Brandon Farris
Vice President
Domestic Policy

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P.O. Box 7604,
Ben Franklin Station
Washington, DC 20044

RE: REG-117631-23

The National Association of Manufacturers submits these comments in response to the Department of the Treasury's Notice of Proposed Rulemaking for the Internal Revenue Code Section 45V Credit for the Production of Clean Hydrogen and Section 48(a)(15) Election to Treat Clean Hydrogen Production Facilities as Energy Property, 88 Fed. Reg. 89220 (Dec. 26, 2023) (the "NPRM").

The NAM appreciates the opportunity to provide input on the proposed regulations. As the nation's largest manufacturing association, the NAM represents nearly 13 million people in every industrial sector and in all 50 states.

Executive Summary

A key purpose of the energy provisions of the Inflation Reduction Act was reducing greenhouse gas emissions and spurring new technologies to produce low carbon energy that could move the nation toward its climate and emissions reduction goals. To meet that goal, the IRA created a new tax credit for the production of hydrogen under Section 45V of the tax code. This tax credit would award up to $3 per kg of hydrogen produced to projects with a lifecycle GHG emissions intensity less than 0.45 kg per kg of hydrogen. The provision is intended to incentivize the transportation, production and use of clean hydrogen in the U.S.[1] To qualify for the maximum credit, Treasury is proposing several requirements that were not in the IRA. These include locked in carbon intensity rates for natural gas, locked in value for steam co-products, and provisions associated with the electricity used during the hydrogen production process, commonly referred to as the "three pillars," which focus on incrementality, temporal matching and deliverability.

- Incrementality: Prop. Reg. §1.45V–4(d)(3)(i) institutes an incrementality requirement which is satisfied when the electricity-generating facility powering a

[1] Treasury Sets Out Proposed Rules for Transformative Clean Hydrogen Incentives, https://www.whitehouse.gov/cleanenergy/clean-energy-updates/2023/12/22/treasury-sets-out-proposed-rules-for-transformative-clean-hydrogen-incentives/ (Dec. 22, 2023)

hydrogen production plant issues an Energy Attribute Certificate, and has begun operation within the 36-month period preceding the hydrogen producing facility's commencement of service. As such, any hydrogen producing facility obtaining EACs from generation facilities beginning operation before the 36-month period would not qualify for the 45V tax credit.

- Temporal Matching: Prop. Reg. §1.45V–4(d)(3)(ii) provides a temporal (hourly) matching requirement beginning in 2028. This requires electricity used to produce hydrogen be generated within the same hour as the hydrogen production process.

- Deliverability: Prop. Reg. §1.45V–4(d)(3)(iii) imposes a deliverability requirement that is met when the electricity represented by the EAC is used by a hydrogen production facility within the same region. The 45V tax credit cannot be claimed if the EAC originated outside of the production facility's region. The regions are defined in the National Transmission Needs Study released by the Department of Energy in October 2023.

In addition to the three pillars, Treasury has proposed several additional requirements:

- GREET Model: The GREET model (Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation) is a tool that assesses a range of life cycle energy, emissions, and environmental impact challenges and that can be used to guide decision-making, research and development, and regulations related to transportation and the energy sector.[2] 45VH2-GREET is the model that has been adopted by Treasury to determine emissions rates for the 45V tax credit. Prop. Reg. §1.45V–1(a)(8)(ii) states that the "most recent GREET Model" means the latest 45VH2-GREET that is publicly available on the first day of the taxpayer's taxable year in which the taxpayer seeking to claim the 45V credit produced qualified clean hydrogen.

- Provisional Emission Rate: Section 45V(c)(2)(C) provides that, in the case of any hydrogen for which a lifecycle GHG emissions rate has not been determined for purposes of Section 45V, a taxpayer producing such hydrogen may file a petition with the Secretary for a determination of the lifecycle GHG emissions rate with respect to such hydrogen, which is referred to as a "provisional emissions rate" or PER in the proposed regulations.

- Lower Carbon Intensity (CI) Feedstocks: The level of the 45V incentive is based on the CI of the hydrogen produced—regardless of technology or feedstock.

    - The proposed regulations require taxpayers to input into the 45VH2-GREET model a national average for upstream natural gas CI and does not allow this number to be changed once submitted. This locked in number does not reflect the true CI of the natural gas used for hydrogen production, and therefore does not reflect the true CI of the hydrogen produced. The EPA has programs that require GHG emissions reporting

[2] GREET, Office of Energy Efficiency & Renewable Energy, https://www.energy.gov/eere/greet

that are currently not used as foreground inputs into the GREET model for 45V purposes.

- Steam co-products from the hydrogen production process are not allowed as part of the final hydrogen CI calculation when the steam is used to reduce emissions in other parts of the energy complex.

If implemented properly, the 45V credit would provide the certainty needed for manufacturers to make investment decisions that encourage further production, transportation and use of clean hydrogen. However, the NAM is concerned Treasury is considering renewable sourcing provisions regarding incrementality, temporal-matching and deliverability requirements, which would limit the amount of energy sources available to power the hydrogen production process. Additionally, the NAM urges Treasury to follow congressional intent and provide a more reasonable process for taxpayers to prove their feedstocks are lower in carbon intensity and therefore eligible for the maximum credit. Failing to address these issues will create significant uncertainty for manufacturers who are considering making long-term capital investments, potentially slowing or stopping new projects.

Incrementality

The NAM is concerned that the inclusion of the incrementality requirement would add unreasonable costs and uncertainty for clean hydrogen producers and users. Manufacturers in the U.S. would need expedited permitting of clean energy projects and transmission infrastructure for the 45V framework and broader U.S. hydrogen deployment to be successful. The proposed three-year timeframe of incrementality is unreasonable, because the average time to move through the interconnection queue is closer to five years.[3] Under the proposed credit, manufacturers would no longer be able to utilize older, yet fully functional, clean electricity generating facilities or renewable natural gas production facilities. By preventing clean energy generation over three years old from qualifying for the tax credit, clean hydrogen will become more costly to produce. Manufacturers also strongly encourage Treasury to allow existing nuclear and hydropower to qualify, as these sources make up nearly 25% of the U.S. power generation.[4]

Temporal-Matching

Temporal matching or time matching could prevent manufacturers from claiming the 45V credit despite using EACs to power their facilities. Treasury should allow manufacturers to claim the credit without the need for time matching as it will help the growth of clean energy generation. Requiring strict temporal matching does not reflect how the clean power generation sector operates, particularly for solar and wind. While solar and wind power at a given facility cannot feasibly be produced 24 hours a day, we need to ensure there is 24 hour on-demand production of hydrogen to decarbonize. To do otherwise would render the provision unusable for any industrial facility that runs nonstop. This would also harm other industrial producers that run their operations continuously for safety, operational and efficiency reasons. The proposed hourly time matching implementation date of 2028 is too early as facilities would not have adequate time to adapt their investments to meet the requirement. The DOE states “time may be required to allow development of the necessary EAC tracking infrastructure and verification

[3]Energy Markets & Policy - Berkley Lab, https://emp.lbl.gov/queues
[4] U.S. Energy Information Administration, https://www.eia.gov/tools/faqs/faq.php?id=427&t=3

process"[5] further proving the need for an extension. The NAM requests that Treasury pushes back the date to at least 2032 to allow a more reasonable timeframe to adjust to the proposed regulations.

Deliverability

To meet this requirement, manufacturers would need to find new sources of EACs within their region or would need to build new power generation or renewable natural gas production facilities in their region, which would again require extensive permitting to bring the clean energy projects online. The NAM requests the final guidance recognize EACs from other regions that can deliver electricity or renewable natural gas into the region in which the hydrogen production process is located as qualifying under the 45V credit, thus incentivizing manufacturers to continue to use clean energy across the U.S. Alternatively, the NAM proposes that the region requirement should include those that have interconnected power grids or gas pipelines as qualifying for "in region."

Lower Carbon Intensity Feedstocks

The proposed regulations and the GREET model set several key data inputs to the 45VH2-GREET model as a fixed, default number that cannot be changed. Examples of these fixed, default numbers, or "background data" include upstream methane losses, the distance of a natural gas pipeline, emissions associated with natural gas production, etc. Using this locked in default number does not recognize the investments companies have made, and will continue to make, to lower upstream and midstream CO2 and methane emissions and resulting CI of the natural gas supply chain. Failure to recognize the lower CI of natural gas used to produce hydrogen will discourage investment and will disincentivize companies to reduce upstream fugitive methane and CO2 emissions that are critical to reaching net-zero goals. There are credible and trusted methane emissions certification standards, including MiQ certificates, that have processes to verify that natural gas has been produced with technologies and processes that minimize methane emissions to rates well below industry averages. These programs provide a certified methane intensity that could be incorporated easily into the GREET model.

The EPA also has the tools in place to verify the lower CI of natural gas. These mandatory programs allow the government to ensure hydrogen producers are reporting their GHG emissions accurately. The EPA created the Greenhouse Gas Reporting Program in 2009 to require the reporting of all direct and indirect CO2 equivalent industrial emissions above a certain threshold.

Subpart W of the GHGRP is the reporting requirement specifically for petroleum and natural gas industry emissions. It covers the GHG emissions from a wide range of operations and equipment, including wells, natural gas gathering lines and processing facilities, storage tanks, and transmission and distribution pipelines.

To further enhance the data reported under Subpart W of the GHGRP, the Methane Emissions Reduction Program was created as part of IRA of 2022 and is an important verification mechanism for Treasury to consider. The MERP will require oil and gas producers to

[5] Assessing Lifecycle Greenhouse Gas Emissions Associated with Electricity Use for the Section 45V Clean Hydrogen Production Tax Credit, https://www.energy.gov/sites/default/files/2023-12/Assessing_Lifecycle_Greenhouse_Gas_Emissions_Associated_with_Electricity_Use_for_the_Section_45V_Clean_Hydrogen_Production_Tax_Credit.pdf

start reporting methane emissions based on empirical data (versus estimates based on measurable factors) to better reflect methane emissions. The EPA has stated that the emissions data reported by producers under Subpart W is verified by "thousands of checks."[6]

A hydrogen producer can take the emissions data reported under these federal programs and use the internationally agreed upon guidelines for the quantification and reporting of the carbon intensity of a product, (via ISO 14067) to convert the data into the appropriate measurement to be used as foreground data for the GREET model. Using an approved, internationally recognized standard ensures there is consistency and provides ease for verification (which is already required in the statue). Given that the MERP will now require the methane emissions data reported under Subpart W to be based on empirical data and the EPA verifies this data, hydrogen producers should be allowed to modify the CI of natural gas in the GREET model for their bespoke natural gas.

Another area in which the GREET model locks background data is co-product steam. Hydrogen produced with natural gas generates hydrogen and CO2 and can also generate co-products, such as steam. The GREET model acknowledges steam produced by the hydrogen production process if it is a result of a necessary part of the production process.

The GREET model allows users to input the amount of co-product steam created (subject to limits), but only for certain reforming processes or pathways. Under the 45V proposed guidance, the GREET model and the DOE's user manual allow only reforming pathways without carbon capture and storage to account for co-product steam created in the well-to-gate emissions of the hydrogen produced. The GREET model does not allow any quantity of steam to be accounted for if the hydrogen is produced using a reforming pathway with CCS. The reasoning provided in the DOE user manual is that the model assumes all steam generated will equal the amount of steam necessary to power the CCS equipment and thus there is no valorized co-product steam created. The proposed guidance's limitation of steam only to pathways without CCS creates a significant disparity and an unlevel playing field for a tax credit intended to be technology neutral.

The GREET model only includes one type of CCS technology called amine, which requires a large amount of steam to power the CCS equipment. The GREET model's assumption that any steam generated in the hydrogen production process is used by the CCS equipment is generally correct for amine CCS technology. However, the GREET model does not recognize other efficient CCS technologies that exist today. Cryogenic CCS processes, which use refrigeration powered by electricity, can have higher overall efficiency and negligible steam requirements when compared to more traditional amine-based processes included in the GREET model. For cryogenic processes, because they are powered by electricity, the steam created as part of the hydrogen production process is not fully used by the CCS equipment and thus co-product steam is produced. In other words, the GREET model's assumption that there is no steam co-product for production pathways using CCS fails to account for the efficiencies found in newer CCS technologies. The co-product steam produced from a natural gas pathway with cryogenic CCS technology is measured by a metering system the exact same way steam is measured for a natural gas pathway without CCS. The co-product steam produced in both pathways is produced in the well-to-gate hydrogen production process and can be used to reduce GHG emissions in other processes across the facility. Producers should be able to

[6] Greenhouse Gas Reporting Program, Report Verification, https://www.epa.gov/sites/default/files/2017-12/documents/ghgrp_verification_factsheet.pdf

capture the benefit of their more efficient processes and account for co-product steam produced during the hydrogen production process.

Treasury should continue to emphasize a technology and feedstock neutral approach to drive hydrogen deployment. As such, use of renewable natural gas should be allowed with mass balancing for processes that use RNG. A robust and transparent monitoring, reporting and verification system already exists within the RNG industry today.

Provisional Emission Rate

The proposed timing for the PER application submission being after the completion of FEED (front end engineering design) can be far too late in the project process for the certainty a project needs. Taxpayers developing capital-intensive projects spend significant time analyzing and selecting a specific technology or facility design concept, often referred to as Pre-FEED. When the Pre-FEED process is complete, it signifies the project's design or technology will no longer be altered. The project then progresses into FEED. During FEED, final engineering is completed on the basis that design work is finalized and the project scope is frozen. Waiting until after FEED to submit the PER application can delay or eliminate the taxpayers' ability to progress a project that aligns with standard project assurance and auditing processes, resulting in a potential project delay. The PER application timing at the end of FEED would also complicate and delay the ability to order long lead items, which taxpayers must order prior to making final investment decisions. Given the uncertainty of the PER process for a given project, waiting for a PER outcome could further delay execution and onstream dates. The credit should be pragmatic and allow timing for the PER application at either the completion of pre-FEED or after the completion of FEED to allow project developers maximum flexibility.

GREET Model

Under the proposed guidance, taxpayers would be required to calculate the annual GHG emissions rate of the hydrogen produced using the latest version of the 45VH2 GREET model publicly available on the first day of the taxable year for which the credit is claimed.[7] Notwithstanding this requirement, if an updated 45VH2 GREET model is made available publicly during the taxable year, the taxpayer would be permitted to elect to calculate its annual emissions using the more recent version of the model. Similarly, a taxpayer that has received—or has submitted a petition for—a PER would be required instead to use the 45VH2 GREET model if its hydrogen production pathway is added to the model during the taxable year for which the credit is claimed.

The DOE user manual notes that the 45VH2 GREET model is expected to be updated on an approximately annual basis.[8]

Regular updates to the 45VH2 GREET model will ensure the model can account properly for new process developments and technologies in the burgeoning hydrogen sector. However, the uncertainty associated with annual adjustments to established background data parameters significantly hinders taxpayers' ability to make project cost estimates and long-term

[7] Prop. Treas. Reg. §1.45V-1(a)(8)(ii).
[8] U.S. Department of Energy Guidelines to Determine Well-to-Gate Greenhouse Gas (GHG) Emissions of Hydrogen Production Pathways using 45VH2-GREET 2023 at 7, https://www.energy.gov/sites/default/files/2023-12/greet-manual_2023-12-20.pdf (Dec. 2023)

economic projections. The process of designing, financing, and constructing capital-intensive hydrogen facilities takes several years. Attracting investment to these multi-billion-dollar projects will be significantly more difficult, if possible at all, where the taxpayer must rely on an annually revised emissions model and corresponding fluctuations in the 45V credit.

Such unpredictable shifts in the 45VH2 GREET model are inconsistent with Congress' longstanding reliance on the beginning-of-construction date with respect to energy tax credits, including 45V. Fundamental to the 45V credit eligibility, as well as prevailing-wage and apprenticeship requirements, is the date on which construction began on the facility.[9] Locking in these components at the time when the project begins significant construction efforts provides taxpayers with the necessary certainty to make long-term investments in clean-energy projects. In contrast, the 45VH2 GREET model, as proposed, will continue to be modified regularly throughout the taxpayer's planning, construction, and operation of the hydrogen facility. Without certainty concerning the emissions model used to determine the annual credit value once the facility is placed in service, the taxpayer will have no way of knowing if its hydrogen production process will remain viable economically throughout the facility's lifespan. Moreover, the predictability of the resulting annual cash flows from the production process will be determinative of whether the project can achieve a final investment decision at the outset.

In keeping with the overall design of the 45V credit, taxpayers should be permitted to elect to use, throughout the duration of the 10-year credit period, the version of the 45VH2 GREET model that was available publicly on the first day of the taxable year for which the construction of the hydrogen facility began. Similarly, taxpayers that determine the credit based on a PER should be permitted to elect to use the emissions value obtained from the DOE to file the PER petition throughout the duration of the credit period, regardless of whether the pathway is added subsequently to an updated 45VH2 GREET model. While this proposed modification would lock in the version of the emissions model for the entire 10-year period, the credit value would still be redetermined on an annual basis, thereby fully accounting for the emissions effects of any year-to-year modifications in feedstock, electricity consumption, or other foreground-data values.

To ensure that the hydrogen production credit under 45V achieves its intended clean energy and climate objectives, Treasury and the IRS should state in the final regulations that taxpayers may rely on the 45VH2 GREET model that relates to the beginning of the hydrogen facility's construction for the duration of the 10-year credit period. Such long-term certainty for taxpayers, while maintaining the proposed annual emissions certification requirements, will ensure the viability of critical investments in transformative hydrogen projects.

Conclusion

Manufacturers depend on access to reliable and affordable energy to create jobs, develop new technologies, scale up and expand and our industry is increasingly relying on hydrogen energy. Hydrogen can be produced from a variety of U.S. domestic resources, such as natural gas, nuclear, biomass and renewable power like solar and wind. To decarbonize energy-intensive industries while ensuring manufacturers in America can continue leading our economic growth, we must work quickly to bring down the cost of U.S. hydrogen production.

[9] I.R.C. §45V(c)(3) and (e)(2).

Boosting hydrogen production can also help secure America's place as a global leader on clean, reliable and affordable energy. As proposed, the hydrogen tax credit would discourage manufacturers from innovation and investment in the hydrogen industry, as the requirements are unfeasible and costly in their current state.

Sincerely,

Brandon Farris
Vice President, Domestic Policy