

February 26, 2024

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

The Honorable Secretary Janet Yellen
U.S. Department of Treasury
1500 Pennsylvania Avenue NW
Washington, D.C. 20220

The Honorable William M. Paul
Acting Chief Counsel
Internal Revenue Service
1111 Constitution Ave, NW
Washington D.C., 20224

Re: Notice of Proposed Rulemaking, Section 45V Credit for Production of Clean Hydrogen; Section 48(a)(15) Election to Treat Clean Hydrogen Production Facilities as Energy Property

Dear Secretary Yellen and Acting Chief Counsel Paul,

The Renewable Thermal Collaborative (RTC) appreciates the opportunity to submit comments in response to the Department of Treasury REG–117631–23.

The RTC is a global coalition of companies, institutions, and governments committed to decarbonizing thermal energy use by scaling up renewable heating and cooling technologies at their facilities. It was founded in 2017 and is facilitated by the Center for Climate and Energy Solutions, David Gardiner and Associates, and the World Wildlife Fund. RTC members and sponsors include many companies in the U.S. and the world across a diverse range of industries, including leaders in the food and beverage, pharmaceutical, consumer packaged goods, paper, chemical, higher education, building materials, and automotive sectors. RTC members include global industrial and institutional energy users representing more than \$3 trillion in market capitalization. The RTC also includes various solutions providers and experts, including renewable thermal technology developers, project financiers, consultants, utilities, and more.

The industrial sector is the third largest source of greenhouse gas (GHG) emissions in the United States after electricity and transportation, accounting for approximately 24% of the total U.S. emissions. Over half of the industrial sector's emissions come from fossil fuel combustion to generate process heat and operate industrial motors.

Green hydrogen, produced by electrolysis using renewable electricity, is critical in decarbonizing heavy industries. Hydrogen is often used as a reaction agent or feedstock to produce commonly used

chemicals and materials, including metals, glass, fertilizer, etc. Hydrogen, with its high heating value and high flame temperature during combustion, is also essential to decarbonize high-heat industrial processes, such as manufacturing steel, chemicals, and cement. The RTC convenes a Green Hydrogen Working Group for energy buyers, solutions providers, and other key stakeholders to better understand the technical and economic potential for scaling green hydrogen for industrial process heat and identify concrete joint actions, including policy engagement, market development, and pilot projects to scale green hydrogen.

Overview of RTC's Comments

The Inflation Reduction Act's Section 45V Clean Hydrogen Production Credit has the potential to significantly lower the production cost of green hydrogen. It could make green hydrogen more cost-competitive than fossil-based hydrogen in the U.S. and natural gas in some states¹. The tax credits will be critical to accelerate the development and deployment of clean hydrogen for various use cases.

The three pillar framework of incrementality, temporal matching, and deliverability in the proposed rulemaking mark a significant step towards ensuring the IRA clean hydrogen production tax credit meaningfully contributes to emissions reduction, enhances U.S. leadership in clean and competitive manufacturing, supports decarbonization of the U.S. electricity grid, and provides U.S. taxpayers the best value for their tax dollars. However, meeting these requirements is still challenging for clean hydrogen producers in the near term. Getting the highest level of tax credit is essential for them to compete with the fossil alternative, accelerate the decarbonization of the hydrogen industry, and scale green hydrogen as a decarbonization solution for other sectors.

Setting attainable and predictable eligibility rules is critical in getting clean hydrogen off the ground. Therefore, the RTC recommends 1) providing long-term certainty on the GREET model, 2) creating additional flexibility for the three pillars of electrolytic hydrogen, and 3) supporting the proper use of Renewable Natural Gas (RNG) for hydrogen production with environmental integrity.

GREET Model

Most green hydrogen projects currently under planning and development need to demonstrate long-term (e.g., ten years) financial viability to secure the investment. The 45VH2-GREET model being updated annually creates substantial uncertainty for a hydrogen producer's eligibility for and amount of 45V credit. While many of the challenges for hydrogen producers may be resolved through careful planning, REC procurement strategies, insurance products, and hedge agreements, this uncertainty cannot be mitigated.

Therefore, the RTC recommends that Treasury adopt the 45VH2-GREET model of the year a hydrogen facility starts construction for the full 10-year tax credit. Hydrogen producers should then have the right, but not the obligation, to elect to adopt future versions of the 45VH2-GREET model for the remainder of the credit period. We note that the beginning of construction is a more suitable milestone than placed-

¹ "The Renewable Thermal Vision", Renewable Thermal Collaborative, November 2022.
<https://www.renewablethermal.org/vision/>

in-service since construction periods can span tax years, which could result in a new GREET model taking effect during construction, posing a risk to investors who have committed capital before construction.

Temporal matching and Incrementality of Electrolytic Hydrogen

1. Temporal matching

Early green hydrogen projects still face challenges related to hourly matching, including an underdeveloped hourly-matching tracking system, lack of access to additional renewable assets to meet the hourly matching requirements, and the cost premium of hourly-matched electricity etc. These challenges could significantly delay the urgently needed investment and progress to scale green hydrogen.

The RTC recommends that Treasury extend the phase-in year of hourly matching from 2028 to 2030 to allow grid infrastructure, electricity market, and tracking system to fully develop and be ready to offer cost-competitive hourly matched electricity.

To support early projects, the RTC also recommends that for clean hydrogen projects placed in service before 2030, Treasury issue the tax credit to the specific volumes of hydrogen that meet the temporal matching requirements rather than according to the average lifecycle GHG emissions rate of all hydrogen produced at a qualified clean hydrogen production facility on an annual basis. Hydrogen projects need to demonstrate long-term financial viability to secure investment. Therefore, even with the phase-in period, projects must show they can meet the temporal matching requirements from the beginning. Granting the tax credit on a volume basis would allow early hydrogen projects the flexibility to determine the levels of hourly matching that make financial, infrastructure, and business sense and the long-term certainty to secure the investment they urgently need to accelerate the growth of the clean hydrogen industry. Hydrogen producers should have the right but not the obligation to switch to a facility average at any point for the remainder of the credit period. For projects placed in service after the beginning of 2030, tax credits should be issued according to the average lifecycle GHG emissions rate of all hydrogen produced at a qualified clean hydrogen production facility on an annual basis to ensure that the tax credit creates incentives for new clean hydrogen projects.

For projects placed in service after the beginning of 2030, the RTC recommends a 5% fixed allowance for non-hourly matched low-carbon electricity to allow for grid operation uncertainties. Analysis also shows that the cost increases drastically to meet the last 5-10% of the hourly matching requirement². This would help clean electrolytic hydrogen become more cost-competitive while meaningfully contributing to decarbonizing the electricity grid.

Energy storage is critical to lower the cost of hourly matching. Behind-the-meter energy storage directly modifies the load of a hydrogen production facility, i.e., the electricity load would reduce when using the battery. The RTC recommends that off-site energy storage be considered a load modification as part of a clean energy portfolio that taxpayers can use to comply with hourly matching requirements.

² “Decarbonizing the grid with 24/7 clean power purchase agreements”, McKinsey&Company, May 2022. <https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/decarbonizing-the-grid-with-24-7-clean-power-purchase-agreements>

2. Incrementality

The RTC recommends that Treasury determine incrementality based on the placed-in-service date of an electrical generation facility and not its commercial operations date. This would align section 45V with other credits related to the energy transition, including the production tax credit for electricity produced from certain renewable resources under section 45 and the clean electricity production credit under section 45Y.

Additionally, the RTC recommends that repowering consistent with rules under sections 45 and 45Y should be eligible for incrementality. Repowered facilities where older units of electricity generation assets such as wind turbines are replaced with new, higher capacity equipment may receive a new placed-in-service date if the “80/20 rule” is met. This rule allows previously placed-in-service energy property to qualify as newly placed-in-service for tax credit purposes so long as the retrofitted energy property is not more than 20% of the facility's total fair market value. Facilities treated as newly placed-in-service under sections 45 and 45Y should also be considered as newly placed-in-service for purposes of incrementality under 45V. An incrementality requirement based on a facility’s placed-in-service date would align section 45V with other energy transitions and ease the administration of such credits.

Long permitting and approval processes and interconnection queues for new renewable projects create risks for clean hydrogen projects to meet the incrementality requirements. The RTC recommends that Treasury extend the incrementality requirements for the placed-in-service date of the electricity generating facility from 36 months to 48 months before the hydrogen production facility is placed in service.

As Treasury points out, negative wholesale prices increased from 2.3% of hours in 2018 to 6.3% in 2022—a nearly 30% average annual increase. At this recent growth rate, negative wholesale prices will reach over 10% of hours 2024. The RTC recommends increasing the 5% fixed allowance for generation from existing low-carbon electricity generators to 10% to better reflect likely futures over the term of the incentive.

Lastly, because the grid will continue to decarbonize, Treasury should create mechanisms to ensure that a sufficiently decarbonized grid meets the incrementality requirement in the future.

Renewable Natural Gas (RNG) for Hydrogen Production

Using RNG as a feedstock is a viable pathway to decarbonize hydrogen production. However, According to RTC’s analysis, RNG could meet 2% of total natural gas demand in the U.S. in 2040, about 875 TBtu, most of which will go to gas utilities and be directly used in commercial and industrial sectors.³ Given the energy loss in converting RNG to hydrogen, it is more efficient to supply the limited RNG to sectors that can use it directly. If the Treasury decides to allow other sources of RNG beyond landfill gas under the 45V tax credit, the RTC recommends the following to ensure it delivers genuine climate benefits and supports the growth of the RNG market.

³ “The Renewable Thermal Vision”, Renewable Thermal Collaborative, November 2022.
<https://www.renewablethermal.org/vision/>

1. Carbon Intensity of RNG

Land use change emissions, including deforestation and losses of other land classes such as wetlands and grasslands, must be included in the GREET model. The Treasury should incorporate accounting rules aligned with the [Greenhouse Gas Accounting Protocol Land Sector and Removals Guidance](#). Land use change can be considered negligible only when the source of the RNG is a waste product (e.g., food or animal waste) that has no other market value than the production of RNG.

Treasury should carefully consider whether to allow negative carbon intensity scores regardless of the counterfactuals included in the GREET model for assessing the lifecycle GHG emissions of RNG-produced hydrogen. The negative carbon intensity of some RNG would create a perverse incentive in favor of conventional natural gas hydrogen production. We are extremely concerned that negative carbon intensity scores of some RNG would allow conventional natural gas hydrogen producers to receive a higher level of tax credits without meaningfully decarbonizing their production. This would undermine the intention of the tax credit to scale clean hydrogen production pathways. To prevent this perverse outcome, Treasury should consider not allowing negative carbon intensity scores or blending RNG with conventional natural gas for hydrogen production.

2. First Productive Use

Treasury anticipates requiring that any RNG used to produce hydrogen must be from the “first productive use” of the RNG in order to qualify for the section 45V credit. Treasury further proposes to define “first product use” of RNG as “the time when a producer of [RNG] 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.”

The RTC recommends that Treasury provide flexibility to better reflect the realities of the differing project development timelines of RNG and hydrogen facilities. Hydrogen production facilities likely have longer financing, construction, and commissioning timelines than RNG facilities. Tying the two facilities together by requiring they both begin production in the same taxable year would unnecessarily hinder the ability of RNG producers to capture methane emissions that would be released into the atmosphere in the absence of the RNG facility. Treasury could provide flexibility by allowing RNG to meet the definition of “first productive use” if the RNG offtake agreement is signed no more than 36 months prior to the beginning of hydrogen production.

3. Book-and-Claim Systems

The RTC supports the use of book-and-claim chain of custody systems under Section 45V to enable hydrogen production facilities to link the volumes of RNG produced and injected into the pipeline system on their behalf with the volumes of hydrogen produced. This will ensure that RNG produced for generating hydrogen is truly incremental to the volumes of RNG already in production in the U.S.

Book-and-claim systems are particularly useful given the interconnected nature of the U.S. interstate natural gas transportation grid. Once methane (fossil-derived or RNG) enters the interconnected pipeline grid, one cannot reliably track where individual molecules of methane will ultimately be

consumed. With book-and-claim accounting, volumes of RNG injected into the grid are documented and compared to volumes of natural gas withdrawn by the end-user. Treasury should further research the need for geographic boundary requirements on RNG book-and-claim to confirm whether there would be different emissions impacts across geographies.

M-RETS is an example of an existing electronic certificate tracking system that can readily support book-and-claim accounting on behalf of a hydrogen production facility. With M-RETS, a unique digital certificate is assigned to the volumes of RNG produced, which the hydrogen production facility can then retire during hydrogen production, thus ensuring no volumes of RNG can be double-counted. Utilizing a book-and-claim chain of custody system via the M-RETS platform or other electronic tracking systems will enable hydrogen producers to confirm that additional volumes of RNG are being produced and injected into the pipeline grid on behalf of the hydrogen producer.

The RTC looks forward to working collaboratively with Treasury to develop practical rules governing tax credits for RNG-produced hydrogen. The twelve questions Treasury posed in the proposed rulemaking indicate the complexity of the RNG production, value chain, and environmental integrity concerns. The RTC urges Treasury to work with key stakeholders as the Treasury evaluates the responses to the twelve questions and finalizes the rules for RNG under the 45V clean hydrogen production tax credit.

Conclusion

Green hydrogen will be an important component of a clean energy economy and a net-zero future. The RTC strongly supports the incentives provided under Section 45V of the Inflation Reduction Act. We appreciate the opportunity to provide input as the Treasury implements this landmark climate and energy legislation, and we are happy to answer any questions or provide any follow-up information that may be helpful.

Sincerely,

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