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Proposed regulations on clean hydrogen production credit and related energy credit

Initial observations and analysis

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The U.S. Treasury and IRS on December 22, 2023, released the highly anticipated proposed regulations regarding the credit for the production of clean hydrogen under section 45V, and the associated energy credit under section 48(a)(15).

The proposed regulations are intended to apply to tax years beginning after December 26, 2023 (the date they were published in the Federal Register). Taxpayers may rely on these proposed regulations for tax years beginning after December 31, 2022, and before the date that the final regulations are published, provided that taxpayers follow the proposed regulations in their entirety and in a consistent manner.

The proposed regulations would provide rules for:

- Determining lifecycle greenhouse gas emissions rates resulting from the hydrogen production processes
- Petitioning the IRS for a provisional emissions rate
- Using electricity from certain renewable or zero-emissions sources to produce qualified clean hydrogen
- Verifying production and sale or use of qualified clean hydrogen
- Modifying or retrofitting existing hydrogen production facilities to obtain a new placed in service date for purposes of the credit
- Irrevocably electing to treat part of a specified clean hydrogen production facility instead as property eligible for the energy credit

Background

The section 45V credit is a production tax credit (PTC) that is generally determined based on the amount of clean hydrogen produced during the 10-year period following the date the production facility is placed in service, and the emissions intensity of the process used to produce the hydrogen. As illustrated in the tables below, to be eligible emissions must be 4kg of CO2 equivalent per kg of hydrogen or less to be eligible, and the credit amount is higher when the hydrogen production process emissions are lower. In lieu of the clean hydrogen production tax credit, a taxpayer can elect to treat the facility (or a portion of the facility) as energy property under section 48. (The energy percentage would range from 1.2 to 6% base rate and 6 to 30% bonus rate depending on the type of clean hydrogen that is produced.)[1]

Determination of Applicable Percentage	
The applicable percentage is determined for clean hydrogen produced through by the emissions rate of CO2 equivalent per kg of hydrogen:	
Emission Rate	*Applicable %*
2.5kg – 4.0kg	20%
1.5kg – 2.5kg	25%
0.45kg – 1.5kg	33.4%
< .45kg	100%

Credit Rate based on Emission Rate		
Emission Rate	*PTC Credit Rate*	*ITC Credit Rate*
2.5kg – 4.0kg	$0.60	6%
1.5kg – 2.5kg	$0.75	7.5%
0.45kg – 1.5kg	$1.00	10%
< .45kg	$3.00	30%

[1] The section 45V (or section 48 in lieu of section 45V) credit rates are subject to meeting the prevailing wage and apprenticeship requirements. A base credit rate is available if the requirements are not satisfied, and a 5x higher bonus credit rate is available if the requirements are satisfied.

45VH2-GREET

The amount of the section 45V credit is determined based upon the lifecycle GHG emissions rate of all hydrogen produced at a qualified clean hydrogen production facility during the tax year. Accordingly, this determination is to be made following the close of each tax year to include all hydrogen production from the year.

The proposed regulations provide that the lifecycle GHG emissions rate for the purposes of section 45V is determined under 45VH2-GREET, or the most recent GREET model.

The 45VH2-GREET was developed for the administration of the section 45V tax credit. The current version of 45VH2-GREET can be found here. The proposed regulations state that this is the only variant of GREET that is suitable to determine emissions rates for the section 45V credit.

As of the publication date of these proposed regulations, 45VH2-GREET includes the following hydrogen production pathways, but the Treasury Department and IRS seek comments on this approach—

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 corn stover and logging residue with no significant market value with potential CCS
7. Low-temperature water electrolysis using electricity
8. High-temperature water electrolysis using electricity and potential heat from nuclear power plants

Energy attribute certificates (EACs)

The proposed regulations provide that EACs (a form of which are renewable energy certificates (RECs)) may be considered in determining the emissions from purchased electricity for purposes of the section 45V credit, however guardrails apply. The proposed regulations include three requirements (often referred to as the “three pillars”) for a qualifying EAC, similar to those adopted in the EU in its clean hydrogen regulations. This includes the adoption of incrementality, temporal matching, and deliverability requirements, which may prove challenging for hydrogen producers to satisfy while the industry catches up to these requirements.

Incrementality: The electricity-generating facility responsible for the electricity at a qualified hydrogen production facility must have a commercial operation date or an increase in rated nameplate capacity (uprate) of no more than three years before the relevant hydrogen production facility is placed in service. The proposed regulations also provide rules, with respect to existing electricity generating facilities that are likely to avoid retirement because of its relationship to a hydrogen production facility, and how these facilities will meet the incrementality requirement.

Temporal matching: The DOE has advised that hourly matching is necessary to properly address significant indirect emissions from electricity use and that the tracking systems and related contractual structures for hourly matching will take some time to develop to an appropriate level of maturity. A transition rule, applicable to EACs representing electricity generated before January 1, 2028, allows for the treatment of electricity as generated in the same hour as used by the hydrogen production facility if the EAC's electricity is generated in the same calendar year that the taxpayer's hydrogen production facility utilizes

electricity for hydrogen production. This transition rule aims to facilitate the development of the EAC market's hourly tracking capability necessary for compliance verification.

Deliverability: This requires qualifying EACs to represent electricity that was produced by an electricity generating facility that is in the same region as the relevant hydrogen production facility. the proposed regulations define the term “region” to mean a United States region derived from the National Transmission Needs Study that was released by the DOE on October 30, 2023.

KPMG observation

Whether and how the proposed regulations would consider the three pillars was much debated leading up to the issuance of the proposed regulations. The proposed rules reflect careful attention to the identified relevant policies and regulatory authority for carrying out those policies. As a practical matter the adoption of the three pillars as proposed will put operational and financial limitations on qualifying for the credit that may limit investment in these projects.

Provisional emissions rate

If the lifecycle GHG emissions rate of the hydrogen produced at a facility has not been determined by 45VH2-GREET then the taxpayer may use a provisional emissions rate (PER) as determined by the Secretary of Treasury. The initial version of 45VH2-GREET does not model every possible fuel as a feedstock nor does it represent all hydrogen production technologies that are currently of commercial interest.

A taxpayer may not use the PER process if its feedstock and hydrogen production technology are represented in 45VH2-GREET, even if the taxpayer disagrees with the underlying assumptions or calculation approach used by the most recent 45VH2-GREET.

The proposed regulations provide procedures for obtaining a PER process, which includes a requirement for taxpayers to request an emissions value from the Department of Energy (DOE).

Procedures for verification of qualified clean hydrogen production and sale or use

Although the section 45V credit is determined with respect to the tax year in which the qualified clean hydrogen is produced, a taxpayer is not eligible to claim the section 45V credit with respect to the production of that hydrogen until all relevant verification requirements, and the verification itself, have been completed for both the production of the hydrogen and the sale or use of that hydrogen. Thus, if verification occurred after the extended return filing deadline for the tax year in which the hydrogen was produced, the taxpayer would need to file an amended return or administrative adjustment request (AAR) to claim the section 45V credit.

The proposed regulations specify that a verification report must be prepared by a qualified verifier, and the report must contain certain specified information regarding the production process and amounts, as well as information concerning the verifier’s qualifications and conflicts of interest.

If a transfer election has been made with respect to the 45V credit, then the attestation requirements must be made with respect to the qualified verifier’s independence from both the eligible taxpayer and the

transferee taxpayer. This will require taxpayers to identify who the credit will be sold to prior to determining the verifier.

A qualified verifier means any individual with accreditation from the American National Standards Institute National Accreditation Board or as a verifier under the California Air Resources Board Low Carbon Fuel Standard program.

Additionally, the proposed regulations provide clarity that section 45V does not deny a credit if the hydrogen is sold or used outside of the United States or a U.S. territory.

Renewable natural gas and fugitive sources of methane

The proposed rules provide limited guidance 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 section 45V credit. The term RNG refers to biogas that has been upgraded to be equivalent in nature to fossil natural gas. Fugitive methane refers to the release of methane through, for example, equipment leaks, or venting during the extraction, processing, transformation, and delivery of fossil fuels to the point of final use, such as coal mine methane or coal bed methane.

The preamble to the proposed regulations indicate that the Treasury and IRS intend to issue relevant rules and that rules around the use of systems such as book and claim are anticipated to be logically consistent with but not identical to the incrementality, temporal matching, and deliverability requirements proposed to apply to EACs. Comments are requested on the potential application of such rules.

KPMG observation

While the proposed regulations provide detail around electricity and related emissions attributes as part of the hydrogen production process, there is little guidance provided for RNG and fugitive methane. The lack of guidance extends to exclusion of those inputs in 45VH2-GREET as well as a statement in the preamble indicating that the PER process is not available to RNG until final rules are issued. Because of this many taxpayers may not have a certain path to claiming the credit absent additional guidance.

Interaction with section 45Q

No section 45V credit is allowed for qualified clean hydrogen production at a facility that includes carbon capture equipment for which the Section 45Q carbon capture and sequestration credit is allowed. The proposed regulations provide that a facility for this purpose is 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 to produce qualified clean hydrogen 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.

A facility does not include equipment that is used to condition or transport hydrogen beyond the point of production or equipment used to produce electricity that will power the hydrogen production process, including any carbon capture equipment associated with the electricity production process.

However, if carbon capture equipment is functionally interdependent with other components to produce qualified clean hydrogen, and the carbon capture equipment is the reason that the facility can produce hydrogen through a process that results in a lifecycle GHG emissions rate falling within the specified qualified range, the carbon capture equipment will be considered part of the facility for purposes of section 45V.

KPMG observation

The definition of "facility" provides helpful clarity for analyzing different project configurations and the implications of the section 45Q anti-stacking rule. For instance, the guidance indicates that co-located power sources utilizing carbon capture are not part of the facility and therefore section 45Q could be available for those carbon capture activities. This guidance is also helpful for purposes of determining the application of the prevailing wage and apprenticeship rules, which generally apply to the construction, alteration and repair of the "facility."

Other rules

Anti-abuse rule

The section 45V credit is not allowable 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.

Retrofits

The proposed regulations provide that a retrofitted facility will be considered originally placed in service for purposes of section 45V, and eligible for a new 10-year credit period, provided the fair market value of the used property is not more than 20 percent of the facility's total value (the "80/20 rule"). Notably, the proposed regulations also provide that the 80/20 rule applies to any existing facility, regardless of whether the facility previously produced qualified clean hydrogen.

Election to treat clean hydrogen production facility as energy property

Section 48(a)(15) allows a taxpayer that owns and places in service a specified clean hydrogen production facility to make an irrevocable election to claim the section 48 credit in lieu of the section 45V credit for any qualified property placed in service after December 31, 2022, that is part of the facility.

The taxpayer must obtain an annual verification report for the tax year in which the election is made and for each tax year thereafter of the recapture period (of five years).

In the event the facility produces qualified clean hydrogen through a process that results in a lifecycle GHG emissions rate greater than the lifecycle GHG emissions rate such facility was designed and expected to produce, resulting in a reduced energy percentage with respect to such facility, an emissions tier recapture event will occur.

An emissions tier recapture event occurs during any tax year of the recapture period if the taxpayer fails to obtain an annual verification report, the facility actually produced hydrogen through a process that results in a lifecycle GHG emissions rate that can only support a lower energy percentage than the energy

percentage used to calculate the amount of the section 48 credit for the year in which the facility is placed in service, or the facility actually produced hydrogen through a process that results in a lifecycle GHG emissions rate of greater than 4 kilograms of CO2e per kilogram of hydrogen.

Next steps

There will likely be active engagement during the comment period for the proposed rules (comments are due February 26), in particular, relating to the three pillars and lack of clear guidance and comment requests for RNG. And with respect to guidance for RNG, it is not entirely clear whether there will be another set of proposed rules and, if so, what the timeline for such rules would be. Finally, the proposed regulations and DOE materials indicate that the 45VH2-GREET will be updated periodically but the frequency of such updates and how stakeholder input is considered is not specifically addressed. So while the proposed regulations provide helpful and much needed initial guidance for clean hydrogen production, questions—both substantive and procedural—still remain.

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