



FOCUS ON HYDROGEN: PROPOSED REGULATIONS FOR CLEAN HYDROGEN TAX CREDIT – THE "THREE PILLARS"

The U.S. Department of the Treasury and the Internal Revenue Service have announced new regulations to implement the clean hydrogen production tax credit envisaged under the Inflation Reduction Act of 2022. This briefing provides an overview of the new regulations, focusing on the most important element – the calculation of lifecycle greenhouse gas emissions. The Proposed Treasury Regulations (the Proposed Rules) were announced on December 22, 2023 and will implement the tax credit under Section 45V of the Internal Revenue Code of 1986 (the Code). The full text of the Proposed Rules is available [here](#).

QUALIFIED CLEAN HYDROGEN AND QUALIFIED PRODUCTION FACILITIES

The production tax credit under Section 45V of the Code is available for "qualified clean hydrogen" produced at a new "qualified clean hydrogen production facility" during the ten-year period beginning on the facility's placed in service date.¹

The Code definition of "qualified clean hydrogen" requires that:

- the hydrogen have a production process resulting in lifecycle greenhouse gas emissions ("**Lifecycle GHG Emissions**") of no more than 4 kilograms of CO₂e per kilogram of hydrogen, where Lifecycle GHG Emissions are determined only through the point of production (so-called "well-to-gate" emissions), based on the most recent GREET model;²
- the hydrogen be produced:
 - in the United States or United States territory;

¹ Under the Proposed Rules, a previously placed-in-service hydrogen production facility may be considered a "new" facility for purposes of the Section 45V tax credit under the familiar 80/20 rule. If a facility is retrofitted such that the newly-added components make up at least 80% of the fair market value of the retrofitted facility, then the facility can be treated as being placed-in-service under Section 45V as of the retrofit completion date. Similarly, under the Proposed Rules, an existing facility that was originally placed in service prior to January 1, 2023 but was not equipped to produce qualified clean hydrogen may be modified to produce qualified clean hydrogen and deemed under Section 45V to be placed in service as of the date such modifications are completed.

² Note: "GREET model" means the Greenhouse gases, Regulated Emissions, and Energy use in Transportation model developed by Argonne National Laboratory or any successor model designated by the Secretary of the Treasury.

- in the ordinary course of trade or business of the relevant taxpayer; and
- for sale or use; and
- both the production and sale or use of the hydrogen is verified by an unrelated party.

The Code specifies that a facility is a "qualified clean hydrogen production facility" if:

- it is owned by the taxpayer claiming the credit;
- it produces "qualified clean hydrogen"; and
- its construction is begun before January 1, 2033.

§ 1.45V-1 of the Proposed Rules includes the following additional guidance on the requirements for qualified clean hydrogen and production facilities:

- production "for sale or use" means production for the primary purpose of making hydrogen ready and available for sale or use. Storing hydrogen following its production is not in and of itself disqualifying;
- the owner of the production facility at the time the qualifying clean hydrogen is produced is the taxpayer entitled to claim the credit. There is no requirement for the taxpayer to qualify as a "producer" under the Code or any other applicable law, and the Explanation of Provisions notes that this approach is intended to provide clarity and avoid issues in the context of tolling and manufacturing arrangements;
- a "facility" is a single production line producing qualified clean hydrogen and includes all components of the production line and property that function interdependently; components are considered to function interdependently to produce hydrogen if the placing in service of one component is dependent on the placing in service of all other components. However, components that have an additional function beyond the hydrogen production process are still deemed part of the facility. The Proposed Rules further specify that (a) equipment used to condition or transport hydrogen beyond the point of production and (b) electricity production equipment (including any carbon capture equipment related to powering production) do not constitute part of a facility; and
- the "most recent GREET model" is the most recent version of the 45VH2-GREET model that is publicly available on the first day of the relevant tax year in which the hydrogen is produced. However, if a new version of the model subsequently becomes available during the tax year, the taxpayer may elect to use the newer version. This approach means that the amount of credit available per kilogram of hydrogen may vary over the ten-year period during which the tax credit is available. The Proposed Rules specifically request feedback on this approach, noting that an alternative would be to require the Secretary to have made a determination that the new version of the model is an appropriate successor in order for it to apply.

CALCULATION OF THE TAX CREDIT AMOUNT

The Code provides that the amount of the tax credit available per kilogram of qualified clean hydrogen produced is equal to \$0.60 *multiplied* by the applicable percentage, where the applicable percentage is determined based on the amount of Lifecycle GHG Emissions generated per kilogram of hydrogen in the production process during the relevant taxable year, as follows:

- 20% for per kilogram Lifecycle GHG Emissions of between 2.5 – 4 kilograms CO₂e;
- 25% for per kilogram Lifecycle GHG Emissions of less than 2.5 but greater than or equal to 1.5 kilograms CO₂e;
- 33.4% for per kilogram Lifecycle GHG Emissions of less than 1.5 but greater than or equal to 0.45 kilograms; and
- 100% for per kilogram Lifecycle GHG Emissions of less than 0.45 kilograms CO₂e.

If the "prevailing wage and apprenticeship requirements" are also met, the maximum possible credit amount is increased fivefold from \$0.60 to \$3.00 per kilogram of clean hydrogen, and thus the tax credit per kilogram of clean hydrogen would be calculated as \$3.00 *multiplied* by the relevant applicable percentage described above.

The calculation of the tax credit is also subject to an annual adjustment for inflation, in accordance with an inflation adjustment factor determined under section 45(e)(2) of the Code (but substituting "2022" for "1992" in section 45(e)(2)(B)).

The Proposed Rules specify that although the tax credit is only available for hydrogen actually produced in the relevant taxable year, the verification requirements may be satisfied in the next taxable year, prior to the relevant filing deadline. The Proposed Rules request feedback as to whether taxpayers consider this verification timing feasible, as well as proposals for possible alternative rules in case taxpayers anticipate not being able to satisfy all verification requirements by the deadline.

The most important aspect of the Proposed Rules relates to the Procedures for Determining Lifecycle Greenhouse Gas Emissions Rates for Qualified Clean Hydrogen set forth in Proposed Treasury Regulation Section 1.45V-4. Again, the amount of the Section 45V tax credit is dependent on the Lifecycle GHG Emissions rate, which is calculated by using the most recent GREET model, or in the case of hydrogen produced for which a Lifecycle GHG Emissions rate has not been determined under the most recent GREET model, by filing a petition for a provisional emissions rate ("**PER**") with the IRS.

QUALIFIED EAC REQUIREMENTS AND THE THREE PILLARS

The Proposed Rules permit a sponsor to reduce the Lifecycle GHG Emissions rate of a hydrogen production facility – and thereby qualify for the Section 45V tax credit when the facility otherwise would not or increase the amount of the Section 45V tax credit – through the acquisition of environmental attribute certificates ("**EACs**"). EACs are tradeable contractual instruments tracked through a registry or account system that are generated to document the production of a unit of electricity (typically a megawatt-hour). Under the

Proposed Rules, certain qualified EACs may be purchased by a hydrogen producer and used to treat the electricity used to generate hydrogen as being from source that generated the EACs.

To be considered a qualified EAC, the EACs must satisfy the requirements of each of the "three pillars" of incrementality, temporal matching, and deliverability. Simultaneously with the release of the Proposed Rules, the U.S. Department of Energy ("DOE") released a white paper setting forth the rationale for these three pillars. Each pillar is summarized below, and the full text of the DOE white paper is available [here](#).

Incrementality:

The incrementality pillar permits EACs to qualify only if they are sourced from "new" renewable energy generation facilities. Under the Proposed Rules, EACs qualify if they are generated by a facility that achieved "commercial operation" no more than 36 months before the hydrogen facility using the EACs was placed in service. EACs may also satisfy the incrementality requirement if they represent the additional incremental capacity of an existing generation facility that was "uprated" to increase its generation capacity within the previous 36 months.

The IRS requested comment on several possible alternative means to satisfy the incrementality requirement that it is considering incorporating into the final rules, although they are not included in the Proposed Rules:

- Whether EACs that are generated by facilities that achieved commercial operation more than 36 months prior to a hydrogen facility being placed in service may nevertheless be deemed to satisfy incrementality if the older generation facility can avoid retirement through the sale of EACs to hydrogen producers.
- Whether there are circumstances in which electricity generated by a generation facility that achieved commercial operation more than 36 months prior to the relevant hydrogen facility being placed in service should be considered incremental if that facility is dedicated exclusively to the hydrogen production facility.
- Whether electricity generated by an older generation facility should be considered incremental if the facility has been modified in the last 36 months in a manner that reduces GHG emissions, such as through the addition of carbon capture and storage capability.
- Whether certain formulaic approaches should be used in determining whether electricity generated by a facility is incremental, such as an approach that would automatically treat deem incrementality satisfied with respect to five percent of the hourly generation from renewable energy generation placed in service before January 1, 2023.

The Incrementality requirements would apply to EACs on day one, as opposed to temporal matching requirements.

Temporal Matching:

The temporal matching pillar set forth in the Proposed Rules imposes an hourly matching requirement for EACs, which mandates that the electricity represented by a qualifying EAC have been generated in the same hour that electricity was used to produce the qualifying clean hydrogen. The hourly matching requirement is intended to ensure alignment between a taxpayer's

generation and the load used for that generation.³ The DOE has noted that an annual matching requirement, which is more typical of current EAC use, is insufficient, as requiring only annual matching can drive induced greenhouse gas emissions due to the large variation in emissions on an hourly, daily, and monthly basis.⁴

Currently, however, there is not widespread availability of hourly tracking systems for EACs, and although such systems are being developed, the DOE and the Proposed Rules' Explanation of Provisions acknowledge that it will take time to achieve broad availability and functionality of such systems across the US.⁵ The Proposed Rules and DOE's analysis note that only two tracking systems⁶ currently offer hourly tracking and that even their tracking software has limited functionality. The Explanation of Provisions notes a number of challenges that the development of such systems will face, including "cost, regulatory approval, interactions with state policy, sufficient stakeholder engagement, data availability and management, and user confusion." The DOE and the Explanation of Provisions also note that, even once functional hourly tracking software is broadly available, more time may be required for the development of efficient trading markets for hourly EACs.

Given the challenges of hourly matching and the anticipated resistance to such a requirement, the Proposed Rules include a transition rule for the temporal matching requirement. This transition rule will apply to EACs corresponding to electricity produced before January 1, 2028. Under the transition rule, the temporal matching requirement will be met as long as the electricity underlying the EAC is produced in the same calendar year as the corresponding electricity is used for production of clean hydrogen. The Explanation of Provisions expressly requests feedback on this transition rule and in particular on the appropriate duration of the transition rule and expected timelines for development of both the hourly tracking systems and the trading markets for hourly EACs.⁷

Deliverability:

The third and final pillar implements a "deliverability" or geographic requirement, meaning the electricity represented by an EAC must be generated by a facility that is in the same "region" as the hydrogen production facility.⁸ The Proposed Rules define the term "region" as "a region derived from the National Transmission Needs Study⁹ that was released by the DOE on October 30, 2023. Alaska, Hawaii, and each U.S. territory will be treated as separate regions."¹⁰

As a general matter, the larger the "region," the easier it would be for a taxpayer to comply with the "deliverability" requirement. The IRS's utilization of the Needs Study to define the term "region" indicates its desire to ensure that the electric generation facility producing an EAC and the hydrogen production facility benefiting from that EAC are, on a relative basis, geographically close

³ See the Explanation of Provisions as well as the DOE whitepaper.

⁴ *Id.*

⁵ *Id.*

⁶ *Id.* These tracking systems are: Midwest Renewable Energy Tracking System, Inc. (M-RETS) and PJM Generation Attribute Tracking System (PJM-GATS).

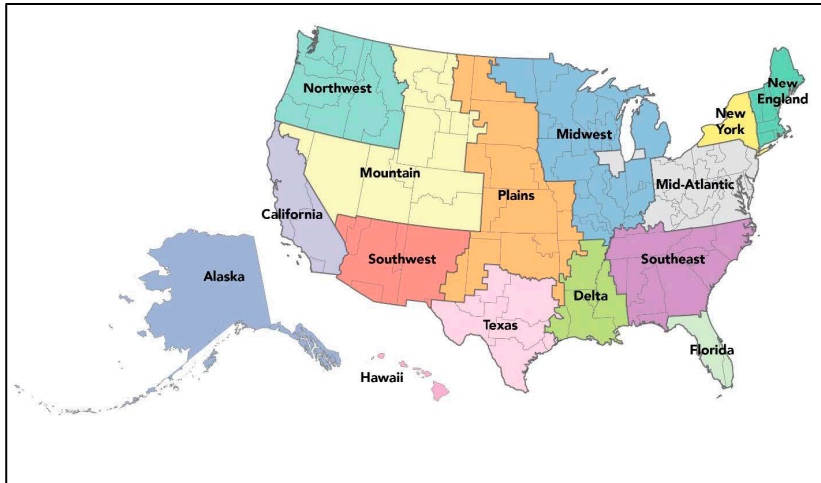
⁷ *Id.*

⁸ Prop. Treas. Reg. Section 1.45V-4(d)(3)(iii).

⁹ The DOE's National Transmission Needs Study (the "**Needs Study**"), is required to be conducted pursuant to Section 216(a)(1) of the Federal Power Act to "identify transmission needs that are currently harming consumers or expected to do so in the future and that could be alleviated by transmission solutions."

¹⁰ Prop. Treas. Reg. Section 1.45V-4(d)(2)(vi).

to one another and roughly conform to the geographic territories of the US's regional transmission organizations and independent system operators, as well as other.



In the lower 48 states, the Needs Study identified 13 different regions. The map inset in this section identifies the 13 regions applicable to the "deliverability" requirement. As an imprecise comparison, NERC has 6 "regional entities" across the lower 48, although this includes regions outside of the US.

The "deliverability" requirement can roughly be viewed as a mitigant for "leakage," a common problem in the carbon offset markets;¹¹ however, the harm that the "deliverability" requirement attempts to mitigate differs from "leakage" in a number of ways.

CONCLUSION

The importance of the "three pillars" cannot be overemphasized. Ease of compliance with the incrementality, temporality, and deliverability requirements will dictate the size and scale of the US hydrogen market. Early indications are that market participants are not pleased with the Proposed Rules, particularly how the "three pillars" have been implemented. The consensus from market participants that seek to take advantage of the Section 45V tax credit is that acquiring EACs that comply with the incrementality, temporality, and deliverability requirements may be impractical or uneconomic, and the Clifford Chance team anticipates that a substantial portion of the public comments will reflect that sentiment.

¹¹ "Leakage is the phenomenon through which efforts to reduce emissions in one place simply shift emissions to another location or sector where they remain uncontrolled or uncounted." W. Aaron Jenkins, Lydia P. Olander, Brian C. Murray, Addressing Leakage in a Greenhouse Gas Mitigation Offsets Program for Forestry and Agriculture, Durham, NC: Nicholas Institute for Energy, Environment & Sustainability, Duke University, March 2009, <https://nicholasinstitute.duke.edu/sites/default/files/publications/offsetseries4-paper.pdf>

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CLEAN HYDROGEN TAX CREDIT
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