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The Section 45V Clean Hydrogen Production Credit

P.L. 117-169, commonly known as the Inflation Reduction Act (IRA), enacted a new tax credit for the production of “clean” hydrogen. Widespread adoption of hydrogen fuel may reduce economy-wide greenhouse gas (GHG) emissions, especially in sectors that have traditionally been difficult to decarbonize, such as cement production, steel manufacturing, and trucking. The credit aims to incentivize hydrogen fuel production, but it reduces government revenue, and the Internal Revenue Service (IRS) implementing regulation generated significant public comment.

The IRS modified and finalized its CHPC regulations on January 10, 2025. The IRS set rules based, in part, on over 30,000 comments received on a December 2023 proposed rule. The CHPC also underwent substantive changes as part of the FY2025 Reconciliation Law (P.L. 119-21).

This In Focus provides information on hydrogen fuel and the clean hydrogen production credit (CHPC), also known as “the 45V credit,” based on its Internal Revenue Code section.

The Basics of Hydrogen Fuel

Hydrogen currently fulfills important uses in chemical plants and oil refineries, but does not deliver energy services other than in demonstration-scale quantities. However, a future economy using hydrogen as a fuel could offer an alternative that provides the numerous modern energy services currently associated with fossil fuels. In addition to providing a fuel for transportation, hydrogen could support industrial processes or building operations, or become part of the energy infrastructure by storing energy. Demonstrations of hydrogen technology and the value propositions based on hydrogen continue to emerge, ranging from one-off funded projects to public-private partnerships in the United States and abroad.

Credit Eligibility Requirements

Taxpayers producing clean hydrogen at qualifying facilities may receive the CHPC based on the amount of clean hydrogen produced, the lifecycle carbon dioxide equivalent (CO_{2e}) emissions rate of the hydrogen through the point of production, and the taxpayer’s compliance with prevailing wage and apprenticeship requirements. The *carbon dioxide equivalent* is a measurement unit that allows disparate gases and their effect on global warming to be expressed in a common unit. Credits are available for 10 years after a facility is placed in service.

A *qualified* facility must be owned by the taxpayer, produce *qualified clean hydrogen* (QCH), and have begun construction prior to 2028. QCH cannot have a lifecycle

GHG emissions rate greater than 4 kilograms of CO_{2e} per kilogram of hydrogen through the point of production. If a facility placed in service before 2023 did not initially produce QCH, but is modified to produce QCH before 2028, and if those modifications are charged to the taxpayer’s capital account, then the facility qualifies for the credit. Without additional modifications, changing the fuel source would not be a capital expense and therefore would not make a facility eligible for the credit.

Tax-exempt entities including nonprofits, state and local governments, and rural electric cooperatives may receive direct cash payments in place of traditional income tax credits. Taxable entities may also elect to receive direct cash payments for five years, starting with the year a facility is placed in service. Taxable entities cannot make this election after 2032. The CHPC is *transferable*, meaning that credits may be sold from one business to another for cash. Businesses of all types, including businesses not in the energy sector, may buy credits. Once bought, credits cannot be resold to a third entity.

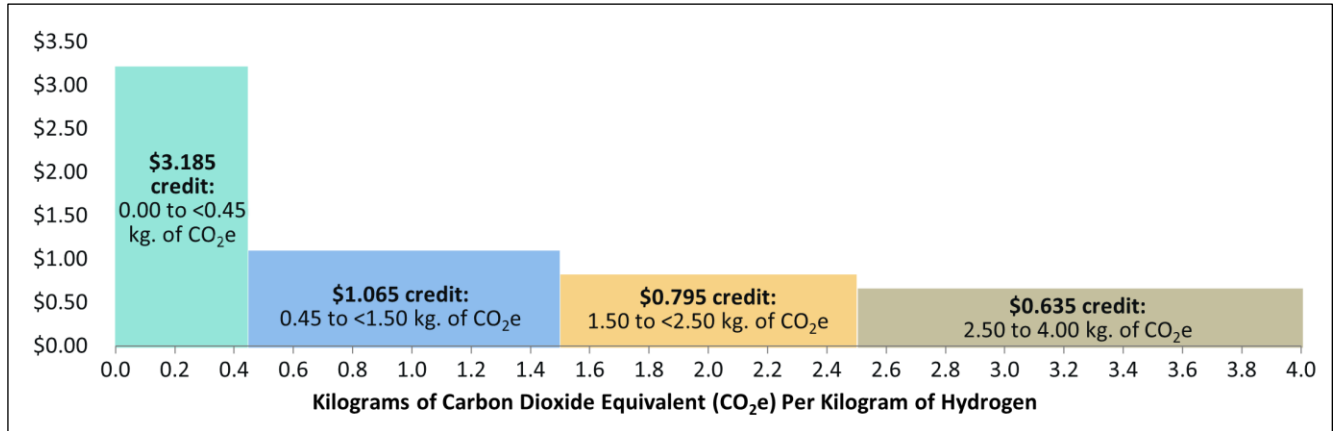
CHPC Credit Values and “Cliffs”

For taxpayers meeting prevailing wage and apprenticeship requirements as described under 26 U.S.C. §45V, the maximum credit in 2025 was \$3.185 per kilogram of QCH; amounts are adjusted annually for inflation. Taxpayers producing QCH with lifecycle GHG emissions below 0.45 kilograms of CO_{2e} (through the point of production) are eligible for the full \$3.185 credit. In 2025, taxpayers were eligible for partial credits of

- \$1.065 per kilogram of QCH if the CO_{2e} emissions rate was from 0.45 kilograms to less than 1.5 kilograms;
- \$0.795 per kilogram of QCH if the CO_{2e} emissions rate was from 1.5 kilograms to less than 2.5 kilograms; and
- \$0.635 per kilogram of QCH if the CO_{2e} emissions rate was between 2.5 and 4.0 kilograms.

Figure 1 shows how the CO_{2e} emissions rate affects the value of the CHPC. The CHPC includes four “credit cliffs”—points at which the value of the credit rises or falls based on small changes in CO_{2e} emissions. Policy cliffs can provide inconsistent incentives for behavioral changes, depending on the proximity to the given cliff. In the case of the CHPC, such cliffs are combined with flat or unchanging credit values over much wider ranges of CO_{2e} emissions. For example, the CHPC increases significantly when taxpayers reduce their CO_{2e} emissions from 0.46 to 0.44 kilograms (per kilogram of hydrogen); on the other hand, producers have no CHPC-related incentive to reduce their emissions from 0.44 to 0.00 kilograms.

Figure 1. Value of the Clean Hydrogen Production Credit in 2025, by Carbon Dioxide Equivalent Emissions
Credit per kilogram of hydrogen for a firm meeting applicable wage and apprenticeship requirements



Source: CRS analysis of 26 U.S.C. §45V and IRS regulatory documents.

Notes: Values displayed are before reductions for the use of tax-exempt bonds. kg = kilogram.

CHPC amounts are reduced by four-fifths for producers failing to meet prevailing wage and qualified apprenticeship requirements. These requirements are discussed in CRS Report R48428, *Inflation Reduction Act (IRA) Wage and Apprenticeship Requirements: Effect on Tax Credit Values*. Finally, the CHPC is reduced by the share of financing from tax-exempt bonds, up to a maximum 15% reduction.

Fiscal Costs

In December 2025, the Joint Committee on Taxation (JCT) projected that the CHPC will reduce federal revenues by \$400 million from FY2025 through FY2029. The JCT estimated that approximately half that amount will come in the form of direct payments to hydrogen producers.

A year earlier, the JCT had projected that the CHPC would cost \$7.2 billion from FY2024 through FY2028. The fall in the cost estimate likely cannot be attributed to the FY2025 Reconciliation Law, which shifted the beginning of construction deadline forward from 2033 to 2028. This still allows taxpayers to begin receiving the credit through the mid-2030s and continue receiving it through the early 2040s, and thus would have little effect on FY2025-FY2029 expenditures. Rather, the change is likely attributable to the inherent difficulties in calculating the costs of a credit for a new and budding industry with an uncertain growth trajectory.

Recent Developments

Under the final CHPC rule, certain GHG emissions—CO₂, methane, and nitrous oxide—are to be calculated through the point of production (well-to-gate) as determined by the version of the Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) model in effect when construction begins. GREET is maintained by Argonne National Laboratory. The IRA allows the use of successor models, and the final rule specifies “45VH2-GREET.”

The final rule explicitly includes a number of methods of making hydrogen, including some based on electricity and some based on chemical transformation of feedstocks such as natural gas, coal bed methane, and others. If the rule

and/or GREET does not explicitly cover a particular method, taxpayers may petition for a provisional emissions rate to calculate the credit. Generally, the calculation of CO₂e emitted when making hydrogen with electricity and water (i.e., *electrolysis*) uses the CO₂e emissions of the regional electricity grid. Taxpayers seeking to attribute their emissions to a specific electricity facility rather than the grid may do so provided they meet three conditions known as *incrementality*, *deliverability*, and *temporal matching*.

In the final rule, *incrementality* involves establishing that the source of electricity is no more than three years old (implying that new “increments” of electric energy were added to the grid) or, if the facility relies on carbon capture and sequestration technology, that technology cannot have started operation more than three years before the hydrogen production facility. Restarted facilities or expanded facilities may also meet the conditions for incrementality. Nuclear generation satisfies the incrementality requirement if purchasing the facility’s electricity is “likely to mitigate risk of retirement” as elaborated in a further set of criteria.

Deliverability is met if the electricity is generated in the region where the hydrogen is produced. The condition can also be met through use of interregional electricity if there are contractual arrangements between the generator and the facility and if the transmission can be demonstrated hourly.

Under the third condition, *temporal matching*, the electricity must be produced in the same time period as the hydrogen. Through 2029, the hydrogen must be produced in the same year as the electricity; starting in 2030, it must be produced during the same hour.

The FY2025 Reconciliation Law required that all hydrogen facilities qualifying for the credit begin construction before January 1, 2028. The previous cutoff was the start of 2033.

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