Invenergy

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Internal Revenue Service
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Room 5203
P.O. Box 5203, Ben Franklin Station
Washington, D.C. 20044

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Re: Request for Comments on Credits for Clean Hydrogen and Clean Fuel Production Under Section 45V and 45Z

Submitted via www.regulations.gov; Notice 2022-58

https://www.irs.gov/pub/irs-drop/n-22-58.pdf

Invenergy is a large, privately held sustainable energy company and renewables developer headquartered in Chicago, Illinois. We appreciate the opportunity to submit comments regarding the Internal Revenue Service (IRS) solicitation for feedback on §45V and §45Z of the Inflation Reduction Act. Clear rules will enable smooth implementation of this legislation, thereby jumpstarting clean hydrogen production and subsequent decarbonization of the economy.

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Responses from Invenergy

.01 (1)(a) Section 45V defines "lifecycle greenhouse gas emissions" to "only include emissions through the point of production (well-to-gate)." Which specific steps and emissions should be included within the well-to-gate system boundary for clean hydrogen production from various resources?

Invenergy agrees with the International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE) definition of hydrogen “production” boundaries. This should include fugitive emissions of all steps of hydrogen production, including feedstock delivery and carbon dioxide capture and storage facilities. Emissions related to the “conditioning” of high purity hydrogen to other forms including but not limited to liquid hydrogen, ammonia, and methanol, should be considered “delivery” or “use” of the hydrogen and occur downstream of the “gate”. This will ensure this credit remains true to its intent, remaining agnostic to the hydrogen’s end use (e.g. liquid hydrogen for fuel delivery, gaseous hydrogen for industry, ammonia for transport).

.01(1)(d) If a facility is producing qualified clean hydrogen during part of the taxable year, and also produces hydrogen that is not qualified clean hydrogen during other parts of the taxable year (for example, due to an emissions rate of greater than 4 kilograms of CO2-e per kilogram of hydrogen), should the facility be eligible to claim the § 45V credit only for the qualified clean hydrogen it produces, or should it be restricted from claiming the § 45V credit entirely for that taxable year?

Yes, this should be allowed as long as the average annual emissions are below the threshold. It ensures subsidization of only clean hydrogen and improves ability to finance projects by reducing infrastructure and offtake risks.

.01(1)(e)(i),(ii) How should qualified clean hydrogen production processes be required to verify the delivery of energy inputs that would be required to meet the estimated lifecycle greenhouse gas emissions rate as determined using the GREET model or other tools if used to supplement GREET? How might clean hydrogen production facilities verify the production of qualified clean hydrogen using other specific energy sources? What granularity of time matching (that is, annual, hourly, or other) of energy inputs used in the qualified clean hydrogen production process should be required?

Clean hydrogen production facilities can verify clean electricity inputs through existing mechanisms, i.e. Renewable Energy Credits (RECs), which are traded in markets across the US and are retired upon use. Invenergy supports utilization of annual matching of these credits to production, as long as the electricity is produced within the same balancing authority as the hydrogen facility. Invenergy urges the IRS to initially adopt annual matching, as there is no existing mechanism to track and validate hourly matching and implementing such system would hinder market growth. Annual matching is immediately feasible and would ensure the power being used is renewable or low emission. Given controversy on whether or not annual matching will reduce emissions, the IRS could initiate a stakeholder process to determine the merits of more stringent temporal requirements as well as the appropriate timeline for introduction of such rules. However, Invenergy urges the IRS to ensure projects be subject to the rules active at the start of construction and remain under those rules for the full PTC lifetime. Without this security

of PTC revenue, it will be extremely challenging to finance any project. Furthermore, many projects will rely on long-term (10y+) renewable power purchase agreements, and the possibility of mid-point rule changes may require producers to partake in more expensive and less predictable short term power purchases.

Please see response to .01(4)(g) for more detail.

.01(2) Alignment with the Clean Hydrogen Production Standard. On September 22, 2022, the Department of Energy (DOE) released draft guidance for a Clean Hydrogen Production Standard (CHPS) developed to meet the requirements of § 40315 of the Infrastructure Investment and Jobs Act (IIJA), Public Law 117-58, 135 Stat. 429 (November 15, 2021).4 The CHPS draft guidance establishes a target lifecycle greenhouse gas emissions rate for clean hydrogen of no greater than 4.0 kilograms CO2-e per kilogram of hydrogen, which is the same lifecycle greenhouse gas emissions limit required by the § 45V credit. For purposes of the § 45V credit, what should be the definition or specific boundaries of the well-to-gate analysis?

See response to .01(1)(a)

.01(3)(a) Provisional Emissions Rate. For hydrogen production processes for which a lifecycle greenhouse gas emissions rate has not been determined for purposes of § 45V, a taxpayer may file a petition with the Secretary for determination of the lifecycle greenhouse gas emissions rate of the hydrogen the taxpayer produces. At what stage in the production process should a taxpayer be able to file such a petition for a provisional emissions rate?

A taxpayer should be allowed to file a petition for a provisional emissions rate as soon as the taxpayer has submitted permit applications and can provide documentation on supply of inputs (i.e. electricity, natural gas, steam) and expected valorized outputs (oxygen, hydrogen, carbon black). This will give an indication of expected lifecycle emissions to determine a provisional emission rate early enough to allow time for financing of projects, which will partially depend on PTC qualification. Once the project is operational, this provisional emissions rate can be validated via recordkeeping, metering, and/or other data.

.01(4)(c) What technologies or accounting systems should be required for taxpayers to demonstrate sources of electricity supply?

For the validation of clean electricity supply, existing accounting systems should be employed to ensure credibility and to enable near-term market growth. These accounting systems include but are not limited to PJM-GATS, NAR, M-RETS, Texas REC, NEPOOL-GIS, NYGATS, WREGIS, MIRECS, and NC-RETS.

.01(4)(f) Should indirect book accounting factors that reduce a taxpayer's effective greenhouse gas emissions (also known as a book and claim system), including, but not limited to, renewable energy credits, power purchase agreements, renewable thermal credits, or biogas credits be considered when calculating the § 45V credit?

For electricity produced within the same balancing authority as the hydrogen, indirect book accounting factors, such as renewable energy credits (RECs), power purchase agreements (PPAs), and virtual PPAs (vPPAs), should be allowed to validate supply of clean inputs. The book and claim system has a proven track record for effectively accrediting low-carbon value to products. For fuels like hydrogen and renewable natural gas, California's Low Carbon Fuel Standard (LCFS) has been particularly successful and includes a regional component to electricity utilized in the production of hydrogen. With thoughtful implementation and guidance, these mechanisms can be implemented quickly as enabling frameworks currently exist. Invenergy urges the IRS to prioritize accounting systems that will not hinder, but instead encourage growth of this nascent industry in line with the policy's ultimate intention.

.01(4)(g) If indirect book accounting factors that reduce a taxpayer's effective greenhouse gas emissions, such as zero-emission credits or power purchase agreements for clean energy, are considered in calculating the § 45V credit, what considerations (such as time, location, and vintage) should be included in determining the greenhouse gas emissions rate of these book accounting factors?

Temporal Accounting As discussed in response to .01(1)(e)(i),(ii), Invenergy encourages the IRS to adopt annual matching, where carbon free energy must be generated within the same year as the hydrogen is produced.

Invenergy urges the IRS to initially adopt annual matching, as there is no existing mechanism to track and validate hourly matching and implementing such system would hinder market growth. This aligns with comments in the Princeton Net Zero Lab study, which read: *"The logistics of implementing a strict 100% Hourly Matching requirement will be more challenging, as markets for time-based PPAs or EACs do not currently exist in the United States. The government may therefore wish to adopt a phased approach to enforcing a strict time-matching requirement while directly supporting development of the required accounting standards and market mechanisms to enable the creation, tracking, and trade of time-based energy attribute certificates (T-EACs)."*[1] Annual matching is immediately feasible and would allow clean validation through existing frameworks.

Given controversy on whether or not annual matching will reduce emissions, Invenergy suggests the IRS initiate a stakeholder process to further evaluate these potential benefits and determine if it is appropriate to introduce such requirements in the future. Invenergy urges the IRS to be cautious in this process when considering the implementation of strict temporal matching, as this will introduce additional cost and risk to projects, thereby limiting growth of the electrolytic hydrogen industry. While stricter requirements may reduce short-term emissions for electrolytic hydrogen, they could push a disproportionate build out of fossil-based hydrogen

[1] Ricks, Wilson; Xu, Qingyu; and Jenkins, Jesse D. "Cost and Emissions Impacts of Hydrogen Production Tax Credit Implementations". Zero Lab. Princeton University. Sept 2022.

assets, which can never be net zero and have 20y+ operational lifetimes. This would ultimately have a reverse impact to the bill's intended purpose.

Note that in Europe, hourly temporal matching was proposed and swiftly rejected, as it became clear this would kneecap the industry and make Europe less competitive in the global sphere. If the United States (US) implemented stricter rules than Europe, it could inhibit the US's ability to become an electrolytic hydrogen leader.

Regardless of whether a stakeholder process is initiated, Invenergy urges the IRS to ensure projects be subject to the rules active at the start of project construction and remain under those rules for the full PTC lifetime. Without this security of PTC revenue, it will be extremely challenging to finance any project and severely hinder market growth. Furthermore, many projects will rely on long-term (10y+) renewable power purchase agreements, and the possibility of mid-point phase-ins or rule changes may require producers to partake in more expensive and less predictable short term power purchases.

Geographic Boundaries Invenergy supports a regional limitation for RECs and PPAs. We recommend the IRS require electricity consumed to be produced within the same financially settled, balancing authority or organized market as the hydrogen project. Where balancing authority coverage areas are small, this can be expanded to include several. This regional limitation will help manage potential energy market price distortion and provide additional credibility that clean energy generation is linked to hydrogen production.

Double Counting IRS should establish requirements to prevent double counting of environmental benefits. Electricity credits utilized and retired under this PTC should not be claimed under any other programs.

Note, if additionality becomes a requirement, it should not be extended to co-located facilities. Otherwise curtailed energy on an existing system can be used as energy supply for electrolyzers, increasing net utilization of clean energy and supporting the increase of renewable generation resources.