

GIBSON DUNN



Tax Update

January 9, 2025

IRS and Treasury Issue Final Regulations for Clean Hydrogen Tax Credits

This update discusses recently issued final regulations under sections 45V and 48(a)(15) regarding tax credits enacted as part of the Inflation Reduction Act of 2022 for clean hydrogen production projects.^[1]

On January 3, 2025, the IRS and Treasury released final regulations relating to tax credits for clean hydrogen that were enacted as part of the Inflation Reduction Act (the “Final Regulations”) and that are scheduled to be published in the Federal Register on January 10, 2025. Please see the unpublished version of the Final Regulations [here](#). The Final Regulations make material modifications to the proposed regulations published in December 2023 (the “Proposed Regulations”).

Background on U.S. Incentives for Clean Hydrogen

Significant incentives for the development of a clean hydrogen industry in the United States were a cornerstone of the Inflation Reduction Act^[2] and the Biden Administration’s goals for a “net zero” emissions economy by 2050.^[3]

In 2021, as part of the plan for achieving those goals, the Department of Energy (DOE) launched its “Hydrogen Shot,” which sought to reduce the cost of clean hydrogen by 80 percent to \$1/kg by 2031.^[4] (In 2021, the cost of “green hydrogen” was approximately \$5/kg.^[5]) The Infrastructure Investment and Jobs Act provided \$9.5 billion for hydrogen resources, including the development

of a national clean hydrogen “strategy and roadmap,” of which \$7 billion was subsequently awarded for the development of seven regional hydrogen hubs.[\[6\]](#)

Overview of U.S. Incentives for Clean Hydrogen

The Inflation Reduction Act enacted section 45V, which provides a ten-year credit for the production of clean hydrogen in the United States.[\[7\]](#) The credit amount ranges from \$0.60/kg to \$3/kg depending on the lifecycle greenhouse gas emissions (GHG) rate of the clean hydrogen production process (discussed in detail below).[\[8\]](#)

The Inflation Reduction Act also enacted (as an elective alternative to the section 45V credit) a 30 percent investment tax credit for qualified property that is part of a specified clean hydrogen production facility (section 48(a)(15)). Both the section 45V and 48(a)(15) credits can be sold on a one-time basis for cash by certain taxpayers, and the section 45V credit is refundable (at the taxpayer’s election) for the first five years of its ten-year credit period.[\[9\]](#)

Section 45V and 48(a)(15) Credits and 45VH2-GREET

The section 45V and 48(a)(15) credit rates are included below:

Section 45V and 48(a)(15) Rates				
GHG intensity (lifecycle kg of CO ₂ -equivalent per kg of H ₂ produced)	0.00-0.44	0.45-1.49	1.50-2.49	2.50-3.99
Section 45V Rate (per kg of H ₂)	\$3.00	\$1.00	\$0.75	\$0.60
Section 48(a)(15) Rate	30%	10%	7.5%	6%

For purposes of the GHG emissions calculation, lifecycle GHG emissions includes all emissions through the point of production (i.e., a “well-to-gate” standard) as determined under the most recent “Greenhouse gases, Regulated Emissions, and Energy use in Transportation” model (commonly referred to as the “GREET” model) developed by Argonne National Laboratory, or a successor model.[\[10\]](#)

The GREET model is essential to the determination of section 45V and 48(a)(15) credits. In connection with the publication of the Proposed Regulations in December 2023, the DOE published the 45VH2-GREET model and a user manual, each available [here](#).[\[11\]](#) The 45VH2-GREET model categorizes data inputs as either “foreground” data (which are dynamic fields input by the taxpayer for a particular project) or “background” data (which are static fields included by the IRS and Treasury).[\[12\]](#)

Adjacent Tax Incentives and Credit Stacking

Sections 45V and 48(a)(15) are only part of the picture. The Inflation Reduction Act enacted numerous additional tax incentives for adjacent technologies that may be upstream and

downstream to the production of clean hydrogen, some of which can be “stacked” with the section 45V credit (or section 48(a)(15) credit) and some of which cannot. For example:

- Production and investment tax credits under sections 45, 45U, 45Y, 48 and 48E are available with respect to projects that generate electricity necessary to power certain hydrogen production facilities (e.g., electrolytic hydrogen projects);
- An investment tax credit is available under section 48 for certain upstream renewable natural gas projects that produce feedstock for other clean hydrogen production facilities (e.g., steam methane reformation (SMR) or autothermal reformation (ATR) projects);[\[13\]](#)
- Section 48 and 48E investment tax credits are also available for downstream facilities that store hydrogen; and
- As noted above, section 48 (and potentially sections 45Y and 48E) also may provide credits for downstream power plants that generate electricity from clean hydrogen.[\[14\]](#)

In addition, carbon capture technology will be essential to section 45V qualification for many clean hydrogen projects, either in the production of hydrogen (e.g., SMR and ATR hydrogen projects) or in the upstream production of energy to power the project. Moreover, clean hydrogen can be used downstream as a fuel source.

The Inflation Reduction Act expanded the 12-year credit for carbon, capture and sequestration projects and provided a credit for sustainable aviation fuel produced through 2027.[\[15\]](#) Both of these credits are subject to statutory anti-stacking rules that generally prevent them from being claimed with respect to a facility claiming the section 45V credit in the same taxable year (or ever claiming the section 48(a)(15) credit) and contain certain restrictions on pivoting between such credits across tax years.

The Proposed Regulations and the Final Regulations

Background

In section 45V, Congress delegated to the Treasury a significant rulemaking task with little explicit statutory direction, leaving numerous key policy choices to Treasury.[\[16\]](#) As a result, it was little surprise that the Proposed Regulations were the source of tremendous debate prior to their publication.[\[17\]](#) A large part of this debate stemmed from a key tension—while the overall thrust of the Inflation Reduction Act (and other Biden Administration administrative and legislative efforts) seemed to support providing an immediate jump-start to the U.S. hydrogen production economy, environmental groups and other stakeholders strongly urged that, absent guardrails, certain hydrogen production processes had the real potential to substantially increase net U.S. GHG emissions.

To address the concerns expressed by environmental groups, the Proposed Regulations introduced several concepts not specifically mentioned in the statute (or in any legislative history) relating to the calculation of the lifecycle GHG emissions. In particular, the Proposed Regulations reflected a pervasive concern with accounting for “induced” GHG emissions resulting from the

potential diversion of renewable or negative-GHG resources (e.g., solar, wind, nuclear, and biogas resources) to hydrogen projects.

The stakeholder interest continued following the publication of the Proposed Regulations. The IRS and Treasury received approximately 30,000 written comments and held a three-day hearing during which approximately 100 individuals testified.^[18]

The Final Regulations generally respond to comments by liberalizing certain of the rules accounting for “induced” emissions.

45VH2-GREET Updates and the PER Process

The Proposed Regulations and the 45VH2-GREET model introduced the term “pathway” to refer to a feedstock and production processes that could be eligible for the section 45V credit, and announced the initial eligible “pathways”:

- SMR of natural gas and landfill gas (with potential carbon capture and sequestration, or “CCS”);
- ATR with potential CCS;
- Coal gasification with potential CCS;
- Biomass gasification with corn stover and logging residue with no significant market value with potential CCS;
- Low-temperature electrolysis of water using electricity; and
- High-temperature electrolysis of water using electricity and potential heat from nuclear power plants.^[19]

The preamble to the Final Regulations announces that a new 45VH2-GREET will be published in January 2025, and the Final Regulations add a taxpayer-favorable safe harbor that allows taxpayers to rely on the 45VH2-GREET model in effect when their project began construction.^[20] The Final Regulations state that the IRS and Treasury anticipate further static “background” data will become project-specific “foreground” data—for example, as natural gas supply chain facilities begin reporting in 2026 to the Environmental Protection Agency’s Greenhouse Gas Reporting Program under the agency’s Subpart W rules, the IRS and Treasury anticipate having sufficient emissions information to move upstream methane leakage rates into a “foreground” data input category in 45VH2-GREET, with the result that hydrogen projects with responsibly sourced natural gas feedstocks may be eligible for greater section 45V credits.

Taxpayers using a pathway not addressed in 45VH2-GREET are instructed to apply to Treasury for a “provisional emission rate” (PER).^[21] The rules for seeking a PER are the same in all material respects as in the Proposed Regulations and are found at Treas. Reg. § 1.45V-4(c).^[22]

The Final Regulations also clarify that the section 45V credit will be determined on a “process”-by-“process” basis, with each “process” defined to refer not just to the production process but also

the single “primary feedstock” used to produce hydrogen via the “process,” with the result that different feedstocks cannot be “blended” in arriving at a process’s GHG emissions rate.[\[23\]](#)

Electrolytic Hydrogen and EACs

Perhaps the most commented-on provisions in the Proposed Regulations dealt with induced emissions from the diversion of clean electricity resources to electrolytic clean hydrogen projects. Under the Proposed Regulations and Final Regulations, taxpayers seeking to demonstrate the source of their electricity as being from a specific facility (e.g., a specific wind, solar or nuclear facility) rather than being from the regional grid must acquire and retire qualifying “energy attribute certificates” (EACs) from the specific electricity generating facility.

Under both the Proposed Regulations and the Final Regulations, these EACs will “qualify” only if they satisfy three requirements to ensure the resulting hydrogen is “clean”[\[24\]](#):

1. **Incrementality:** The electricity generating facility began commercial operations no more than 36 months before the relevant hydrogen production facility was placed in service.[\[25\]](#)

The Final Regulations loosened the incrementality requirements by:

- Including facilities that use CCS technology that was placed in service no more than 36 months before the relevant hydrogen production facility was placed in service, even if the other parts of the facility were placed in service earlier;
 - Excusing from the “incrementality” requirement any facility in a state that Treasury determines has a qualifying electricity decarbonization standard or GHG cap program (only California and Washington state currently qualify); and
 - Deeming incremental up to 200 MWh of electricity per operating hour per reactor from certain merchant or single-unit nuclear facilities that are below an average annual gross receipts threshold[\[26\]](#) and that either have a behind-the-meter connection to the hydrogen production facility or are subject to a ten-year qualifying contract whereby the owner of the hydrogen facility acquires EACs from the nuclear reactor.[\[27\]](#)
2. **Temporal matching:** Subject to a transition rule discussed below, the electricity represented by the EAC must be generated in the same hour that the taxpayer’s hydrogen production facility uses electricity to produce hydrogen.

A transition rule in the Final Regulations allows annual (instead of hourly) matching for electricity generated before January 1, 2030 (a two-year extension from the Proposed Regulations). The Final Regulations also expand temporal matching to EACs from qualifying storage systems, provided the storage system EACs track the energy attributes of the generating facility from which the electricity was stored.[\[28\]](#)

3. **Deliverability:** The electricity generating facility must be in the same “region” as the hydrogen facility, as determined by the balancing authority to which each is electrically interconnected.

The Final Regulations slightly eased the deliverability rule by including electricity from facilities that have transmission rights from the generation location to the region in which the hydrogen production facility is located.^[29] In the case of electricity imported from Canada or Mexico, the generator also must provide an attestation that the use or attributes of the electricity are not being claimed for any other purpose.

Rules for Natural Gas Fuel and Feedstock Alternatives

The Proposed Regulations did not specifically address induced emissions from the diversion of natural gas fuel and feedstock alternatives to clean hydrogen projects, but the preamble to the Proposed Regulations made clear that the IRS and Treasury were considering how to address the issue.

The Proposed Regulations would have required that “renewable natural gas” (*i.e.*, biogas upgraded to the equivalent of fossil natural gas) originate from the “first productive use” of the relevant methane. In response to taxpayer comments observing that it would have been practically impossible to substantiate and verify independently the “first productive use” of a fuel or feedstock source, the Final Regulations dropped the rule. Instead, the Final Regulations introduce a set of rules for determining the “alternative fate” of the various natural gas alternatives that generally reduce the “negative” GHG emissions effect of using such fuels or feedstocks.

The Final Regulations also set forth a “gas EAC” book-and-claim system for substantiating RNG and “coal mine methane” bought and sold through the national pipeline network. The system will have “deliverability” and “temporal matching” requirements, although the deliverability rules will treat the contiguous United States as a single region and the temporal matching rules will require only monthly matching. No state’s system currently satisfies the rules laid out by the IRS and Treasury (and so only direct pipelines or other means of exclusive delivery will currently qualify), but the IRS and Treasury expect current systems to adapt over the next two years in a manner that will allow them to qualify.

Other Rules

- The anti-abuse rule in the Proposed Regulations targeting “wasteful” uses of otherwise-creditable clean hydrogen was narrowed slightly in the Final Regulations to accommodate certain non-abusive ordinary-course commercial industry practices, such as venting or flaring hydrogen for safety or maintenance.^[30]
- In calculating the section 45V lifecycle GHG emissions rate, carbon capture may be taken into account only if carbon is captured and disposed of or utilized in accordance with the rules under section 45Q.
- The Final Regulations add helpful examples illustrating the ordering of the recapture rules under sections 50(a) (generally, disposition or cessation-related recapture), 48(a)(10)(C) (prevailing wage/apprenticeship-related recapture), and 48(a)(15)(E) (GHG emission tier-related recapture) and otherwise do not make material changes to the Proposed Regulations under section 48(a)(15).

- In a taxpayer-favorable rule, taxpayers that acquire and retire EACs on an hourly basis after January 1, 2030 will be able to determine the section 45V credit on an hourly basis (rather than an annual average of the lifecycle GHG emissions).[\[31\]](#)

Congressional Review Act

Because the Final Regulations will be published in the Federal Register on January 10, 2025, the incoming 119th Congress and President Trump will be able to overturn the Final Regulations under the special Congressional Review Act procedures. Under the Congressional Review Act, a final agency rule can be overturned under a special expedited procedure requiring a joint resolution of disapproval by both houses of Congress (in a process requiring very little Senate floor time) and signature by the President.[\[32\]](#) If Congress enacts such a joint resolution overturning a regulation, the agency may not reissue the rule “in substantially the same form” unless Congress passes legislation authorizing such a rule.[\[33\]](#)

[\[1\]](#) Unless indicated otherwise, all “[section](#)” references are to the Internal Revenue Code of 1986, as amended (the “Code”), and all “[Treas. Reg. §](#)” are to the Treasury regulations promulgated under the Code, in each case as in effect as of the date of this alert. The actual name of Public Law No. 117-169, commonly referred to as the Inflation Reduction Act of 2022, is “An Act to provide for reconciliation pursuant to title II of S. Con. Res. 14.”

[\[2\]](#) Before the Inflation Reduction Act, tax incentives for clean hydrogen were generally limited to a modest investment tax credit for fuel cell power plants. Section 48(a)(2)(i)(I).

[\[3\]](#) Executive Order 14057, available [here](#). Related goals included reducing greenhouse gas emissions to 50-52 percent below 2005 levels by 2030 and achieving a carbon pollution-free energy sector by 2035. See White House Fact Sheet: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies, available [here](#).

[\[4\]](#) Dept. of Energy, *Hydrogen Shot*, available [here](#).

[\[5\]](#) Dept. of Energy, *Hydrogen Shot; An Introduction*, available [here](#).

[\[6\]](#) Pub. L. No. 117-58, Subtitle B, 135 Stat. 429, 1005 (Nov. 15, 2021); Dept. of Energy, *Biden-Harris Administration Announces \$7 Billion For America’s First Clean Hydrogen Hubs, Driving Clean Manufacturing and Delivering New Economic Opportunities Nationwide*, available [here](#).

[\[7\]](#) For this purpose, the United States includes possessions as defined in section 638(2). Qualifying hydrogen production must occur in the ordinary course of the taxpayer’s trade or business and must be “for sale or use” (with the production and sale or use verified by a third party).

[\[8\]](#) All stated section 45V rates in this alert are before inflation adjustments and assume satisfaction of all prevailing wage and apprenticeship requirements. The inflation adjustment mechanism is in section 45V(b)(3). For a discussion of the prevailing wage and apprenticeship

requirements made applicable by the Inflation Reduction Act to numerous general business tax credits (including sections 45V and 48(a)(15)), please see our prior alert [here](#).

[9] Section 6418(f)(1)(A)(v), (ix); section 6417(d)(1)(B). In addition, the section 45V credit is refundable for the entire credit period for certain tax-exempt “applicable entities.” Section 6417(b)(5).

[10] Section 45V(c)(1). For these purposes, “well-to-gate” would include emissions associated with feedstock growth, gathering, extraction, processing, and delivery of feedstocks to a hydrogen production facility, as well as the emissions associated with the hydrogen production process, inclusive of the electricity used by the hydrogen production facility, and taking into account any capture and sequestration of carbon dioxide generated by the hydrogen production facility. Treas. Reg. § 1.45V-1(a)(9)(iii).

[11] The 45VH2-GREET was identified in the Proposed Regulations as the “most recent” GREET model for purposes of sections 45V and 48(a)(15)). Updates to the GREET model and user manual were published by DOE in March, August, and November of 2024. In the Final Regulations, the IRS and Treasury clarify that 45VH2-GREET is a “successor model” for purposes of section 45V.

[12] See Preamble to the Final Regulations. Background data includes upstream methane loss rates, emissions associated with power generation from specific generator types, and emissions associated with regional electricity grids.

[13] In SMR, methane reacts with steam under pressure in the presence of a catalyst to produce hydrogen, carbon monoxide, and a relatively small amount of carbon dioxide; in ATR, methane reacts with pure oxygen to create hydrogen and carbon dioxide. See Congressional Research Service, *Hydrogen Production: Overview and Issues for Congress*, available [here](#).

[14] For a discussion of the proposed regulations under sections 45Y and 48E, please see our prior alert [here](#).

[15] Sections 45Q and 45Z. For a discussion of the increased incentives for carbon capture, utilization and sequestration projects (section 45Q) under the Inflation Reduction Act, please see [here](#).

[16] Congress’s delegation provides that Treasury “shall issue regulations or other guidance to carry out the purposes of this section, including regulations or other guidance for determining lifecycle greenhouse gas emissions.” Section 45V(f). Since section 45V(f) was enacted, the Supreme Court in *Loper Bright Enterprises v. Raimondo*, 603 U.S. 369 (2024), instructed courts to independently interpret statutes without deference to an agency’s reading of the law. For a further discussion of *Loper Bright*, please see [here](#).

[17] See, e.g., Amrith Ramkumar & Richard Rubin, *Companies Clash Over Billions of Dollars in Hydrogen Tax Breaks*, Wall St. J., Oct. 23, 2023.

[18] The comments to the Proposed Regulations are available [here](#).

[19] See Dept of Energy, *Guidelines to Determine Well-to-Gate Greenhouse Gas (GHG) Emissions of Hydrogen Production Pathways using 45VH2-GREET Rev. August 2024*, available [here](#).

[20] Treas. Reg. §§ 1.45V-4(b)(2) and 1.48-15(d)(5).

[21] A PER cannot be sought for a pathway addressed in 45VH2-GREET, and a taxpayer relying on a PER must use 45VH2-GREET if the pathway is subsequently reflected in the model.

[22] A PER application requires taxpayers to apply to DOE for an emissions value, a process that was opened in October 2024 and is accessible [here](#). A PER application also requires a Class 3 front-end engineering and design (FEED) study (generally, a study used for project budget approval and indicating a level of project development beyond feasibility).

[23] For this purpose, “electricity” would not be treated as a feedstock, but electricity would still be tracked via EACs as discussed below.

[24] The requirements are commonly referred to as the “three pillars.” See Evolved Energy Research, *45V Hydrogen Production Tax Credits: Three-Pillars Accounting Impact Analysis (2023)*, available [here](#) (cited in the Preamble to the Final Regulations).

[25] The Proposed Regulations also included a rule (generally unchanged in the Final Regulations) that similarly treats an “uprated” facility as incremental to the extent of the facility’s uprated production. Treas. Reg. § 1.45V-4(d)(3)(i)(B). The Final Regulations expand the rule to provide a base rate of zero to qualifying restarts of certain decommissioned facilities. Treas. Reg. § 1.45V-4(d)(3)(i)(B)(2).

[26] \$0.04375/kWh for any two of the calendar years 2017 through 2021.

[27] The contract must be a binding written contract that is in place on the first date on which qualified EACs are acquired and must also manage the reactor’s revenue risk, e.g., a fixed-price power purchase agreement.

[28] The storage system must be located in the same region as both the hydrogen production facility and the facility generating the stored electricity, and the volume of electricity use substantiated by each EAC representing stored electricity must account for storage-related efficiency losses.

[29] Treas. Reg. § 1.45V-4(d)(3)(iii)(B). The generated and delivered electricity must be demonstrated on at least an hour-to-hour basis (with qualifying verification).

[30] Treas. Reg. § 1.45V-2(b).

[31] The rule only applies if the annual average lifecycle GHG emissions rate is not greater than 4kgs of CO₂-e per kg of hydrogen for all hydrogen produced pursuant to that process during the taxable year.

[32] 5 U.S.C. § 802. In President Trump's first term, the Congressional Review Act was used to overturn 16 rules that had been enacted toward the end of the Obama administration. Congressional Research Service, *The Congressional Review Act (CRA): A Brief Overview*, available [here](#). For more information on the Congressional Review Act, please see [here](#).

[33] 5 U.S.C. § 801(b).

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