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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 45 Z

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

Intersect Power is pleased to submit the following comments in response to the Internal Revenue Service's (Treasury) Request for Comments on Credits for Clean Hydrogen and Clean Fuel Production Under Section 45V and 45 Z. The new Production Tax Credit (PTC) for hydrogen (H2) has potential to be a market-changing element of the Inflation Reduction Act (IRA) signed by President Biden earlier this year.

Intersect Power is a clean energy company bringing innovative and scalable low-carbon solutions to its customers in retail and wholesale energy markets. Our current portfolio includes 2.2 GWp of solar PV and 1.4 GWh of co-located storage, which are currently under construction and will be in operation in 2023. Our mid to late-stage pipeline includes over 8.5 GW of clean energy generation and 8 GWh of battery storage. We are proud to be a green hydrogen leader with over 3 GW of electrolytic green hydrogen facilities under development.

Intersect Power believes that clean electrolytic hydrogen production from abundant clean energy resources like solar and wind can be the basis for an array of decarbonization strategies. The process of producing hydrogen from feedstocks including water and electricity can have nearly zero carbon emissions so long as we are confident that the electricity consumed by the

electrolyzer also represents nearly zero carbon emissions. The purpose of congress offering this tax credit based on a lifecycle emissions approach is to reward the greatest reduction of carbon emissions with a goal of producing low/zero carbon intensity (CI) hydrogen.

Development of new clean electrolytic hydrogen production facilities works best when the electrolyzer load can be co-located with new additional clean energy generation. This configuration offers the lowest cost of hydrogen and is the easiest to verify as having zero CI. However, we also support configurations which enable the decoupling of electroyzer loads from new additional clean generation. We believe it is critical that any decoupled configuration maintains both load and generation in the same Regional Transmission Operator (RTO), Independent System Operator (ISO), or balancing authority.

When designing and operating a hydrogen configuration which decouples generation from load, and uses the transmission system to connect the two, achieving low or zero CI for the produced hydrogen requires careful temporal matching of the generation and the load. The simplest method to follow is to only operate the electrolyzer load when offsite clean generation is supplying adequate clean energy to the regional grid. This way, any potential marginal emissions increase from the electrolyzer load is avoided by the simultaneous addition of zero CI generation.

Verification of the temporal characteristics of clean energy generation can initially rely on the same time stamping systems used for power purchase agreement (PPA) transactions. Currently, meter data of the generation system is recording throughout the day the exact amount of clean energy generation at a specific moment in time. In a PPA transaction, all the data needed to represent the quantity of energy and time of generation is available to be collected and organized. To calculate lifecycle emissions accurately for a specific hydrogen production process, a taxpayer should demonstrate that for all hours of electrolyzer operation, clean energy was generated on behalf of the electrolyzer and the environmental attributes during those hours retired. Environmental attributes generated during a specific hour of the day may only be used to satisfy the marginal emissions associated with electrolyzer load during that same hour of the day or else a complicated avoided marginal emissions matching system is required where each certificate representing the environmental attributes of clean generation would have a different marginal emission value.

(1) Clean Hydrogen. 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?

- Further guidance is needed regarding the specifics of calculating the lifecycle greenhouse gas emissions rate for purposes of determining whether hydrogen is qualified clean hydrogen. Specifically:
    - Will marginal emissions associated with grid-tied resources be included in the calculation and, if so, would such data be available using the GREET model?
    - Can environmental attributes/offsets/credits (“environmental attributes”) be used to offset such marginal emissions or any emissions associated with non-grid-tied electricity and, if so, to what extent (e.g., should temporal or regional limitations be placed on the use of such environmental attributes)?
    - Is the GREET model designed to take environmental attributes into account?

- How will the existing GREET models, which are designed for well-to-wheels and vehicle life cycle calculations, be adapted to only account for well-to-gate emissions?

- Should hydrogen product be required to meet a specific purity threshold (i.e., a minimum percentage of hydrogen) to be qualified clean hydrogen?

(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?

- The well-to-gate system boundary should include marginal emissions associated with grid-tied resources and also account for certain environmental attributes used to offset emissions associated with emissions from grid power.

    - Marginal emissions refer to the amount of emissions by which grid emissions change as a result of a change in demand from a grid-tied resource (e.g., an electrolyzer tied to the grid). Another way of attributing emissions is using average emissions, which assigns emissions to a grid-tied resource consistent with the average emissions of all generation resources contributing to the grid. Using marginal emissions allows for a more accurate accounting of the actual emissions associated with a grid-tied resource by considering emissions associated with the specific demand on the grid in the location and at the time the energy load is increased.

    - Environmental attributes utilized by such grid-tied resources should also be included in the well-to-gate boundary to the extent such environmental attributes can be attributed to the marginal emissions associated with the grid-tied resource (i.e., the use of environmental attributes should be limited to energy generated at the time of, in the same region as, the energy demanded by the grid-tied resource so that the environmental attributes represent actual offsetting of emissions associated with the resource, which can be determined by evaluating data pulled from the meter located at the source of the demand and the meter located at the source of the generation).

        - We note that the Clean Air Act definition of "lifecycle greenhouse gas emissions", incorporated by reference at IRA § 45V(c)(1)(A), contemplates inclusion of environmental attributes: "the aggregate quantity of greenhouse gas emissions (including… **significant indirect emissions**)… related to the full fuel lifecycle… where the mass values for all greenhouse gases are adjusted to account for their relative global warming potential." 45 USC § 7545(o)(1)(H) (emphasis added).

        - Other incentive programs also permit the use of environmental attributes. For example, the California Air Resources Board has published guidance documents on book-and-claim accounting of environmental attributes for "Low-CI Electricity" and Biomethane for use in the Low Carbon Fuel Standard Program.

(b)(i) 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.

- Emissions should not be allocated to co-products as a means of reducing the lifecycle greenhouse gas emissions of the hydrogen. Allowing such emissions to be allocated to co-products would incentivize production of non-sustainable hydrogen products that only qualify for 45V because emissions can be allocated to co-products and would generally artificially reduce the lifecycle emissions of a hydrogen product. In addition, allocating lifecycle greenhouse gas emissions to co-products would significantly lower the barrier to entry for 45V, thereby allowing credits to be generated by projects that could not qualify for 45V based on the lifecycle emissions of the hydrogen product alone.

(ii) How should emissions be allocated to the co-products (for example, system expansion, energy-based approach, mass-based approach)?

- See response to (b)(i).

(iii) What considerations support the recommended approaches to these issues?

- See response to (b)(i).

(c)(i) How should lifecycle greenhouse gas emissions be allocated to clean hydrogen that is a by-product of industrial processes, such as in chlor-alkali production or petrochemical cracking?

- No credit should be provided here. Making such by-products eligible for the credit would incentivize production of non-sustainable and non-scalable hydrogen products. The climate-related provisions of the IRA seek to incentivize clean energy projects that accelerate decarbonization of energy overall, especially projects that can decarbonize hard-to-electrify industrial process like hydrogen production that expand the scope of decarbonization. As such, the hydrogen PTC should incentivize development of novel, sustainable hydrogen projects that are scalable and commercially feasible, which does not include production of these hydrogen byproducts.

(ii) How is byproduct hydrogen from these processes typically handled (for example, venting, flaring, burning onsite for heat and power)?

- No response.

(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 CO_2-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?

- No response.

(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?

- Hydrogen production co-located with new additional clean energy generation offers the lowest cost of hydrogen and is the easiest to verify as having zero carbon intensity ("CI"). In addition, configurations which enable the decoupling of electroyzer loads from new additional clean generation should be supported. It is critical that any decoupled configuration maintains both load and generation in the same Regional Transmission Operator (RTO), Independent System Operator (ISO), or balancing authority and adheres to careful temporal matching of the generation and the load.

- Verification of the temporal characteristics of clean energy generation can initially rely on the same time stamping systems used for power purchase agreement (PPA) transactions. In a PPA transaction, all the data needed to represent the quantity of energy and time of generation is available to be collected and organized. Environmental attributes generated during a specific portion of the day may only be used to satisfy the marginal emissions associated with electrolyzer load during that same portion of the day.

- Given the foregoing, the taxpayer should be able to provide documentation of contracted generation occurring in the same regional area as the project during the same time that such project's marginal emissions were generated in the form of verified environmental attributes, including PPAs or virtual PPAs, or other contractual product, such environmental attributes should also be accounted for and the emissions associated with energy input should be zero.

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

- See response directly above.

(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?

- See response directly above.
- Intersect Power is focused on achieving the objectives of 45V to decarbonize the production of hydrogen and see merit in hourly time matching but remain open to other approaches that achieve the goal of zero emission hydrogen production.
- Our perspective today is that when a taxpayer is relying on environmental attributes, hourly time matching should be used. Hourly matching data is available (i.e., it can be pulled from the meter at the source of the demand and from the meter at the source of the generation), is simple, and allows for one-to-one matching of demand and generation that is easily verifiable. In addition, hourly matching provides detailed information to generation and storage resources regarding demand for new resources needed to power grid-tied hydrogen projects.

(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?

- The extent to which the life cycle greenhouse gas emissions calculation should align with the CHPS is to be determined. The draft guidance is both high-level and preliminary and includes a request for comments from stakeholders to both the draft guidance and specific questions included by the DOE, the comment period for which closed on November 14, 2022. The draft guidance also expressly refers to the § 45V credit and seeks to align with the requirements of IRA. In addition, in contrast to the IRA and the forthcoming § 45V credit regulations, the draft guidance expressly notes that the "CHPS is not a regulatory standard, and DOE may not necessarily require future funded projects to achieve the standard." Given the foregoing, while the CHPS guidance and standard should be used to inform development of the § 45V credit guidance and regulation, it should not be dispositive for development of the § 45V credit guidance and regulation.
- Also see Footnote 1 above.

(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?

- No response.

(b) What criteria should be considered by the Secretary in making a determination regarding the provisional emissions rate?

- No response.

(4) Recordkeeping and Reporting.

(a) What documentation or substantiation do taxpayers maintain or could they create to demonstrate the lifecycle greenhouse gas emissions rate resulting from a clean hydrogen production process?

- Taxpayers could maintain documentation of the project's marginal emissions as well as documentation of environmental attributes, including PPAs and VPPAs.
- Taxpayers could maintain documentation of hourly energy inputs supplying a project by retaining data from the meter.
- Taxpayers could maintain documentation of third-party verification of the lifecycle analysis consistent with the GREET model.

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

- No response.

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

- Taxpayer should maintain documentation of the project's use of environmental attributes, including PPAs and VPPAs.

(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?

- No response.

(e) If a taxpayer serves as both the clean hydrogen producer and the clean hydrogen user, rather than selling to an intermediary third party, what verification process should be put in place (for example, amount of clean hydrogen utilized and guarantee of emissions or use of clean electricity) to demonstrate that the production of clean hydrogen meets the requirements for the § 45V credit?

- No response.

(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?

- Yes. Configurations which enable the decoupling of electroyzer loads from new additional clean generation should be supported. It is critical that any decoupled configuration maintains both load and generation in the same RTO, ISO, or balancing authority and adheres to careful temporal matching of the generation and the load. Contractual documentation of such environmental attributes, such as PPA and virtual PPAs, should be maintained and such environmental attributes must be retired at the appropriate time. We note that other incentive programs utilize book-and-claim accounting for purposes of calculating a product's overall emissions. For example, the California Air Resources Board has published guidance documents on book-and-claim accounting for "Low-CI Electricity" and biomethane for use in the Low Carbon Fuel Standard Program.

(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?

- It is critical that any decoupled configuration maintains both load and generation in the same RTO, ISO, or balancing authority and adheres to careful temporal matching of the generation and the load. Verification of the temporal characteristics of clean energy generation can initially rely on the same time stamping systems used for power PPA transactions. In a PPA transaction, all the data needed to represent quantity of energy and time of generation is available to be collected and organized. Environmental attributes generated during a specific period of the day may only be used to satisfy the marginal emissions associated with electrolyzer load during that same period of the day.

(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?

- No response

(b) What criteria or procedures, if any, should the Treasury Department and the IRS establish to avoid conflicts of interest and ensure the independence and rigor of verification by unrelated parties?

- No response

(c) What existing industry standards, if any, should the Treasury Department and the IRS consider for the verification of production and sale or use of clean hydrogen for the § 45V credit, § 45 credit, and § 48 credit?

- Any reasonable method for identifying hydrogen production and sale, including mass flow rate and composition.

(6) Coordinating Rules.

(a) Application of certain § 45 rules.

(i) Section 45V(d)(3) includes a reduction for the § 45V credit when tax-exempt bonds are used in the financing of the facility using rules similar to the rule under § 45(b)(3)). What, if any, additional guidance would be helpful?

- No response

(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?

- No response

(b) Coordination with § 48.

(i) What factors should the Treasury Department and the IRS 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?

- No response.

(ii) What factors should the Treasury Department and the IRS consider when providing guidance on whether a facility is "designed and reasonably expected to produce qualified clean hydrogen?"

- No response.

(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?

- No response.

(7) Please provide comments on any other topics related to § 45V credit that may require guidance.

- Intersect Power believes that clean electrolytic H2 production from abundant clean energy resources like solar and wind can be the basis for an array of decarbonization strategies. The process of producing H2 from feedstocks including water and electricity can have nearly zero carbon emissions so long as we are confident that the electricity consumed by the electrolyzer also represents nearly zero carbon emissions. The purpose of congress offering this tax credit based on a lifecycle emissions approach is to reward the greatest reduction of carbon emissions with a goal of producing zero carbon intensity (CI) H2.

- Development of new clean electrolytic H2 production facilities works best when the electrolyzer load can be co-located with new additional clean energy generation. This configuration offers the lowest cost of hydrogen and is the easiest to verify as having zero CI. However, we also support configurations which enable the decoupling of electroyzer loads from new additional clean generation. We believe it is critical that any decoupled configuration maintains both load and generation in the same RTO, ISO, or balancing authority.

- When designing and operating a H2 configuration which decouples generation from load, and uses the transmission system to connect the two, achieving low or zero CI for the produced H2 requires careful temporal matching of the generation and the load. The simplest method to follow is to only operate the electrolyzer load when offsite clean

generation is supplying adequate clean energy to the regional grid. This way, any potential marginal emissions increase from the electrolyzer load is avoided by the simultaneous addition of zero CI generation.

- Verification of the temporal characteristics of clean energy generation can initially rely on the same time stamping systems used for power purchase agreement (PPA) transactions. Currently, meter data of the generation system is recording throughout the day the exact amount of clean energy generation at a specific moment in time. In a PPA transaction, all the data needed to represent quantity of energy and time of generation is available to be collected and organized. To calculate lifecycle emissions accurately for a specific H2 production process, a taxpayer should demonstrate that for all hours of electrolyzer operation, clean energy was generated on behalf of the electrolyzer and the environmental attributes during those hours retired. Environmental attributes generated during a specific hour of the day may only be used to satisfy the marginal emissions associated with electrolyzer load during that same hour of the day or else a complicated avoided marginal emissions matching system is required where each certificate representing the environmental attributes of clean generation would have a different marginal emission value.

In closing, Intersect Power recognizes that the implementation of 45V is complicated and is likely to require companies involved in clean energy and clean fuels to evolve to use new tools and data verification methods. We would urge Treasury to rely as much as needed on subject matter experts at Department of Energy (DOE) to jointly craft workable procedures that ensure emission reductions from these new facilities who qualify for 45V. We urge Treasury and DOE to avoid the temptation to employ overly simple processes which rapidly grow the clean hydrogen industry but sacrifice certainty of carbon emission reductions. To avoid this outcome, we support a workshop process led by DOE to bring stakeholders from academic institutions, industry, environmental groups, etc. together to determine the best path forward on this new and exciting industry.