a feedstock to produce qualified clean hydrogen. We welcome the opportunity to work with Treasury (and DOE) to design an appropriate pathway for the use of CMM in the production of qualified clean hydrogen.

IX. THE RULE SHOULD UTILIZE ENERGY–BASED ACCOUNTING

EQT offers the following in response to Treasury's request for comment on alternative co-product accounting methods (e.g., mass allocation vs. energy allocation etc.) that can better represent the CI of the qualified clean hydrogen.[32] EQT currently uses energy allocation. Hydrogen's value is in its energy content not in its mass, so allocation on a mass basis is improper (EQT does not produce or sell hydrogen based on mass). Normalizing CI by mass-based accounting methods would result in a disproportionately small denominator, increasing CI mathematically but not practically. Therefore, the GREET guidelines should recognize methods such as energy allocation for accounting that do not artificially skew CI, even with regards to co-products. This would better ensure the accurate representation of the well-to-gate CI of the hydrogen production.

X. CONCLUSION

The Proposed Regulations' imposition of artificial limitations on the Section 45V credit is inconsistent with the express language of the IRA and the Clean Air Act. Congress did not intend the rule to preclude qualified clean hydrogen produced from natural gas, or any other feedstock, from qualifying for the full Section 45V credit. By placing undue reliance on a GREET model that intentionally excludes the opportunity for RSG to deliver significant environmental and energy benefits, the Proposed Regulations calculate the tax credit based off the lifecycle GHG emissions of hydrogen production in general and not—as was contemplated by Congress—the lifecycle GHG emissions rate of the hydrogen actually produced at the facility. Final regulations under Section 45V should embrace a lifecycle GHG emissions analysis that is technology-neutral and does not undermine any feedstock or production process, as long as the facility meets the performance-based targets for the PTC based on high-fidelity, verifiable and certified data. Absent change, these rules will mean that clean hydrogen producers that utilize RSG feedstock in an ATR with carbon capture utilization and sequestration will reduce (not increase) their investments in clean hydrogen projects. This is completely counter to US climate and decarbonization leadership and economic and energy independence goals. Clean hydrogen producers who take steps to reduce carbon emissions below GREET model background default values should be rewarded for their investments in the future US energy sector, not excluded from benefiting fully from the PTC.

EQT also respectfully requests, Treasury, and the IRS to recognize the role that carbon capture and utilization can play in reducing the lifecycle GHG emissions rate and to confirm that the definition of "facility" accommodates the entire production processes for qualified hydrogen. This may include

[31] *Id*. at 89238.

[32] *Id*. at 89225.

functionally interdependent components in the context of qualified clean hydrogen that utilize qualified clean hydrogen and carbon oxides in the production of co-products such as LCAF.

EQT appreciates the opportunity to provide input to assist Treasury and the IRS in drafting final rules that will grow the clean hydrogen market. Please do not hesitate to contact me at (412) 491-9637 or TQuinlan@eqt.com if you have any questions regarding EQT's comments.

Respectfully submitted,

DocuSigned by:
Thomas E. Quinlan
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Thomas E. Quinlan
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EQT Corporation

APPENDIX A

Burnham, A. (2022). Updated Natural Gas Pathways in GREET 2022. Argonne National Lab. https://greet.anl.gov/publication-update_ng_2022.

Table 4: Summary Comparison of CH4 Emissions per Throughput of Each Stage between EPA and Hybrid data in GREET1_2022 (a)

Sector	Process	Unit	Hybrid Conventional GREET1_2022	EQT Data	
Production	Completion	g CH4 / million Btu NG	0.6	0.07	
	Workover		0.0	0.01	
	Liquid Unloading		4.8	0.81	
	Well Equipment		76.7	0.85	
	Gathering and Boosting		31.2	31.2	
	Total		113.3	32.9	(b)
Processing	Processing		6.0	0.0	(c)
Transmission	Transmission and Storage		67.6	0.0	(c)
Distribution	Distribution		27.1	0.0	(c)
Distribution	Distribution (station pathway)		19.6	0.0	(c)
Total			214.0	32.9	
Total (station pathway)			**206.6**	**32.9**	

1 MMBtu = 22,380.5 grams Total (station pathway) / 22,380.5	**0.92%**	**0.15%**	**(d)**

(a) Upstream methane rate of 0.9% is discussed in Section 2.4.2, Upstream Methane, of the Guidelines to Determine Well-to-Gate Greenhouse Gas (GHG) Emissions of Hydrogen Production Pathways using 45VH$_2$-GREET 2023, December 2023 (U.S. Department of Energy), which further references the Updated Natural Gas Pathways in GREET 2022. Other Columns from Table 4 excluded for simplicity as they are not utilized.

(b) EQT is utilizing the average gathering and boosting rate in this example for ease of reference.

(c) EQT's RSG will not require any of these processes prior to the RSG arriving at the Low Carbon Energy Complex.

(d) The background methane loss rate is 6 times greater than EQT's actual methane loss rate.

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