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

The Honorable Lily L. Batchelder
Assistant Secretary for Tax Policy
Department of the Treasury
1500 Pennsylvania Ave., NW
Washington, D.C. 20220

Mr. William M. Paul
Principal Deputy Chief Counsel and Deputy Chief
Counsel (Technical)
Internal Revenue Service
1111 Constitution Ave., NW
Washington, D.C. 20224

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

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

Pattern Energy appreciates this opportunity to submit the following comments in response to the Internal Revenue Service's (IRS or the Service) Request for Comments on Credits for Clean Energy and Clean Fuel Production Under Section 45V and 45Z. Pattern is a developer and operator of wind, solar, transmission, and energy storage projects in the United States, Canada, Mexico, and Japan. Pattern's projects generate many direct and indirect benefits to communities located throughout the United States, including creating thousands of construction jobs with hiring priority for local workers, millions of dollars of economic opportunity for local communities, and connecting diverse energy sources, which provides increased electric reliability and consumer savings.

I. QUESTIONS FROM TREASURY/IRS

***.01(1).* Section 45V provides a definition of the term "qualified clean hydrogen." What, if any, guidance is needed to clarify the definition of qualified clean hydrogen?**

Pattern concurs with the American Clean Power Association's (ACP's) comments.

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?

Pattern concurs with the American Clean Power Association's (ACP's) comments.

b)(i and ii) How should lifecycle greenhouse gas emissions be allocated to co-products from the clean hydrogen production process? For example, a clean hydrogen producer may valorize steam, electricity, elemental carbon, or oxygen produced alongside clean hydrogen. (ii) How should emissions be allocated to the co-products (for example, system expansion, energy-based approach, mass-based approach)?

Pattern concurs with the American Clean Power Association's (ACP's) comments.

(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?

Treasury should, with the 45V credit, encourage projects to move to the lowest level of CO2e emissions. Ultimately, hourly matching of renewable energy production with electricity consumption is likely the best approach for achieving the lowest level of CO2e emissions. Unfortunately, ISOs do not administratively support measuring and claiming hourly RECs and green hydrogen projects will need more renewables of all types (long duration storage, wind and solar) to match 100 percent of hours. It is possible to match approximately 50 percent of hours in most wind and solar resource rich regions with minimal additional economic burden. Accordingly, we highlight two ways to award the 45V credit to achieve a balanced objective of jumpstarting a nascent industry and reducing emissions. First award 45V credit for projects based on their CO2e level on an hour- month average basis (12x24), given that it is the monthly level at which all ISOs measure and report RECs today. Second, award the credit based on an annual average CO2e level but also require that a project show that at least 50 percent of hours are shown to have been sourced from wind and solar and establish an appropriate phase-in to increase that percentage of hours over time to at least 75 percent. Both methodologies would reflect both where the market functions today but importantly would also drive the industry towards lower emissions over time and beneficially encourage economy wide emission reductions and a balanced grid.

(e) 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?

Pattern concurs with the American Clean Power Association's (ACP's) comments.

(i) How might clean hydrogen production facilities verify the production of qualified clean hydrogen using other specific energy sources?

Pattern concurs with the American Clean Power Association's (ACP's) comments.

(ii) 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?

Treasury should encourage increasingly rigorous temporal granularity in its requirements over time. Treasury's guidance in this area will have implications for the wider renewable energy industry and the competitiveness of green hydrogen in replacing carbon emitting fuels in the broader economy. Granular temporal matching is important to (1) reduce hydrogen emissions versus traditional hydrogen (2) send a demand signal for a diverse build out of new technology like 8 hour/long duration storage and a mix of wind and solar -which is good for emissions reduction and a stable and balanced electric grid and (3) Incentivize and buildout a robust hydrogen supply chain.

Pattern has analysed various regions of the US to understand at what level of hourly matching is possible today with no additional cost. In Texas, a green hydrogen project would be able to match approximately 65 percent of hours at minimal additional cost to annual matching and in MISO 45 percent of hours can be matched with minimal additional cost. In regions like FRCC (Florida) with only one strong renewable resource, about 40 percent of hours can be matched today without additional storage. With some storage and additional wind and solar MWh purchases, 50 percent of hours can be matched in most major regions of the United States today. However, it is important for Treasury to understand that challenges exist with hourly matching above 80 percent of hours, moving to 100 percent, given the current percentages of renewables available on the grid. To match over 85 percent of load-hours in Texas, our analysis concluded that three times as many renewable energy MWhs would need to be contracted, additional storage would be required, or alternately, running an electrolyzer a reduced number of hours (or a combination of all three). It is only at this high percentage of matching that green hydrogen will face additional cost and physical limits on deployment in the near term (5 years) until generation and transmission constraints are overcome by larger wind and solar build out and/or longer duration storage is more common.

.*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). 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 answer to question .01(1)(a) above.

.*01(3)*. 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.

(a) At what stage in the production process should a taxpayer be able to file such a petition for a provisional emissions rate?

Pattern concurs with the American Clean Power Association's (ACP's) comments.

.01(4). **Recordkeeping and Reporting.**

(b) What technologies or methodologies should be required for monitoring the lifecycle greenhouse gas emissions rate resulting from the clean hydrogen production process?

Pattern concurs with the American Clean Power Association's (ACP's) comments.

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

Pattern concurs with the American Clean Power Association's (ACP's) comments.

(d) What procedures or standards should be required to verify the production (including lifecycle greenhouse gas emissions), sale and/or use of clean hydrogen for the § 45V credit, § 45 credit, and § 48 credit?

Pattern concurs with the American Clean Power Association's (ACP's) comments.

(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?

Pattern concurs with the American Clean Power Association's (ACP's) comments.

(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?

- ***Regionality***

Regionality establishes a geographical boundary within which both the clean energy project and the electrolyzer must be located. Pattern supports Treasury adopting a requirement that the electrolyzer be in the same region as the renewable project that it claims as the source of electricity. This enables operators of green hydrogen to draw power from the local utility, e.g., if they have a PPA, virtual PPA, or storage tolling agreement, so long as it is within the same financially settled, balancing authority or organized market. In the case where a single utility acts as the balancing authority, the boundaries should be extended to include any adjacent or connected balancing authority.

- ***Additionality***

Additionality is critical to ensure that hydrogen projects do not increase grid electric load and increase greenhouse gas emissions. Additionality on its own is not the most important driver to reduce greenhouse gas emissions. This is because not all additional MWhs are equal in their offset of carbon emissions from the MWh

they are displacing – coal or gas. Increasing solar in a region like California does not reduce emissions an equivalent amount to adding wind to California's energy mix, which displaces gas for example. The best requirement Treasury could require to drive additionality that lowers greenhouse gas emissions, is temporal matching and ultimately hourly matching. In defining additionality, Treasury should include all new generation that is added to the grid. Therefore, MWhs that would have been curtailed as well as repowers—since repowers greatly increase the clean generation potential of assets—should count as additional resources.

- ***Double Counting***

Treasury should consider establishing requirements to ensure no double claiming of benefits so that any environmental attributes associated with the electricity used to produce green hydrogen are retired and not claimed under any other program.[1] For clarification, consideration of the renewable component of the carbon intensity of the regional grid should not be considered double counting, except to the extent that renewable component is driven by the same RECs purchased by the taxpayer under separate transaction.

- ***Temporal Accounting***

As discussed further above, sub-annual temporal matching is possible today and is achievable at the hourly level for 50 percent of hours in wind and solar resource rich regions at minimal additional cost and should be considered with a phase in, to account for current REC reporting (monthly at its most granular) and economic competitiveness, but also move towards increasing stringency. Treasury should also provide guidance that is agreeable to the financing community and provides clarity over the 10-year of the 45V tax credit.

.01. (5) **Unrelated Parties.**

(a) What certifications, professional licenses, or other qualifications, if any, should be required for an unrelated party to verify the production and sale or use of clean hydrogen for the § 45V credit, § 45 credit, and § 48 credit?
(c) What existing industry standards, if any, should the Treasury Department and the Treasury consider for the verification of production and sale or use of clean hydrogen for the § 45V credit, § 45 credit, and § 48 credit?

See answer to question 4(d) above.

.01(6). **Coordinating Rules.**

(a) Application of certain § 45 rules.

(ii) Section 45V(d)(1) states that the rules for facilities owned by more than one taxpayer are similar to the rules of § 45(e)(3). How should production from a qualified facility with more than one person holding an ownership interest be allocated?

[1] Some exceptions however should be provided; for instance, the electricity should be able to be claimed for the federal renewable fuel standard operated by the Environmental Protection Agency or for a regional cap-and-trade program (provided that the electricity is not claimed in the cap-and-trade program's voluntary renewable electricity program).

Pattern concurs with the American Clean Power Association's (ACP's) comments.

(b) Coordination with § 48.

(i) What factors should the Treasury Department consider when providing guidance on the key definitions and procedures that will be used to administer the election to treat clean hydrogen production facilities as energy property for purposes of the § 48 credit?

Pattern concurs with the American Clean Power Association's (ACP's) comments.

(c) Coordination with § 45Q. Are there any circumstances in which a single facility with multiple unrelated process trains could qualify for both the § 45V credit and the § 45Q credit notwithstanding the prohibition in § 45V(d)(2) preventing any § 45V credit with respect to any qualified clean hydrogen produced at a facility that includes carbon capture equipment for which a § 45Q credit has been allowed to any taxpayer?

(d)

Pattern concurs with the American Clean Power Association's (ACP's) comments.

Conclusion

We appreciate the opportunity to respond to this request for comments on Section 45V credits and look forward to continuing engagement with Treasury on this issue.