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IRS Issues Final Regulations on Clean Hydrogen Tax Credits

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The IRS and the Treasury Department issued final regulations on January 3 (Final Regulations), providing guidance on the clean hydrogen production tax credit under Section 45V (Hydrogen PTC) and the investment tax credit under Section 48 (Hydrogen ITC). The Final Regulations follow the passage of the Inflation Reduction Act of 2022 (IRA), the publication of Notice 2022-58, 2022-47 I.R.B. 483, which requested comments on the Hydrogen PTC and ITC, and proposed regulations addressing the Hydrogen PTC and ITC that were issued on December 26, 2023 (Proposed Regulations). Treasury received more than 30,000 written comments in response to the Proposed Regulations.

The Final Regulations apply to taxable years beginning after December 26, 2023. Taxpayers may choose to apply the Final Regulations for taxable years beginning after December 31, 2022, and on or before December 26, 2023, if they apply the Final Regulations in their entirety and in a consistent manner. Taxpayers may choose to rely upon the Proposed Regulations for taxable years beginning after December 31, 2022, and before January 10, 2025 (the date the Final Regulations were published in the *Federal Register*), provided that taxpayers follow the Proposed Regulations in their entirety and in a consistent manner.

Background

The Hydrogen PTC is available for a 10-year production period at an amount equal to the product of (1) the kilograms of qualified clean hydrogen produced by a taxpayer during a taxable year at a qualified clean hydrogen production facility and (2) an applicable percentage of $0.60, as adjusted for inflation. The applicable percentage, which ranges from 20% to 100%, is based on the lifecycle greenhouse gas (GHG) emissions rate of the process to produce such qualified clean hydrogen, which ranges from 4 to 0.45 kilograms of CO2e per kilogram of hydrogen. The Hydrogen ITC is equal to the basis of a clean hydrogen production facility multiplied by an applicable percentage ranging from 1.2% to 6% depending on the reasonably expected lifecycle GHG emissions rate.

The Hydrogen PTC and ITC rates are multiplied by five if the qualified clean hydrogen production facility begins construction before January 29, 2023 or satisfies applicable prevailing wage and apprenticeship requirements. Section 45V does not provide for domestic content or energy community credit enhancements for the Hydrogen PTC or ITC.

Energy Attribute Certificates

The Hydrogen PTC and ITC depend on the lifecycle GHG emissions of the hydrogen production process. The Proposed Regulations introduced a process by which taxpayers would be required to match energy input to hydrogen production through the acquisition and retirement of energy attribute certificates (EACs). Specifically, taxpayers may treat electricity used by a hydrogen production facility as being from a specific electricity generating facility rather than the regional electricity grid only if the taxpayer acquires and retires a qualifying EAC for each unit of electricity the taxpayer claims from such source. An EAC is a tradeable contractual instrument issued through a qualified EAC registry or accounting system that represents the energy attributes of a specific unit of energy produced. The Final Regulations retain the EAC requirements, regardless of whether the facility is grid-connected, directly connected, or co-located with the hydrogen production facility.

The EAC requirement is the vehicle through which Treasury addressed the so-called “three pillar” requirements of incrementality, temporal matching, and deliverability, intended to prevent an increase of “induced emissions” (i.e., increased emissions in the power generation sector due to diversion of zero- or low-emission energy sources to hydrogen production).

- The incrementality, temporal matching, and deliverability requirements were the subject of intensive discussions and debate leading up to the issuance of the Proposed Regulations and of many comments received by Treasury in response to the Proposed Regulations. They reflect the tension between ensuring that the hydrogen is “clean” and encouraging the development of hydrogen production and infrastructure, which will require significant capital outlays.

The Final Regulations generally retain the three pillar requirements set forth in the Proposed Regulations, with certain clarifications and modifications described below.

Incrementality

Generally, an EAC meets the incrementality requirement if the facility that produced the electricity has a commercial operation date or an uprate (an increase in rated nameplate capacity) that is no more than 36 months before the hydrogen production facility was placed in service. In response to many comments that the short timeline could limit the universe of power plants capable of serving as sources of power for producing clean hydrogen, the Final Regulations include the following significant modifications:

- An EAC may meet the incrementality requirement if the electricity represented by the EAC is produced by a qualifying nuclear reactor (i.e., a nuclear reactor that is either a merchant nuclear reactor or a single-unit plant, meets the average annual gross receipts test related to the Section 45U credit for any two of the calendar years 2017 through 2021, and either has a physical electric connection with the hydrogen production facility or is the subject of a written binding contract under which the owner of a hydrogen production facility agrees to acquire and retire EACs from the nuclear reactor for a fixed term of at least 10 years). Only up to 200 megawatt hours (MWh) of electricity per operating hour per qualifying nuclear reactor may be considered incremental.
    - Taxpayers will be familiar with the “written binding contract” standard from various iterations of IRS guidance on the beginning-of-construction standard.

- The exception for a qualifying nuclear reactor is narrowly tailored to identify nuclear reactors most at risk of retirement and ensure that hydrogen production facilities materially contribute to the continued operation of these reactors. However, the exception represents a major win for the nuclear industry.

- An EAC may meet the incrementality requirement if the electricity it represents is produced by an electricity generating facility that has been retrofitted with carbon capture and sequestration (CCS) technology, if the CCS equipment was placed in service no more than 36 months before the hydrogen production facility was placed in service.

- For purposes of the uprate rule, a facility that has been decommissioned or is in the process of decommissioning may be considered as having increased capacity from a base of zero if it restarts operations. The facility must have been shut down for at least one calendar year during which it was not authorized to operate by its respective federal regulatory authority (e.g., FERC or the NRC), and the increased capacity of the restarted facility must be eligible to restart based on an operating license issued by the regulatory authority. The facility must not have ceased operations for the purpose of qualifying for the rule for restarted facilities.

- An EAC may meet the incrementality requirement if the electricity represented by the EAC is produced by an electricity generating facility that is physically located in a qualifying state, and the hydrogen production facility is also located in a qualifying state. A qualifying state is one that has both a qualifying electricity decarbonization standard and a qualifying GHG cap program. A qualifying electricity decarbonization standard includes a target for 100% of the state's retail sales of electricity to be supplied by renewable or minimal-emitting sources by 2050 or earlier, and a qualifying GHG cap program includes a legally binding cap on GHG emissions from the electricity sector that declines over time and applies to the majority of in-state and out-of-state electricity supplied to the state.

    - As of the publication date of the Final Regulations, only California and Washington are qualifying states.

Temporal Matching

An EAC meets the temporal matching requirement if the electricity represented by the EAC is generated (i) in the same calendar year that the hydrogen production facility uses the electricity, with respect to electricity generated before January 1, 2030, or (ii) in the same hour that the hydrogen production facility uses the electricity, with respect to electricity generated after December 31, 2029.

- The hourly matching requirement has been the subject of much concern for the hydrogen industry, given both the developing state of EAC registries and concerns over consistent supply of renewable electricity. The Proposed Regulations would have shifted from the annual to the hourly matching requirement as of January 1, 2028. The Final Regulations extend the transition rule by two years to provide additional time for tracking systems to achieve functionality and to allow the market to develop for hourly-matched EACs.

The Final Regulations also add a rule clarifying that an EAC meets the temporal matching requirement if the electricity represented by the EAC is discharged from a storage system in the same hour that the hydrogen

production facility uses the electricity to produce hydrogen. The storage system must be in the same region as both the hydrogen production facility and the facility generating the electricity to be stored.

- The energy storage system does not need to meet the incrementality requirement, but the electricity stored must meet the incrementality requirement based on the attributes of the generator. The use of energy storage must be verified by an EAC registry that ensures no double counting, accounts for storage-related efficiency losses, and tracks the temporal profile of stored and discharged electricity.

Deliverability

An EAC meets the deliverability requirement if the electricity represented by the EAC is generated by a source that is in the same region as the hydrogen production facility. The term “region” means a U.S. region that corresponds to a balancing authority (as set forth in a table in the Final Regulations) to which the facility is electrically interconnected. The Final Regulations provide an alternative rule under which an EAC can meet the deliverability requirement if the electricity generation represented by the EAC has transmission rights from the generator location to the region of the clean hydrogen producer, and such generation is delivered to the producer’s region. This delivery must be demonstrated on at least an hour-to-hour basis, with no direct counterbalancing reverse transactions, and verified with NERC E-tags or equivalent. Tracking of transmission rights and electricity delivery must also occur via the relevant EAC registry. In the case of imports from Canada and Mexico, the electricity generator must include an attestation that the attributes included in the eligible EACs are not being used for any other purpose.

- Treasury may provide updated versions of the table of balancing authorities, which taxpayers may choose to rely on, or taxpayers may continue to utilize the table in the Final Regulations.

RNG and Fugitive Sources of Methane

In the Proposed Regulations, Treasury announced the intent to provide rules addressing hydrogen production pathways that use renewable natural gas (RNG) or other fugitive sources of methane (for example, from coal mine operations) for purposes of the Hydrogen PTC or ITC. The Final Regulations include such rules, which apply different approaches for each type of natural gas alternative, rather than rules that provide a single, generic alternative fate for all natural gas alternatives.

Importantly, the Final Regulations do not impose a “first productive use” requirement for the relevant methane, although the preamble to the Proposed Regulations indicated that was Treasury’s intent. Under a first productive use requirement, for natural gas alternatives to receive an emissions value consistent with that gas (and not fossil natural gas), the natural gas alternative used during the hydrogen production process must originate from the first productive use of the relevant methane. The Final Regulations instead take the likelihood of alternative productive use into account in assessing the alternative fate of such gas.

- While a first productive use requirement could effectively address important considerations in the determination of a lifecycle GHG emissions rate, Treasury acknowledged that the requirement may be difficult for taxpayers to

substantiate and to verify independently.

More specifically, the Final Regulations establish general requirements for lifecycle GHG emissions determinations for processes that use methane derived from natural gas alternatives to produce hydrogen. In doing so, the Final Regulations require such determinations to consider the alternative fates of that methane, including avoided emissions and alternative productive uses of that methane, the risk that the availability of the Hydrogen PTC and ITC creates incentives to produce additional methane or otherwise induces additional emissions, and observable trends and anticipated changes in waste management and disposal practices over time as they are applicable to methane generation and uses. The Final Regulations address specific alternative fates for specific sources of methane.

The Final Regulations allow a book-and-claim system for establishing claims to certain attributes of RNG or coal mine methane used in hydrogen production, provided the Treasury Secretary makes a determination that one or more electronic tracking systems meets the standards for a qualifying gas EAC registry or accounting system set forth in the Final Regulations, which determination may be no earlier than January 1, 2027. Before such determination, a taxpayer using RNG or coal mine methane in a hydrogen production process must substantiate the use of such gas by maintaining a direct pipeline connection to a supplier or documentation of exclusive delivery of such gas.

Lifecycle Greenhouse Gas Emissions

The Proposed Regulations would have provided that, except as otherwise provided, the term “lifecycle greenhouse gas emissions” has the meaning provided pursuant to 42 U.S.C. 7545(o)(1)(H) (as in effect on August 16, 2022) of the Clean Air Act[1] and only includes emissions through the point of production (well-to-gate), as determined by the most recent GREET model. The Final Regulations modify this rule to provide that, for purposes of Section 45V, lifecycle GHG emissions are determined under the 45VH2-GREET Model (discussed below).

The term “emissions through the point of production (well-to-gate)” means the aggregate lifecycle GHG emissions related to hydrogen produced at a hydrogen production facility during the taxable year through the point of production. The Final Regulations clarify that emissions that result from certain purification activities that occur downstream of the facility’s qualified clean hydrogen production process are still within the well-to-gate system boundary. If the taxpayer knows or has reason to know the purification of a hydrogen gas stream is necessary for a hydrogen gas stream to be productively used, or to be sold for productive use, any lifecycle GHG emissions relating to such purification (for example, emissions from electricity used in purification, or carbon dioxide that is separated from a hydrogen gas steam and then vented as part of purification) are treated as emissions through the point of production (well-to-gate). Additionally, if the taxpayer knows or has reason to know that a hydrogen gas stream contains less than 99 percent hydrogen and will be combusted without purification, any lifecycle GHG emissions relating to the purification needed to purify the hydrogen gas stream to contain 99 percent hydrogen are treated as emissions through the point of production (well-to-gate).

Applicable GREET Model

Under the Proposed Regulations, unless otherwise specified, the “most recent GREET model” would have been

the most recent version of 45VH2-GREET available to the public and provided in the instructions to the latest version of Form 7210, Clean Hydrogen Production Credit, as of the first day of the taxpayer's taxable year in which the qualified clean hydrogen for which the taxpayer is claiming the Hydrogen PTC or Hydrogen ITC was produced. The Proposed Regulations would have further provided that, if a version of 45VH2-GREET subsequently becomes available to the public in the same taxable year, the taxpayer may choose to treat such version of 45VH2-GREET as the most recent GREET model. The Final Regulations change the nomenclature of the "most recent GREET model" to the "45VH2-GREET Model," but do not otherwise change the definition of such model. The current GREET model, past versions of the GREET model, and future updates to the GREET model may be found at: http://www.energy.gov/45vresources.

The Proposed Regulations would have provided procedures to calculate the lifecycle GHG emissions rate of hydrogen produced at a hydrogen production facility using the most recent GREET model. The Proposed Regulations would have further provided that, for each taxable year during the period described in Section 45V(a)(1), a taxpayer claiming the Hydrogen PTC or ITC determines the lifecycle GHG emissions rate of hydrogen produced at a hydrogen production facility within the interface of 45VH2-GREET. The 45VH2-GREET User Manual released in conjunction with the Proposed Regulations provided that 45VH2-GREET is expected to be updated on at least a yearly basis, which would result in taxpayers using an updated version of 45VH2-GREET each taxable year (insofar as an update arises).

To provide greater certainty about a hydrogen production facility's lifecycle GHG emissions rate throughout the credit period for that facility, the Final Regulations give taxpayers the option to elect to use the version of 45VH2-GREET that was in effect on the date when construction of their hydrogen production facility began for the remaining taxable years within the 10-year credit period. Additionally, in the case of a facility owned by the taxpayer that began construction before December 26, 2023, the Final Regulations provide taxpayers with the option to make an election to use the first publicly available version of 45VH2-GREET (the version of 45VH2-GREET released in December 2023) for the remaining taxable years within the 10-year credit period. This election is irrevocable.

The Proposed Regulations additionally would have provided that a taxpayer may use a PER (as defined below) to calculate the amount of the clean hydrogen production credit with respect to qualified clean hydrogen produced by the taxpayer at a qualified clean hydrogen production facility beginning with the first taxable year in which a PER determined by the Secretary has been obtained and for any subsequent taxable year during the 10-year period beginning on the date such facility was originally going to be placed in service, provided all other requirements of Section 45V are met, and until the lifecycle GHG emissions rate of such hydrogen has been determined under the most recent version of 45VH2-GREET. The Final Regulations clarify that taxpayers may continue to use the PER to calculate the amount of the Hydrogen PTC with respect to qualified clean hydrogen produced at a qualified clean hydrogen facility, provided that: (1) the lifecycle GHG emissions rate of such hydrogen has not been determined; (2) there are no material changes to the information about the taxpayer's hydrogen production process from the information provided to the DOE to obtain an emissions value; and (3) all other requirements of Section 45V are met.

Provisional Emissions Rate

If the most recent GREET model does not include a lifecycle GHG emissions rate for the hydrogen production

pathway through which a taxpayer produces qualified clean hydrogen, the taxpayer may file a petition for a "provisional emissions rate" or "PER." The Proposed Regulations would have provided that an applicant may request an emissions value only after a front-end engineering and design (FEED) study or similar indication of project maturity, such as project specification and cost estimation sufficient to inform a final investment decision, has been completed for the hydrogen production facility. The Final Regulations retain the requirement for a FEED study but clarify that a taxpayer only needs a Class 3 FEED study or similar indication of project maturity, as determined by the DOE, to apply for an emissions value.

- Class 3 FEED studies reflect more mature projects than FEED studies of Class 4 or 5, making them more likely to be robust and therefore likely to facilitate faster reviews. Class 3 FEED studies can also be conducted sooner in a project and are generally less detailed or time-consuming than a Class 1 or Class 2 FEED study.

Anti-Abuse Rule

The Proposed Regulations would have provided that the Hydrogen PTC or ITC is not allowed in circumstances where the primary objective of the production and sale or use of the qualified clean hydrogen is to obtain the benefit of the credit in a manner that is wasteful. The Final Regulations clarify that the Hydrogen PTC is not allowable if the primary purpose of the sale or use (rather than the production and sale or use) of qualified clean hydrogen is to obtain the benefit of the credit in a manner that is wasteful. The Final Regulations further clarify that the taxpayer obtains the Hydrogen PTC in a wasteful manner if the taxpayer sells qualified clean hydrogen that the taxpayer knows or has reason to know will be vented, flared, used to produce heat or power that is then directly used to produce hydrogen, or otherwise used to produce hydrogen, in excess of standard commercial practices.

The Final Regulations provide that venting or flaring for safety or maintenance reasons in the ordinary course of business is a non-abusive commercial industry practice. However, while not abusive, such venting or flaring is also not a verifiable use under the Final Regulations and therefore any such hydrogen that is vented or flared for safety reasons is not eligible for the Hydrogen PTC or ITC.

Impact of Incoming Trump Administration

The Final Regulations' interpretation of the "three pillars," which are not explicitly addressed in Section 45V, may be a likely target for a court challenge given the recent *Loper Bright* decision overturning the *Chevron* doctrine.

While a Congressional overturning of the Final Regulations is possible under the Congressional Review Act, it is unlikely given the narrow Republican margins in Congress and the fact that the Congressional Review Act has not previously been used to overturn tax regulations. A revision to the Final Regulations also seems unlikely, given the notice and comment process for new regulations. What is more likely is that the Trump Administration could provide additional flexibility for hydrogen producers through the issuance of subregulatory guidance such as IRS notices. However, as of now the Trump Administration's views on the Hydrogen PTC and ITC are unknown.

In addition, while a large-scale repeal of the IRA tax credits is not currently expected, modifications to the Hydrogen PTC and ITC as part of a tax bill passed through a budget reconciliation process cannot be ruled out.

Summary

The Final Regulations reflect a slight loosening of the requirements around incrementality, temporal matching, and deliverability, but generally retain the structure of the Proposed Regulations intended to limit induced emissions associated with hydrogen production. The issuance of the Final Regulations provides some much-needed clarity, particularly for projects currently in development, though the comfort is dampened somewhat by the uncertainties around the incoming Trump Administration and the new Republican-controlled Congress.

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[1] 42 U.S.C. 7545(o)(1)(H) (as in effect on August 16, 2022)

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