



## Proposed regulations under section 45V – Clean hydrogen production credit Tax Alert

### Overview

On December 26, 2023, Treasury and the IRS published in the Federal Register a notice of proposed rulemaking and notice of public hearing ([REG-117631-23](#)) (“Proposed Regulations”) relating to the [section 45V](#) clean hydrogen production credit (“section 45V credit”) and the election to claim the [section 48](#) energy investment tax credit (ITC) in lieu of the section 45V credit, as established and amended by the Inflation Reduction Act of 2022 (IRA).

The Proposed Regulations provide guidance on section 45V eligibility and other key issues on which taxpayers have sought clarity since section 45V was enacted in 2022. This guidance considers nearly 250 comments received from industry participants, environmental groups, individuals, and other stakeholders in response to IRS [Notice 2022-58](#), released on November 3, 2022, as well as extensive consultation with external stakeholders in coordination with the Environmental Protection Agency (EPA) and the Department of Energy (DOE).

The Proposed Regulations apply to taxable years beginning after December 26, 2023. However, taxpayers may rely on the Proposed Regulations for taxable years beginning after December 31, 2022, and before the date the final regulations are published in the Federal Register, provided the taxpayers follow the Proposed Regulations in their entirety and in a consistent manner.

Treasury and the IRS have requested written or electronic comments on all aspects of the Proposed Regulations by February 26, 2024. Requests to speak and outlines of topics to be discussed at the public hearing must be received by March 4, 2024. A public hearing on the Proposed Regulations has been scheduled for March 25, 2024, at 10:00 a.m. Eastern time.

#### Agency coordination

In conjunction with the publication of the Proposed Regulations, the White House, the EPA, and the DOE each issued separate documents, addressing the rules related to the lifecycle greenhouse gas (GHG) emissions determination for the section 45V credit. The White House press release titled *U.S. Department of the Treasury, IRS Release Guidance on Hydrogen Production Credit to Drive American Innovation and Strengthen Energy Security* references the releases from the other agencies, stating:

*“The notice of proposed rulemaking (NPRM) is supported by a technical paper from DOE that considers how to assess lifecycle greenhouse gas emissions associated with hydrogen production using electricity. Treasury is also citing to a letter from EPA to Treasury explaining how its prior interpretations of the Clean Air Act could inform Treasury’s implementation of the statute given the statutory reference to the Clean Air Act. In addition to the Treasury Department’s NPRM, DOE is releasing the 45VH2-GREET<sup>1</sup> model that taxpayers will use to calculate the 45V credit and an updated GREET user manual.”*

Relevant links (all released on December 22, 2023):

- **The White House Press Release:** [U.S. Department of the Treasury, IRS Release Guidance on Hydrogen Production Credit to Drive American Innovation and Strengthen Energy Security | US Department of the Treasury](#)
- **EPA Letter:** [Letter to Treasury on the Definition of Lifecycle GHG Emissions | US Environmental Protection Agency](#)
- **DOE Position Paper:** [Assessing Lifecycle GHG Emissions Associated with Electricity Use for the Section 45V Credit | U.S. Department of Energy](#)

The EPA Letter and DOE Position Paper provide context for one of the most anticipated aspects of the Proposed Regulations – the use of Energy Attribute Certificates (EACs) to reduce the GHG emissions rate of the hydrogen production process for the section 45V credit, including the rules around the “three pillar” requirements for the use of EACs, which include (1) additionality (incrementality); (2) temporal time matching; and (3) geographic correlation (deliverability).

Please see [The Future of Hydrogen in the Energy Transition | Deloitte US](#) to learn about our thought leadership and eminence related to hydrogen.

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## Background - Section 45V credit

Section 45V provides a federal income tax credit based on the volume (in kilograms) of clean hydrogen production at a qualified facility in the United States, over a 10-year period beginning on the date the facility is placed in service.

*Qualified clean hydrogen production facility* means a facility that (i) is owned by the taxpayer, (ii) produces qualified clean hydrogen, and (iii) the construction of which begins before January 1, 2033.

*Qualified clean hydrogen* means hydrogen which is produced through a process that results in a lifecycle GHG emissions rate of not greater than 4 kilograms (kg) of carbon dioxide equivalent (CO<sub>2</sub>e) per kg of hydrogen, and which is produced: (i) in the US or a US territory, (ii) in the ordinary course of a trade or business of the taxpayer, and (iii) for sale or use. Furthermore, the production and sale or use of such hydrogen must be verified by an unrelated third party.

Section 45V credit for any taxable year is an amount equal to the product of (i) the kg of qualified clean hydrogen produced by the taxpayer during such taxable year, and (ii) the applicable percentage of **\$0.60**, subject to an annual inflation adjustment.

The *applicable percentage* is determined based on the lifecycle GHG emissions rate of the process to produce any qualified clean hydrogen expressed in kg of CO<sub>2</sub>e per kg of hydrogen:

- **100 percent** if the emissions rate is less than 0.45 kg of CO<sub>2</sub>e per kg of hydrogen;
- **33.4 percent** if the emissions rate is less than 1.5 kg of CO<sub>2</sub>e per kg of hydrogen, and not less than 0.45 kg of CO<sub>2</sub>e per kg of hydrogen;
- **25 percent** if the emissions rate is less than 2.5 kg of CO<sub>2</sub>e per kg of hydrogen, and not less than 1.5 kg of CO<sub>2</sub>e per kg of hydrogen; and
- **20 percent** if the emissions rate is not greater than 4 kg of CO<sub>2</sub>e per kg of hydrogen, and not less than 2.5 kg of CO<sub>2</sub>e per kg of hydrogen.

For facilities that meet the prevailing wage and apprenticeship (PWA) requirements under section 45V(e), the section 45V credit amount is multiplied by five (“5X Multiplier”). For example, if a taxpayer satisfies the PWA requirements related to hydrogen produced at a qualified facility through a process with a lifecycle GHG emissions rate of less than 0.45 kg of CO<sub>2</sub>e per kg of hydrogen, the applicable credit amount is \$3.00 per kg of hydrogen produced (i.e., \$0.60 x 100% x 5).

Under [section 48\(a\)\(15\)](#), taxpayers may make an irrevocable election to treat any qualified property that is part of a *specified clean hydrogen production facility* as energy property to claim the section 48 ITC in lieu of section 45V credit (“ITC election”), in an amount equal to the energy percentage with respect to such property for the facility that is designed and reasonably expected to produce qualified clean hydrogen based on the lifecycle GHG emissions rate.

The table below provides the 5X Multiplier applicable amounts for the section 45V credit, and the energy percentages for the ITC election.

| Emissions Rate   | Applicable Percentage | 45V Credit Amount per kg* | ITC Election Percentage Rate |
|------------------|-----------------------|---------------------------|------------------------------|
| < 0.45 kg        | 100%                  | \$3.00                    | 30%                          |
| 0.45 kg ≤ 1.5 kg | 33.4%                 | \$1.00                    | 10%                          |
| 1.5 ≤ 2.5 kg     | 25%                   | \$0.75                    | 7.5%                         |
| 2.5 kg ≤ 4.0 kg  | 20%                   | \$0.60                    | 6%                           |

\*Subject to inflation adjustment factor.

Certain entities are permitted to make an election to treat the tax credit as a payment of taxes under [section 6418](#) (“direct pay election”) for the first five tax years beginning on the placed in service date of the qualified clean hydrogen production facility.

## Proposed regulations under section 45V and section 48

The Proposed Regulations provide important guidance related to determining section 45V credit eligibility and establishing a section 45V regulatory framework. Notably, the Proposed Regulations include:

- Definition of qualified clean hydrogen and what property comprises a qualified clean hydrogen production facility, including coordination with the [section 45Q](#) credit for carbon oxide sequestration;
- Calculation of the amount of the credit based on lifecycle GHG rates resulting from hydrogen production processes;
- Petition process for provisional emissions rates where a lifecycle GHG rate has not been determined;
- Use of electricity from certain renewable or zero-emissions sources to produce qualified clean hydrogen;
- Verification of production and sale or use of clean hydrogen, including requirements for annual verification reports and attestations; and



- Modification or retrofit of existing facilities to produce qualified clean hydrogen.

The Proposed Regulations also provide rules under Prop. Treas. Reg. § 1.48-15 relating to an election to treat a specified clean hydrogen production facility as energy property eligible for the ITC under section 48, including emissions tier recapture.

#### **Prop. Treas. Reg. § 1.45V-1: Credit for production of clean hydrogen**

##### Definition of facility in “qualified clean hydrogen production facility”

The Proposed Regulations establish that a *facility* means a single production line that is used to produce qualified clean hydrogen. A *single production line* includes all components of property that function interdependently to produce qualified clean hydrogen. Components of property function interdependently if the placing in service of each component is dependent upon the placing in service of each of the other components to produce qualified clean hydrogen.

Dual function property or *multipurpose components* (i.e., has a purpose in addition to production of qualified hydrogen) may be part of a facility if such components function interdependently with other components to produce qualified clean hydrogen.

A facility does not include certain indirect production and post-production equipment, such as:

- Equipment used to condition or transport hydrogen beyond the point of production;
- Electricity production equipment used to power the hydrogen production process, including any carbon capture equipment associated with the electricity production process (notwithstanding the multipurpose component provision).

##### **Observations:**

Defining a qualified facility based on a “single production line” provides clarity for taxpayers with co-located production lines at a single location. This provision is particularly relevant for taxpayers that are evaluating eligibility for other credits based on operations at the same site (e.g., the section 45Q carbon oxide sequestration credit or the [section 45Z](#) clean fuel production credit).

Under Prop. Treas. Reg. § 1.45V-1(a)(7)(ii), certain post-production equipment would not be included as part of the facility. This provision is consistent with the DOE draft guidance for a [Clean Hydrogen Production Standard \(“CHPS”\)](#) released in June 2023, “[the] system boundary includes CCS [carbon capture and sequestration] even if sequestration is not at the site of production but does not include other post-hydrogen production steps such as potential liquefaction, compression, dispensing into vehicles, etc., consistent with the intent of a hydrogen production standard.”

Notably, the Proposed Regulations do not address a required level of hydrogen purity or hydrogen quality. Generally, the hydrogen quality specification depends on the specific end-use case. This lack of clarity impacts projects that utilize technologies such as carbon capture to produce clean hydrogen as part of a gas blend consisting of separate hydrogen and carbon molecules such as low-carbon syngas. Clarifying this issue is critical to impacted industries because requiring a separate production step of isolating clean hydrogen from other molecules and re-blending them could necessitate costly and less efficient production process changes that may be unworkable.

The DOE 45VH2-GREET 2023 Guidelines do note that the associated emission rate will be determined using a functional unit of one kg of 100% hydrogen at a pressure of 300 psia<sup>2</sup> (i.e., 20 bar). The draft DOE CHPS state, *“to enable consistent comparisons across different hydrogen production technologies, the target corresponds to a functional unit of 1 kilogram of hydrogen at 99% purity and 3 megapascals (MPa) pressure (i.e., 30 bar).”*

#### Lifecycle GHG emissions determination and the most recent GREET model

Consistent with the statute, the Proposed Regulations provide that lifecycle GHG emissions include emissions only through the point of production, determined under the most recent GREET model.

The most recent GREET model is the latest version of 45VH2-GREET that is publicly available on the first day of the taxable year during which the qualified clean hydrogen was produced. It is available at <https://www.energy.gov/45vresources>.

If an updated version of 45VH2-GREET becomes publicly available after the first day of the taxable year of production (but still within such taxable year), then the taxpayer may, in its discretion, treat such later version of 45VH2-GREET as the most recent GREET model.

The term emissions through the point of production (well-to-gate) includes:

- Emissions associated with feedstock growth, gathering, extraction, processing, and delivery to a hydrogen production facility; and
- Emissions associated with the hydrogen production process, inclusive of the electricity used by the hydrogen production facility and any capture and sequestration of carbon dioxide generated by the hydrogen production facility.

The GHG emissions rate determination is made following the close of each taxable year that clean hydrogen is produced and must include all hydrogen produced at a hydrogen production facility during the taxable year.

The GHG emissions rate is determined separately for each hydrogen production facility the taxpayer owns.

#### **Observations:**

Taxpayers may not bifurcate hydrogen production at a qualified facility (single process line) as the emissions rate determination must include all hydrogen produced at the facility during the taxable year.

Based on the DOE GREET User Manual (December 2023), 45VH2-GREET is expected to be updated annually to include new technologies and more recent estimates of background data. This timeline is similar to the historical timeline for updates to other GREET model versions. Accordingly, the GHG emissions rate may differ each year even if the production process remains unchanged. The latest version of 45VH2-GREET includes eight hydrogen production pathways:

1. Steam methane reforming (SMR) of natural gas, with potential carbon capture and sequestration (“CCS”);
2. Autothermal reforming (ATR) of natural gas, with potential CCS;
3. SMR of landfill gas with potential CCS;
4. ATR of landfill gas with potential CCS;
5. Coal gasification with potential CCS;
6. Biomass gasification with potential CCS;
7. Low-temperature water electrolysis using electricity;
8. High-temperature water electrolysis using electricity and/or heat from nuclear power plants.

The SMR, ATR, and gasification pathways include the potential for carbon capture. However, it is unclear how the DOE will treat the utilization of captured carbon (e.g., fixation through photosynthesis or chemosynthesis, chemical conversion to a material or chemical compound, use for other commercial purposes). In addition, there are limited feedstock options for SMR and ATR (fossil natural gas and landfill natural gas), as well as for biomass gasification (corn stover, forest residue).

The DOE GREET User Manual provides that certain parameters in 45VH2–GREET are fixed and may not be changed – referred to as “background data” (e.g., upstream methane loss rates, emissions associated with power generation from specific generator types, and emissions associated with regional electricity grids). Within the preamble, Treasury and the IRS state that “*background data are parameters for which bespoke inputs from hydrogen producers are unlikely to be independently verifiable with high fidelity, given the current status of verification mechanisms.*” Taxpayers that have higher emissions associated with certain background data could benefit from the fixed background data, however, those with lower emissions could end up with a less advantageous result. Treasury and the IRS seek comments on the readiness of verification mechanisms that could be utilized for certain background data in 45VH2–GREET if it were reverted to foreground data in future releases.

The Proposed Regulations do not provide for the use of certificates related to renewable natural gas (RNG) and fugitive methane (e.g., leaks, venting) in the determination of the applicable emissions rate, stating that a book-and-claim system that meets the needs of administering the section 45V credit are not yet available. However, Treasury and the IRS are considering rules on the expected conditions to take RNG and fugitive methane certificate claims into account when determining emissions rates for purposes of the section 45V credit. Within the preamble, Treasury and the IRS state that such conditions would be “*logically consistent with but not identical to the incrementality, temporal matching, and deliverability requirements for electricity derived EACs.*” Hydrogen producers would be required to acquire and retire corresponding attribute certificates through a book-and-claim system that can be verified through an electronic tracking system to confirm all applicable requirements are met.

Furthermore, environmental benefits associated with the use of biogas or biogas-based RNG for hydrogen production can only be taken into account if such methane originates from the *first productive use* (e.g., to provide heat or cooling, generating electricity, upgraded to RNG). The term “first productive use” is proposed to mean “*the time when a producer of that gas 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.*” This would limit emissions associated with the diversion of biogas and RNG from other pre-existing productive uses.

The preamble identifies several key issues associated with developing rules on the use of RNG and fugitive methane certificates for section 45V credit purposes and solicits comments on twelve specific questions to aid the agency in drafting the future guidance, which may also inform future versions of 45VH2–GREET.

The sale or use of methane to produce hydrogen may have [section 4661](#) implications related to excise taxes imposed on certain chemicals and certain imported substances (“Superfund chemical taxes”), effective July 1, 2022. See notice of proposed rulemaking ([REG-105954-22](#)) published on March 29, 2023 related to the Superfund chemical taxes. Several comments were submitted expressing concern about the Superfund taxes on methane and ammonia, specifically in their relation to hydrogen production.



***Producer of qualified clean hydrogen:*** The credit is available to a taxpayer that owns the qualified clean hydrogen production facility at the time of the production of hydrogen, regardless of whether such taxpayer is treated as a producer under [section 263A](#) or under any other provision of law with respect to such hydrogen.

- ***Verification required:*** An unrelated party must verify the production and sale or use of the qualified clean hydrogen. The term for *sale or use means* for the primary purpose of making ready and available for sale or use. Storage of hydrogen following production does not disqualify such hydrogen from being considered produced for sale or use.
- ***Amended returns:*** A taxpayer is not eligible to claim the section 45V credit until the verification requirements have been completed for both the production and sale or use. Thus, if verification occurred after the extended return filing deadline for the taxable year in which the hydrogen was produced, the taxpayer would need to file an amended return, an amended [Form 1065, US Return of Partnership Income](#), or administrative adjustment request (AAR), as applicable, to claim the section 45V credit for such hydrogen.

**Prop. Treas. Reg. § 1.45V-2: Coordination with section 45Q credit, anti-abuse rule, and recordkeeping requirement**

Coordination with section 45Q credit and 80/20 Rule

As provided in section 45V(d)(2) and the Proposed Regulations, no section 45V credit is allowed for any qualified clean hydrogen produced at a facility that includes carbon capture equipment (CCE) for which a section 45Q credit is allowed to any taxpayer for the taxable year or any prior taxable year.

Note that under [Treas. Reg. § 1.45Q-2\(g\)\(5\)](#), a qualified facility or carbon capture equipment may qualify as originally placed in service even if it contains some used components of property, provided that the fair market value of the used components of property is not more than 20 percent of the qualified facility or carbon capture equipment's total value (that is, the cost of the new components of property plus the value of the used components of property) ("80/20 Rule"). If the CCE satisfies the 80/20 Rule and no new section 45Q credit has been allowed to any taxpayer, such CCE is not treated as CCE for which section 45Q credit has been allowed.

Anti-abuse rule

The Proposed Regulations provide an anti-abuse rule that disallows the section 45V credit if the primary purpose of the production and sale or use of qualified clean hydrogen is to obtain the benefit of the section 45V credit in a manner that is wasteful, such as the production of qualified clean hydrogen that the taxpayer knows or has reason to know will be vented, flared, or used to produce hydrogen. This determination is based on all facts and circumstances.

Recordkeeping requirement

Taxpayers claiming the section 45V credit must maintain and preserve records sufficient to establish the amount of the credit claimed by the taxpayer, consistent with [section 6001](#). At a minimum, those records must include records to substantiate the information required to be included in the verification report, records establishing that the facility meets the definition of a qualified clean hydrogen production facility, records of past credit claims under section 45Q by any taxpayer with respect to CCE included at the facility, and records establishing the date the qualified clean hydrogen production facility was placed in service.

If the requirements for the increased credit amount were satisfied, then the taxpayer must also maintain records related to PWA requirements, in accordance with Prop. Treas. Reg. § 1.45–12. Taxpayers must also retain all raw data used for submission of a request for an emissions value to the DOE for at least six years after the due date (including extensions) for filing the federal income tax return or information return to which the provisional emissions rate (PER) petition is ultimately attached.

If the taxpayer makes the election under section 48, at a minimum, those records must include records substantiating the information required to be included in the annual verification report, records establishing that the facility meets the definition of a specified qualified clean hydrogen production facility, and records establishing the date the specified clean hydrogen production facility was placed in service. If the increased section 48 credit amount was allowed, then the taxpayer must also maintain records in accordance with Prop. Treas. Reg. § 1.45–12.

**Observation:**

The anti-abuse rule is based on all the relevant facts and circumstances to prevent the potential of exploiting the section 45V credit in a manner that is inconsistent with the purpose of section 45V (i.e., to provide an incentive to produce qualified clean hydrogen for a productive use). Prop. Treas. Reg. § 1.45V–2(b)(2) provides an example of the anti-abuse rule where a taxpayer knows or reasonably expects that a customer will vent or flare a *portion* of the qualified clean hydrogen it purchased from the taxpayer. With the verification requirements (later described), a third party (i.e., a qualified verifier) must provide various attestations under penalty of perjury, including an attestation from the qualified verifier regarding the amount of such qualified clean hydrogen sold or used. This may serve as the first line to help prevent such abuse. However, Treasury and the IRS requested comments on whether there are additional anti-abuse safeguards that should be adopted.

**Prop. Treas. Reg. § 1.45V-3: [Reserved]**

Treas. Reg. § 1.45V-3 was previously proposed in the notice of proposed rulemaking ([REG-100908-23](#)) relating to the increased credit amount for satisfying PWA requirements, published in the Federal Register on August 30, 2023.

**Prop. Treas. Reg. § 1.45V-4: Procedures for determining lifecycle GHG emissions rates**

Emissions value request to the DOE and provisional emissions rate petition to the IRS

A taxpayer may file a petition for a PER if the GHG emissions rate has not been determined under the most recent GREET model with respect to the taxpayer's hydrogen production facility (i.e., if the feedstock used by such facility or the facility's hydrogen production technology is not included in the most recent GREET model).

Prior to filing the PER petition, a taxpayer must first submit an emissions value request with the DOE to conduct an analytical assessment related to the technology and/or feedstock for a value consistent with the well-to-gate system boundary and background data parameters in 45VH2–GREET (with fixed values that an applicant cannot change). In order to submit the request, a taxpayer must have completed a front-end engineering and design (FEED) study, or similar indication of project maturity, as determined by the DOE (e.g., project specification and cost estimation sufficient to inform a final investment decision (FID) related to the hydrogen production facility).



The DOE may decline to review requests that are not responsive or incomplete, including those that use a hydrogen production technology and feedstock already in the 45VH2–GREET model.

Based on the preamble of the Proposed Regulations, DOE guidance for applicants to submit a request will be released before April 1, 2024 (date the DOE process will open). Such guidance will include a process for, under limited circumstances, a revision to the DOE’s initial analytical assessment of an emissions value on the basis of revised technical information or facility design and operation.

After a taxpayer obtains an emissions value from the DOE, a taxpayer may submit a PER petition by attaching the emissions value to its federal income tax return for the first taxable year of hydrogen production ending within the 10-year credit period for which the taxpayer claims the section 45V credit. The PER petition must contain: (i) an emissions value obtained from the DOE setting forth the DOE’s analytical assessment of the lifecycle GHG emissions rate associated with the facility’s hydrogen production pathway, and (ii) a copy of the taxpayer’s request to the DOE for an emissions value, including any supporting information provided to the DOE.

Upon the IRS’s acceptance of the taxpayer’s federal income tax return containing a PER petition, the emissions value of the hydrogen specified on such petition is deemed accepted. Therefore, a taxpayer can rely upon the emissions value provided by the DOE to calculate and claim a section 45V credit, provided that any information, representations, or other data provided to the DOE in support of the request for an emissions value are accurate.

However, the third-party verification requirement (later defined) and any information, representations, or other data provided to the DOE in support of the request for an emissions value are subject to later examination by the IRS.

**Observations:**

The Proposed Regulations take potential project changes into account regarding the emissions rate request from the DOE, stating that there will be a process to request a revision to the DOE’s initial assessment of an emissions value on the basis of revised technical information or facility design and operation, under limited circumstances. The limited circumstances and overall process are expected to be included in additional guidance that will be released by the DOE.

If a taxpayer receives an emissions value from the DOE shortly after the commission of completed FEED study, it may be years before the construction of the facility is complete. If the technology and feedstock is later included as part of the GREET model, the taxpayer must use the GREET model to determine the emission rate, which may or may not be the same DOE-provided value (due to availability of data at the time).

Furthermore, the Proposed Regulations provide that a PER petition with the DOE-provided emissions rate will be deemed accepted when the taxpayer’s Federal income tax return containing a PER petition is accepted.

**Energy attribute certificates and temporal matching transition rule (annual matching through 2027; hourly matching thereafter)**

The Proposed Regulations provide guidance on the treatment of electricity used in the production of hydrogen for purposes of the section 45V credit.

The Proposed Regulations define the term *energy attribute certificate (EAC)* as 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. Renewable energy certificates (RECs) and other similar energy certificates issued through a registry or accounting system are forms of

EACs. Generally, an EAC may be traded with or separately from the underlying energy it represents; and can be retired by or on behalf of its owner, which is the party that has the right to claim the underlying attributes represented by the EAC.

Taxpayers may treat their hydrogen production facility's use of electricity as being from a specific electricity-generating facility rather than being from the regional electricity grid (as represented in 45VH2–GREET) only if the taxpayer acquires and retires *qualifying EACs* for each unit of electricity that the taxpayer claims from such source.

For example, one megawatt-hour of electricity used to produce hydrogen would need to be matched with one megawatt hour of qualifying EACs. This retirement must be recorded in a *qualified EAC registry or accounting system* so that the acquisition and retirement of such EACs may be verified.

A *qualifying EAC* is an eligible EAC that meets the following requirements:

- ***Incrementality*** – Electricity generation facility (or the uprate of such facility) that produced the unit of electricity to which the EAC relates must have a **commercial operations date (COD) (the date on which a facility that generates electricity begins commercial operations) that is no more than 36 months** before the hydrogen production facility for which the EAC is retired was placed in service.
- ***Temporal matching*** – Subject to a transition rule, electricity represented by the EAC must be **generated in the same hour** that the taxpayer's hydrogen production facility uses electricity to produce hydrogen. Under the transition rule, EACs that represent electricity generated **before January 1, 2028**, will be considered generated in the same hour if the electricity is **generated in the same calendar year** that the taxpayer uses such electricity to produce hydrogen ("temporal matching transition rule").
- ***Deliverability*** – Electricity represented by the EAC must be generated by a facility that is in the **same region** as the qualified hydrogen production facility. The term region means an area **derived from the National Transmission Needs Study** that was released by the DOE on October 30, 2023. Alaska, Hawaii, and each US territory will be treated as separate regions.

The term *eligible EAC* means an EAC that, with respect to the electricity to which the EAC relates, provides, at a minimum, the following information:

- A description of the facility, including the technology and feedstock used to generate the electricity;
- The amount and units of electricity;
- The COD of the facility that generated the electricity;
- For electricity that is generated before January 1, 2028, the calendar year in which such electricity was generated;
- For electricity that is generated after December 31, 2027, the date and hour in which such electricity was generated; and
- The project identification number or assigned identifier.

The retirement of qualified EAC must be recorded in a *qualified EAC registry or accounting system* so that the acquisition and retirement of such EACs may be verified. A *qualified EAC registry or accounting system* is a tracking system that:

- Assigns a unique identification number to each EAC tracked by such system;
- Enables verification that only one EAC is associated with each unit of electricity;
- Verifies that each EAC is claimed and retired only once;
- Identifies the owner of each EAC; and
- Provides a publicly accessible view (for example, through an application programming interface) of all currently registered generators in the tracking system to prevent the duplicative registration of generators.

### Observations:

Treasury and the IRS consulted with the EPA and DOE in the preliminary determination that EACs may be used under certain conditions in documenting purchased electricity inputs and assessing emissions impacts of electricity used in the production of hydrogen for purposes of the section 45V credit. These conditions include the “three pillars” which are of great interest to taxpayers given the potential implications to the clean hydrogen industry.

The incrementality (or additionality) requirement provides a clear measurement period of 36 months based on the COD of the electric generating facility and the placed in service date of the qualified hydrogen facility. Up-rated production within this period would also be considered incremental. The Proposed Regulations request comments on other potential approaches for existing clean power generators (e.g., nuclear, hydroelectric) to meet the incrementality, such as avoided retirements and alternative formulaic approaches to address incrementality from existing clean electricity sources.

The DOE has advised that hourly matching under the temporal matching requirement is necessary to properly address significant indirect emissions from electricity use. However, it will take some time for the development of tracking systems and related contractual structures to a level mature enough for hourly matching. Therefore, the Proposed Regulations provide a transition rule intended to provide time for the EAC market to develop the hourly tracking capability necessary to verify compliance with this requirement. The transition rule allows annual matching through 2027. Thereafter, hourly matching would be required. Projects that begin construction in calendar year 2024 and completed by December 31, 2028 (within the Continuity Safe Harbor period), would be subject to the hourly matching requirements immediately for the section 45V credit. Commenters suggested a grandfather provision for early movers to have more flexibility in temporal matching requirements.

The deliverability (geographic correlation) requirement is based on the 15 geographic regions within the *DOE National Transmission Needs Study* released in October 2023. Within the preamble, Treasury and the IRS state that this approach provides reasonable assurances of deliverability of electricity because the regions were developed by the DOE in consideration of transmission constraints, congestion, and in many cases, match power-systems operation. The Proposed Regulations request comments on whether there are additional ways to establish deliverability, such as circumstances indicating that electricity is actually deliverable from an electricity generating facility to a hydrogen production facility, even if the two are not located in the same region or if the clean electricity generator is located outside of the United States.

The three pillars set forth in the Proposed Regulations resemble those within the European Commission’s Revised Renewable Energy Directive (RED II) First Delegated Act, which sets out the requirements for the electricity used in renewable liquid and gaseous transport fuels of non-biological origin (RFNBO) production to be considered fully renewable. The associated requirements also provide a temporal matching transition, requiring monthly matching through 2029, then shifting to an hourly matching requirement thereafter.

The First Delegated Act was finalized in June 2023, and under one of the production pathways, the following three conditions must be met for the certain grid electricity to be considered fully renewable electricity: (1) additionality – the renewable energy source must not come into operation any earlier than *36 months prior* to the electrolyzer; (2) temporal



correlation – the production must be within the same calendar month as the renewable electricity, or *monthly matching through 2029*, which will transition to *hourly matching beginning on January 1, 2030*; and (3) geographical correlation – *location within the same zone* or located within an interconnected bidding zone.

The Treasury and the IRS are also seeking comments on two specific types of electricity generation for which GHG emissions can be highly variable or uncertain: fossil fuel-powered electricity generation with CCS and biomass-powered electricity generation. This includes mechanisms for, among other things, verification of the origin of the feedstock, rate of carbon capture, and other parameters that are relevant to create an accurate lifecycle analysis, as well as the ability of EAC instruments to accurately represent such attributes.

The preamble of the Proposed Regulations state that qualifying EAC registries include: (1) Electric Reliability Council of Texas (ERCOT); (2) Michigan Renewable Energy Certification System (MIRECS); (3) Midwest Renewable Energy Tracking System, Inc. (M-RETS); (4) North American Registry (NAR); (5) New England Power Pool Generation Information System (NEPOOL-GIS); (6) New York Generation Attribute Tracking System (NYGATS); (7) North Carolina Renewable Energy Tracking System (NC-RETS); (8) PJM Generation Attribute Tracking System (PJM-GATS); and (9) Western Electric Coordinating Council (WREGIS).

**Prop. Treas. Reg. § 1.45V-5: Procedures for verification of qualified clean hydrogen production and sale or use**

Taxpayers claiming the section 45V credit would have to attach a verification report (prepared by a qualified verifier) to Form 7210, *Clean Hydrogen Production Credit*, or any successor form, with their annual federal income tax return or information return for each taxable year in which they claim the credit.

A *qualified verifier* is any individual or organization with an active accreditation either: (1) as a validation and verification body by the American National Standards Institute (ANSI) National Accreditation Board; or (2) as a verifier, lead verifier, or verification body under the California Air Resources Board (CARB) Low Carbon Fuel Standard (LCFS) program.

The verification report must be signed and dated by the qualified verifier no later than the extended due date of the federal income tax return or information return for the taxable year during which the hydrogen undergoing verification is produced (or, in the case of a section 45V credit first claimed on an amended return or administrative adjustment request, the filing date of such return or administrative adjustment request (AAR)); and must contain the following:

- *Production attestation* – An attestation, made under penalties of perjury, from the qualified verifier regarding the taxpayer's production of qualified clean hydrogen for sale or use, including supporting documentation.
- *Sale or use attestation* – An attestation, made under penalties of perjury, from the qualified verifier regarding the amount of qualified clean hydrogen sold or used. A person's *verifiable use* of the hydrogen can be made by the taxpayer or a person other than the taxpayer and can occur within or outside the US. A verifiable use does not include use of hydrogen to generate electricity that is then directly or indirectly used in the production of more hydrogen; or venting or flaring of hydrogen. For example, a verifiable use includes a tolling arrangement pursuant to which a service recipient provides raw materials or inputs, such as water or electricity, to a toller (that is, a third-party service provider that owns a hydrogen production facility), and the toller produces hydrogen for the service recipient using the service recipient's raw materials or inputs in exchange

for a fee. Use of the hydrogen by the service recipient would be a verifiable use.

- **Conflict attestation** – An attestation, made under penalties of perjury, from the qualified verifier regarding conflicts of interest with the taxpayer, and if applicable, transferee taxpayer.
- **Qualified verifier statement** – Statement with the qualified verifier’s information, including documentation related to qualifications.
- **Facility information** – Certain general information about the taxpayer's hydrogen production facility where the hydrogen production undergoing verification occurred, including feedstock and metering device data.
- **Verifier’s accreditation** – Any documentation necessary to substantiate the verification process given the standards and best practices prescribed by the qualified verifier's accrediting body and the circumstances of the taxpayer and the taxpayer's hydrogen production facility.

If a taxpayer produces electricity for which the [section 45](#) or [section 45U](#) credit is claimed, and the taxpayer or a related person uses such electricity to produce hydrogen, the verification report must also contain attestations that the qualified verifier performed a verification related to such electricity (e.g., amount of electricity in kilowatt hours used to produce such hydrogen and alignment of EAC retirement with claimed section 45 or section 45U credits for the electricity used in hydrogen production).

If a taxpayer makes an election to treat a specified clean hydrogen production facility as energy property under section 48, the taxpayer must obtain a similar annual verification report for the taxable year in which the election is made for the facility and for each taxable year thereafter during the 5-year recapture period. The taxpayer must submit the annual verification report as an attachment to the [Form 3468](#), *Investment Credit*, or any successor form(s), for the taxable year in which the election is made for the facility.

#### **Observations:**

The Proposed Regulations seek feedback on whether taxpayers expect to fulfill all the prerequisites for claiming the section 45V credit, including the proposed verification requirements, by the extended filing deadline for the hydrogen production taxable year. If taxpayers anticipate being unable to meet these requirements by the filing deadline, comments are also invited regarding specific alternatives to the proposed rule, along with their rationale.

The Treasury and the IRS also considered allowing taxpayers to treat the section 45V credit as determined in the taxable year of hydrogen production or verification. However, such an option would create administration issues and potentially a mismatch between the taxable year in which the hydrogen is produced and the taxable year in which the section 45V credit for such production is claimed. Thus, the proposed regulations would require the credit to be determined in the taxable year of production.

In addition, the preamble clarifies that section 45V does not deny a section 45V credit if the hydrogen is sold or used outside the United States or United States territory. This clarification is helpful to domestic clean hydrogen producers planning to export hydrogen overseas as international demand for clean hydrogen is bolstered by foreign mandates such as the European Commission’s RED II and Fit for 55 package, which requires that 40% of all energy usage in the European Union by 2030 (including a certain portion of transport fuels) be produced from renewable energy sources.

#### **Prop. Treas. Reg. § 1.45V-6: Modification and retrofit of an existing facility**

There are two ways for an existing facility to have a deemed placed in service date to start a new 10-year credit period for the section 45V credit – through a modification of a hydrogen production facility placed in service before 2023 that did not produce clean hydrogen, or by meeting the 80/20 Rule.

For the modification provision, the modification must be made for the purpose of enabling the facility to produce qualified clean hydrogen and the taxpayer must pay or incur an amount that is properly chargeable to the taxpayer's capital account with respect to the facility. For example, if a taxpayer solely pays or incurs capital expenses to modify existing components of a hydrogen production facility that are not necessary for the production of clean hydrogen, such modification does not entitle the facility to a new placed in service date.

Furthermore, merely changing fuel inputs to the hydrogen production process, such as switching from conventional natural gas to renewable natural gas, would not qualify as a facility modification.

The 80/20 Rule is adopted where a facility may establish a new placed in service date, even with used property, as long as the fair market value of the used property is not more than 20% of the facility's total value. The cost of new property includes all properly capitalized costs of the new property included within the facility. The 80/20 Rule applies to any existing facility, regardless of its prior hydrogen production or original placed in service date.

#### **Observation:**

The Proposed Regulations provide two examples (Examples 4 and 5) illustrating the application of the 80/20 Rule for section 45V purposes. Example 5 discusses the retrofit of an existing (non-clean) hydrogen production facility that had CCE for which a section 45Q credit was claimed prior to the retrofit. Accordingly, the taxpayer may not claim the section 45V credit even though the 80/20 Rule was met for the clean hydrogen production facility. It is important to note that the 80/20 Rule for section 45V satisfied in Example 5 is distinct from the 80/20 Rule for a carbon capture facility provided in [Notice 2020-12](#), Section 8.01 relating to the section 45Q credit. If the taxpayer in Example 5 also met the 80/20 Rule to be deemed to have a newly placed in service carbon capture facility, the taxpayer should not be precluded from claiming a credit under section 45V.

#### **Prop. Treas. Reg. § 1.48-15: Election to treat a specified clean hydrogen production facility as energy property and annual verification report**

The ITC election is available to a taxpayer that owns and places in service a *specified clean hydrogen production facility* ("specified facility"), which is any qualified hydrogen production facility –

- That is placed in service after December 31, 2022;
- With respect to which (1) no section 45V credit or section 45Q credit has been allowed, and (2) the taxpayer makes an irrevocable election to have section 48(a)(15) apply; and
- For which an unrelated third party has verified that such facility produces hydrogen through a process that results in lifecycle GHG emissions that are consistent with the hydrogen that such facility was designed and expected to produce.

Hydrogen that a facility is *designed and reasonably expected to produce* means hydrogen produced through a process that results in the lifecycle GHG emissions rate specified in the annual verification report for the taxable year in which the election is made.



To make the ITC election, a taxpayer must claim the section 48 credit with respect to a specified facility on a completed Form 3468, and file the form with the taxpayer's federal income tax return for the taxable year that the specified facility is placed in service.

A separate election must be made for each specified facility.

If any taxpayer owning an interest in a specified facility makes such an election, then that election is binding on all taxpayers that directly or indirectly own an interest in the specified facility. Where a specified facility is owned by a partnership or an S corporation, such election is made by the partnership or S corporation and is binding on all ultimate credit claimants.

To claim the ITC, a taxpayer must also obtain an annual verification report for the taxable year in which the election is made for the facility (attached to Form 3468, for the taxable year), and for each taxable year thereafter during the 5-year recapture period.

The annual verification report must be signed, under penalties of perjury, and dated by a qualified verifier no later than the due date, including extensions, of the federal income tax return for the taxable year in which the hydrogen undergoing verification was produced.

The annual verification report must contain an attestation providing information similar to the requirements for the section 45V credit, including a production attestation; sale or use attestation; conflict attestation; qualified verifier statement; facility information; and verifier's accreditation (described above), as well as the following:

- Emissions rate data attestation – Statement attesting to the lifecycle GHG emissions rate of the hydrogen produced at the specified facility for the taxable year, and that the operation, during such taxable year, of the specified facility, and any EACs applied for the purpose of accounting for such facility's emissions, are accurately reflected in the data that the taxpayer entered into the most recent GREET model (or provided to the DOE for an emissions value request), to determine the lifecycle GHG emissions rate of the hydrogen undergoing verification.
- Designed or expected emissions rate attestation – Statement attesting that the facility produced hydrogen through a process that results in a lifecycle GHG emissions rate that is consistent with, or lower than, the lifecycle GHG emissions rate of the hydrogen that such facility was designed and expected to produce.

#### **Observations:**

The annual verification report requirements for the section 45V credit and the ITC election are similar, however there are additional ITC attestation requirements. Based on the recapture rules described in the section below, the annual verification report would essentially provide for a "true-up" of section 48 credit claimed by a taxpayer using the emission rate of the hydrogen that its facility was designed and expected to produce.

Under section 48(a)(15)(B) no section 45V credit or section 45Q credit is allowed for any taxable year with respect to any specified facility or any CCE included at such facility. This credit interplay provision does not preclude a taxpayer from claiming both a section 45V (or credit section 45Q) and an ITC in lieu of section 45V credit election at the same location, provided that the associated "facilities" are different (i.e., the clean hydrogen production facility is not the same as the specified facility).

## Emissions tier recapture event and coordination with other recapture rules

In addition to the recapture rules under [section 50\(a\)](#), and section 48(a)(10)(C), the ITC is also subject to recapture if the facility's actual emissions rate is less than the amount used when calculating the credit in the year the facility was placed in service ("*emissions tier recapture*").

An emissions tier recapture event occurs in any taxable year of the 5-year recapture period beginning on the first day of the first taxable year after the taxable year in which the facility was placed in service under the following circumstances:

- The taxpayer fails to obtain an annual verification report by the applicable deadline for the taxable year;
- The actual hydrogen production results in a higher lifecycle GHG emissions rate than the rate used to calculate the amount of the section 48 credit; or
- The actual hydrogen production results in a lifecycle GHG emissions rate of greater than 4 kilograms of CO<sub>2</sub>e per kilogram of hydrogen.

The recapture amount for the taxable year is equal to 20 percent of the excess of: (1) the section 48 credit allowed, and (2) the section 48 credit amount that would have been allowed if the taxpayer had used the energy percentage supported by the facility's actual production to calculate the credit.

The taxpayer must report the recapture amount on the annual tax return in the taxable year in which the recapture event occurs, and must adjust carrybacks and carryovers under [section 39](#). In each taxable year of the recapture period, the recapture rules, if applicable, apply in the following order:

- Section 50(a) – Dispositions or ceasing to be investment credit property recapture
- Section 48(a)(10)(C) – Prevailing wage recapture
- Section 48(a)(15)(E) – Emission tier recapture

### **Observation:**

The recapture period related to the *emissions tier recapture* differs from the other recapture rules that begin on the date that the energy property is placed in service. For example, if a calendar filer places in service a specified facility on June 1, 2024, the associated *emissions tier recapture* period is from *January 1, 2025 through December 31, 2029*, whereas the section 50(a) recapture period is from *June 1, 2024 through May 31, 2029*.



## Footnotes

<sup>1</sup>Greenhouse gases, Regulated Emissions, and Energy use in Transportation model (GREET).

<sup>2</sup>Pounds per square inch absolute (PSIA).

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