US TREASURY DEPARTMENT RELEASES PROPOSED SECTION 45V HYDROGEN TAX CREDIT REGULATIONS

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On 22 December 2023, the US Treasury Department (Treasury) released the highly anticipated Proposed Regulations relating to the Clean Hydrogen Production Credit (hydrogen credit) under the US Internal Revenue Code of 1986, as amended (the Code),[1] Section 45V (Proposed Regulations).[2] We provide a high-level overview of the Proposed Regulations below.

The Proposed Regulations would define key terms, such as "lifecycle greenhouse gas emissions," "qualified clean hydrogen," "provisional emissions rates," and "qualified clean hydrogen production facility." Treasury proposes rules for:

- Determining lifecycle greenhouse gas (GHG) emissions rates resulting from hydrogen production processes;
- Petitioning for provisional emissions rates;
- Verifying hydrogen production and sale or use of clean hydrogen via an unrelated, qualified verifier;
- Modifying or retrofitting existing qualified clean hydrogen production facilities;
- Using electricity from certain renewable or zero-emissions sources to produce qualified clean hydrogen;
- Electing to treat part of a specified clean hydrogen production facility instead as property eligible for the energy credit; and
- Determining the service date for modified and retrofitted facilities.

The rules would include designation of the applicable Greenhouse gases, Regulated Emissions, and Energy use in Transportation (GREET) Model. These rules, if adopted, would greatly inform the feedstock eligibility criteria for qualifying clean hydrogen, and likely will have a dramatic impact on the development at-scale of the hydrogen value chain in the United States. Treasury is seeking further comments on many topics that will inform the final regulations.

CREDIT CALCULATIONS

As set forth in the Inflation Reduction Act (IRA),[3] the hydrogen credit amount depends on the lifecycle GHG emissions rate of the hydrogen production process at a qualified clean hydrogen production facility during the

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taxable year. The base credit rate is set at $0.60 per kilogram of hydrogen, adjusted annually for inflation, and has an eligibility period of 10 years after the facility is placed in service.[4] Facilities that meet the prevailing wage and apprenticeship requirements are eligible for an additional 5x multiplier of the applicable base credit amount.[5]

The applicable percentage of the base credit for which a hydrogen producer is eligible varies depending on the GHG emissions rate associated with the clean hydrogen product:

- 20% for emissions above 2.5 but not exceeding 4 kg of CO2e/kg of hydrogen;
- 25% for emissions between 1.5 and 2.5 kg of CO2e/kg;
- 33.4% for emissions between 0.45 and 1.5 kg of CO2e/kg; and
- 100% for emissions less than 0.45 kg of CO2e/kg.[6]

The Proposed Regulations would provide additional specificity on the prevailing wage and apprenticeship requirements that must be met to qualify for the 5x multiplier, which allows for a total credit of up to $3.00 per kilogram of hydrogen produced.[7] Qualified facilities that have started construction before 29 January 2023 must satisfy the prevailing wage requirements for any alterations or repairs of the facility that occur after 29 January 2023 and that fall within the 10-year period after the facility has been placed in service. For construction of a facility that begins after 29 January 2023, both the prevailing wage and apprenticeship requirements of Section 45(b) must be met. As such, prevailing wage rates will be determined in accordance with the Davis-Bacon Act and are based on prevailing rates within the locality in which the facility is located. For instances of noncompliance with the prevailing wage and apprenticeship requirements, the preamble of the Proposed Regulations explains that similar penalties will be imposed and opportunities to cure will be available.

GREET MODEL

Under the IRA, the calculation of lifecycle GHG emissions will include all upstream emissions from “well-to-gate,” (i.e., through the point of production). The preamble of the Proposed Regulations provides that this would include all emissions associated with feedstock growth, gathering, extraction, processing, and delivery to the qualified facility. Emissions associated with the hydrogen production process, such as electricity used by the hydrogen production facility and any capture and sequestration of carbon dioxide generated by the hydrogen production facility, would also be included.

The IRA deferred to Treasury on whether to rely on the GREET Model, or alternatively, adopt a “successor” model to calculate lifecycle GHG emissions. Treasury has opted to adopt a successor GREET Model and proposes using the 45VH2-GREET Model developed by Argonne National Laboratory, which has been purpose-built for the hydrogen credit.[8] The 45VH2-GREET Model is available here.

Notably, the version of the 45VH2-GREET Model that is in effect at the time the facility is placed into service may not apply throughout the lifetime of the qualified facility. For each year of production, the latest version of the 45VH2-GREET Model that is publicly available on the first day of that tax year would apply.[9] However, the taxpayer would have discretion to use a model released later in the year. Therefore, taxpayers must ensure they continue to qualify for the hydrogen credit each year and at the same tier of the hydrogen credit as intended.

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The 45VH2-GREET Model includes various hydrogen production pathways. As of the publication date of the Proposed Regulations, the 45VH2-GREET Model includes:

- Steam methane reforming (SMR) of natural gas, with potential carbon capture and sequestration (CCS);
- Autothermal reforming (ATR) of natural gas, with potential CCS;
- SMR of landfill gas with potential CCS;
- ATR of landfill gas with potential CCS;
- Coal gasification with potential CCS;
- Biomass gasification with corn stover and logging residue with no significant market value with potential CCS;
- Low-temperature water electrolysis using electricity; and
- High-temperature water electrolysis using electricity and potential heat from nuclear power plants.

CCS technologies are featured prominently in the 45VH2-GREET Model as a means to produce qualifying clean hydrogen. However, taxpayers are not permitted to take both the Section 45V hydrogen credit and the Section 45Q carbon capture credit. Taxpayers modifying or retrofitting facilities to produce clean hydrogen who are planning to take the hydrogen credit should make sure that no Section 45Q carbon capture credit was claimed on the facility in prior years. The Proposed Regulations request comments on mechanisms to verify emissions related to hydrogen production from upstream fossil-fuel- and biomass-powered electricity-generation facilities that include CCS technologies.

For taxpayers using production pathways or hydrogen production technologies that are not included in the 45VH2-GREET Model, the Proposed Regulations would permit those taxpayers to petition the Secretary of Treasury for a provisional emissions rate (PER) that would be analogous to the lifecycle GHG emissions rate calculated using the 45VH2-GREET Model.[10] Such PER would only be allowed as long as the production pathway was not included in the annual 45VH2-GREET Model.

VERIFICATION PROCESS OF HYDROGEN PRODUCED USING ELECTRICITY

To confirm that the electricity used in hydrogen production is sourced from renewable or zero-emission sources, taxpayers may use Energy Attribute Certificates (EACs), including Renewable Energy Certificates (RECs) and other zero-emission attribute certificates, such as those associated with nuclear power generation. The Proposed Regulations would impose three new criteria for EACs to qualify for purposes of the hydrogen credit, sometimes indicated as the “three pillars”:

1. Incrementality

Clean power generators that began commercial operations within three years of a hydrogen facility being placed into service are considered new sources of clean power under the Proposed Regulations. Uprates are also considered new sources of clean power. The Proposed Regulations request comments on approaches by which generation from existing clean power generators could be considered to meet the requirements for new clean

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power under certain circumstances, which will be particularly relevant for existing nuclear generating facilities, and may also include re-powering existing renewables, or renewables that otherwise would be removed from service at the end of a power purchase agreement term. The Proposed Regulations allow for the purchase of "unbundled" EACs, which are sold separately from the underlying electricity produced by the generator.[11]

2. Deliverability

Clean power must be sourced from the same region as the hydrogen producer, as derived from the Department of Energy's 2023 National Transmission Needs Study. The Proposed Regulations request comments on how to consider transmission of clean power between regions.[12]

3. Temporal Matching

EACs will generally need to be matched to production on an hourly basis—meaning that the claimed generation must occur within the same hour that the electrolyzer claiming the hydrogen credit is operating.[13] Considering the high costs of hourly matching, the Proposed Regulations include a transition phase to allow annual matching until 31 December 2027.[14] The preamble of the Proposed Regulations provide that the transition is intended to provide time for the EAC market to develop the hourly tracking capability necessary to verify compliance with this requirement.

The Proposed Regulations contain significant detail and analysis of the three pillars, and hydrogen industry participants should review these sections of the Proposed Regulations closely to understand the impacts on potential transactions.

The Proposed Regulations also request substantial comments on how Treasury and the Internal Revenue Service (IRS) should consider the utilization of fossil-fuel- and biomass-derived electric power for the production of hydrogen, specifically requesting comments on, among other things: whether an existing fossil fuel electricity-generating facility that adds CCS technologies should be considered "incremental;" mechanisms to verify accurately real-world emissions related to hydrogen production from these power sources (e.g., feedstock origin, rate of carbon capture); and the extent and manner in which the three pillars (i.e., incrementality, temporal matching, and deliverability) should be applied in accounting for existing or new electricity generation from fossil feedstocks or biomass.

The breadth and extent of these requested comments impacting electrolytic hydrogen production that would come from upstream fossil-fuel sources, demonstrates the Proposed Regulations' general aversion to fossil-fuel powered electrolytic hydrogen, and likely will further delay the deployment of a robust hydrogen economy in the United States, as the agencies attempt to sort out a path forward.

SERVICE DATE FOR MODIFIED FACILITIES

An existing facility originally in service before 1 January 2023, and not producing qualified clean hydrogen before modification, will be considered newly placed in service on the date the property required for modification is placed in service.[15] This applies only if the modification aims to enable the production of qualified clean hydrogen and does not include mere changes of fuel inputs such as a switch from conventional natural gas feedstock to renewable natural gas. Retrofits of existing facilities may also establish a new in-service date if the fair market value of the used property is not more than 20% of the retrofitted facility's total value.[16]

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HYDROGEN PRODUCED USING RENEWABLE NATURAL GAS (RNG)

The preamble of the Proposed Regulations provides some criteria for producing hydrogen from biogas, including landfill gas, under specific conditions. Treasury and the IRS plan to finalize regulations that would include additional methods for hydrogen production using renewable natural gas and fugitive methane sources, such as coal mine and coal bed methane—though it is clear from the wide-ranging questions the agencies pose that there is a current lack of clarity on how RNG should be treated under the regulations. As a result, companies potentially impacted should provide comments on the issues raised by Treasury.

Written or electronic comments must be received by 26 February 2024, which is 60 days after 26 December 2023, the date in which the Proposed Regulations are scheduled to be published in the Federal Register. A public hearing on the Proposed Regulations is scheduled for 25 March 2024 at 10:00 AM EST.

FOOTNOTES

[1] All "Section" or "§" references herein are to the Code, unless indicated otherwise.

[2] *See* Internal Revenue Serv., Section 45V Credit for Production of Clean Hydrogen; Section 48(a)(15) Election To Treat Clean Hydrogen Production Facilities as Energy Property, 88 Fed. Reg. 89220 (proposed Dec. 26, 2023) (to be codified at 26 C.F.R. pt. 1).

[3] Inflation Reduction Act of 2022, Pub. L. No. 117-169, 136 Stat. 1946.

[4] Prop. Treas. Reg. §1.45V-1(a)(2), 88 Fed. Reg. 89220, 89244 (Dec. 26, 2023).

[5] *Id*. §1.45V-1(b)(1), 88 Fed. Reg. 89246.

[6] *Id*. §1.45V-1(a)(3), 88 Fed. Reg. 89245.

[7] *Id*. §1.45V-1(b)(3), 88 Fed. Reg. 89246.

[8] *Id*. §1.45V-1(a)(8)(ii), 88 Fed. Reg. 89245.

[9] *Id.*

[10] *Id*. §1.45V-4(c)(3), 88 Fed. Reg. 89247-48.

[11] *Id.* §1.45V-4(d)(3)(i), 88 Fed. Reg. 89249.

[12] *Id*. §1.45V-4(d)(3)(iii), 88 Fed. Reg. 89249.

[13] *Id*. §1.45V-4(d)(3)(ii)(A), 88 Fed. Reg. 89249.

[14] *Id*. §1.45V-4(d)(3)(ii)(B), 88 Fed. Reg. 89249.

[15] *Id*. §1.45V-6(a), 88 Fed. Reg. 89251.

[16] *Id*. §1.45V-6(b), 88 Fed. Reg. 89251.

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