Intersect Power

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Internal Revenue Service
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Room 5203
P.O. Box 7604, Ben Franklin Station
Washington, D.C. 20044

The Honorable Lily L. Batchelder
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Re: Request for Comments on Clean Hydrogen Production Under Section 45V

Submitted via www.regulations.gov

Intersect Power is pleased to submit the following comments in response to the Internal Revenue Service's (Treasury) Request for Comments on the Proposed Regulations for Clean Hydrogen Under Section 45V.

Intersect Power is a clean energy company bringing innovative and scalable low-carbon solutions to its customers in global energy markets. We have a base portfolio of 2.2 GW of solar PV and 1.4 GWh of co-located storage in operation. Our business plan includes growth in grid-tied renewables, as well as large-scale clean energy assets including clean hydrogen.

We commend Treasury and the IRS on the thoughtfulness in the proposed regulations. Hydrogen with low to zero carbon intensity (CI) has the potential to play a critical role in decarbonizing our economy, specifically in sectors that are difficult to address with electrification alone. Intersect Power believes that the investment in technology and infrastructure buildout from the 45V tax credits should result in projects and businesses that are economically viable after the tax credits expire. Starting with this goal, we generally applaud Treasury's draft rule and are eager to join other early movers to deliver business structures and set expectations around projects that truly achieve low CI hydrogen. Our view of the fundamentals for building this new decarbonization pathway are articulated below.

Clean electrolytic hydrogen production without tax incentives will only be feasible if the hydrogen is produced with low cost and low to zero emissions electricity. Very low cost, low emissions electricity is implicitly intermittent, a technical reality that must be addressed in any clean electrolytic hydrogen system design. Some taxpayers will likely advocate that the regulations should make it easier to qualify for the tax incentives on the premise that such an onramp will result in an overall increase in hydrogen production that will lead to low cost economies of scale and wider adoption of hydrogen. Then they will say that over time more stringent requirements can be added. Intersect Power sees two major risks with this approach. First, it will delay development of the flexible technology and infrastructure necessary for building clean electrolytic hydrogen systems. Second, it will promote deployment of hydrogen facilities that lack said technology and infrastructure, and hence need to be retired when the Hydrogen tax incentives are phased out.

Clean electrolytic hydrogen facilities utilize an electrolyzer powered by renewable energy to break down a water molecule into oxygen and hydrogen. Developers of these facilities must decide whether to design their facility to operate as a flexible load (ramping up and down to accommodate the intermittent nature of renewable energy), or to use an electrolyzer that requires more consistent operation throughout the day utilizing base load power.

Over the long-term, we believe that clean electrolytic hydrogen facilities will only be economical if they are developed to operate as a flexible load, meaning the facility will have the flexibility to ramp up at times of cheap renewable energy and ramp down when such energy is not available. Post tax credits, all developers can agree that the unit economics of a clean

electrolytic hydrogen system will require very cheap electricity and that the cheapest renewables are definitionally intermittent.[1]

We also know that clean electrolytic hydrogen facilities are only one component of a larger still-nascent hydrogen system, which includes the customer/end-user of hydrogen, and may also include midstream (transportation and storage) infrastructure. The entire system must be designed to accommodate the hydrogen being produced. Some taxpayers argue that end-uses for hydrogen cannot be paired with flexible production. We do not believe this to be the case. There are technical solutions to pair flexible electrolytic clean hydrogen facilities with a wide variety of downstream uses, but they do require investment in additional technology and infrastructure – technology and infrastructure that we view as equally important as the electrolyzer, and technology and infrastructure that will not receive investment if policy allows developers to take the 'easy' route and ignore the realities of intermittency.

The IRS and Treasury requested comments on several topics which we believe tie into our view of the fundamentals for building new clean hydrogen infrastructure. The regulations should promote establishment of a hydrogen market that will be economical for the long haul.

Temporal Matching

We commend the IRS on its decision to implement hourly matching with a transition period of January 1, 2028, prior to which annual matching will be permitted. Hourly matching is necessary to properly address significant indirect emissions from electricity; however we recognize that it may take some time to fully develop and implement a qualifying EAC market with hourly matching. The Treasury Department and IRS requested comment on whether permitting annual matching through January 1, 2028 will provide sufficient time for the market to develop an hourly tracking mechanism. We believe there is sufficient economic opportunity to encourage the market to develop in a timely manner, however in the event the IRS concludes, after studying data from commenters, that the time frame for the transition rule should be extended, we would recommend only extending the transition rule through January 1, 2030 to align with new European regulations that will require hourly matching in 2030 and beyond. Maintaining alignment with the European regulations would support the potential for the United States to expand domestic hydrogen businesses and be able to export hydrogen to European countries in a manner that complies with the EU's clean hydrogen rules.

[1] Renewables such as wind and solar power are routinely the cheapest form of electricity generation available. Other zero CI forms of electricity such as geothermal, hydro, or nuclear also exist but are not as easy to or low cost to build new. When we refer to cheap clean power we are referring to wind and solar.

We expect that some commenters will recommend grandfathering hydrogen projects that begin construction or that are placed in service prior to a certain date from ever needing to satisfy the hourly matching requirement. We are not in favor of that approach primarily because it will result in significant private capital and tax credit support for hydrogen projects that do not invest in the technologies and infrastructure required for clean electrolytic hydrogen projects to operate flexibly, and which are not economically viable following expiration of the 10-year credit, when flexibility/hourly matching is implicitly required by unit economics. It is important that every hydrogen project supported by 45V credits be built in a manner that provides the flexibility to switch to hourly matching at least by 2030. This will direct investment in the right technology, like flexible electrolyzers, hydrogen storage solutions, and dynamic downstream hydrogen uses, that enable long term emissions reductions from hydrogen replacement of incumbent technologies.

Incrementality

The IRS and Treasury have requested comments on situations in which EACs from existing electricity generating facilities may be deemed to satisfy the incrementality requirement on the premise that there is minimal risk that utilizing that power for hydrogen would result in significant induced grid emissions.

The purpose of the incrementality rule is to ensure that existing minimal-emitting electricity is not diverted to hydrogen production with the result that other electricity needs on the grid are now met by a carbon-emitting energy source (i.e., induced GHG emissions).

The proposed regulations specifically request comment on whether there should be an exception to the incrementality rule in a case where there is zero or minimal induced grid emission that can be proved from modeling or other evidence. An example given is a situation where there is curtailment or zero or negative pricing. We recommend that the IRS adopt an exception to the incrementality rule for electricity from existing minimal-emitting electricity generators that is purchased at a time of curtailment or zero or negative pricing ("Curtailed Power"). For purposes of proving that power would have been otherwise curtailed and for administrative ease given that higher emissions electricity generating units are unlikely to sell zero or negative priced power due to input costs, we would recommend requiring the hydrogen facility to provide supporting evidence that the electricity was acquired by the hydrogen facility for a zero or negative price.

The proposed regulations also request comment on an exception to the incrementality rule that uses a more formulaic approach, such as deeming five percent of the hourly

generation from minimal-emitting electricity generators as satisfying the incrementality requirement. The IRS offers this suggestion primarily because it is easy to administer and to avoid the burden of proving that use of certain incremental power would not result in induced GHG emissions. We recommend that the IRS not adopt this approach primarily because it will likely have the unintended result of diverting five percent of the minimal-emitter's electricity to hydrogen, resulting in induced GHG.

If a hydrogen facility is not permitted to purchase electricity from a solar farm that is 40 months after COD, why should such a facility be permitted to enter into PPAs with 20 different solar farms for five-percent of their power and get a different result? The EAC rules should be implemented in a manner that results in a minimal risk of induced GHG emissions and we believe that can only be accomplished through a more thoughtful analysis, such as the exception for Curtailed Power as outlined above. We note that the preamble to the proposed regulations openly acknowledges this concern stating that the "Treasury and the IRS are mindful of the risk that an allowance without further temporal, spatial, and circumstantial precision results in hydrogen production facilities receiving credits for which they should not be eligible given their induced emissions rates." We further note that a formulaic approach to calculating induced grid emissions does not appear to be consistent with the requirement in 26 U.S.C. 45V(c)(1) to calculate lifecycle greenhouse gas emissions in accordance with Section 211(o)(1)(H) of the Clean Air Act. In consultations with the IRS and Treasury regarding the proposed rules, the U.S. Environmental Protection Agency confirmed that accounting for induced grid emissions is consistent with its longstanding interpretation of Section 211(o)(1)(H) and the IRS and Treasury determined that the use of EACs was the appropriate way to account for such induced emissions. As such, any exception to the incrementality requirement should be based on evidence that such an approach can otherwise satisfy the temporal, spatial, and circumstantial considerations underlying the IRS and Treasury's decision to utilize EACs, which the formulaic approaches suggested appear unable to do.

Lastly, as noted in page 1 of our comments we believe the regulations should promote development of hydrogen facilities that will be able to continue to operate in the long-term after any tax incentives are phased out. We believe that without incentives, it will be imperative that hydrogen facilities take advantage of low electricity pricing and be able to ramp up during times of low locational marginal pricing. Permitting hydrogen projects to run base load 24 hours a day using five percent incremental power from all renewable generation will inevitably result in that hydrogen facility being retired when the incentive is phased out.

Lifecycle Emissions of RNG

The proposed regulations state that the IRS and Treasury intend to issue rules addressing hydrogen production pathways that use renewable natural gas ("RNG") for purpose of the 45V credit, including rules that are intended to address the potential for perverse incentives, and requests comments on these rules. One such perverse incentive would be allowing high carbon intensity natural gas blended with small amounts of RNG to receive the maximum value 45V credit by attributing a negative emission CI value to the RNG. If granted the maximum credit (i.e., $3/kg), projects such as this would have negative variable costs since the $3 credit would be higher than input costs. Said another way, hydrogen producers using natural gas and blending RNG with negative CI will be extremely profitable, such that it would encourage the creation of more sources of RNG to capture more credits.

The 45V credit is intended to incentivize development of "clean" hydrogen projects and the Biden administration views such hydrogen projects as a "major component" of decarbonizing industrial activities.[2] To stay faithful to these goals, the final rules should provide, and future versions of the 45VH2 GREET model should be updated to clearly state,[3] that RNG used in hydrogen production cannot be attributed emissions less than zero in the life cycle emissions analysis conducted for purposes of the 45V credit. Otherwise, hydrogen that is not actually "clean" may be eligible to earn the maximum 45V credit.

For example, one method of hydrogen production is natural gas reforming which combines natural gas sources and thermal processes to create hydrogen. In such cases, small amounts of RNG captured and refined from animal waste lagoons using anaerobic digesters could be blended with large amounts of traditional sources of natural gas to serve as feedstock for the reforming process. If the RNG is assigned a negative emissions value as part of the life cycle emissions analysis, blending a small percentage of RNG (less than 5-10% of the total in some cases) could be added to offset the emissions associated with the otherwise high carbon intensity traditional natural gas sources. This would allow a method of hydrogen production

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2 *See* The White House Inflation Reduction Act Guidebook at p. 74, https://www.whitehouse.gov/wp-content/uploads/2022/12/Inflation-Reduction-Act-Guidebook.pdf.

3 Intersect recognizes that the 2023 45VH2 GREET Model does not include reformation of RNG from animal lagoons as a qualified pathway, but notes that Department of Energy guidelines indicate that such pathways may be included in the future and that this pathway may have been excluded specifically to allow further analysis of any emissions associated with such pathway. *See* https://www.energy.gov/sites/default/files/2023-12/greet-manual_2023-12-20.pdf, at p. 25.

that uses predominantly traditional sources of fuel to qualify for the maximum 45V credit and even incentive more fossil gas usage. Such a result does not align with the purpose of the 45V credit and the overall policy goals of the Inflation Reduction Act.

Certain applications of the GREET model, such as the California Low Carbon Fuel Standard, may assign negative lifecycle emissions to RNG created from methane captured using anaerobic digesters at animal farms. These negative emissions are based on the assumption that upgrading this methane to RNG eliminates emissions of methane relative to the baseline for animal farms, which would otherwise have been vented or flared into the atmosphere in the ordinary course of business. Such applications should not be extended to the 45V credit by the IRS and Treasury. While the capturing and venting of this methane does avoid emissions that would have otherwise occurred, such activities do not remove or otherwise decrease the overall volume of GHG emissions in the atmosphere and, as such, should not be assigned an overall negative amount of emissions.[4] At best, the amount of emissions assigned to RNG produced in this manner should be zero.

Batteries

Batteries are expected to play an important role in assisting hydrogen producers to manage green hydrogen production despite the intermittent nature of renewable energy. To ease the burden of having sufficient clean electricity during periods of reduced production (e.g., nighttime hydrogen production), a battery can procure clean electricity (or EACs) during periods of high production. The subsequent discharge of that clean electricity merely shifts the time during which the electricity is utilized, in this case for low carbon hydrogen production.

We propose implementing a system whereby a battery substantiates that it discharges as much clean electricity as it takes in, less round-trip efficiency (RTE) losses, and further, issues EACs at the time of discharge that enables a producer to satisfy its hourly matching obligations. Specifically, a grid connected battery may substantiate its charge as renewable electricity by purchasing an EAC (subject to annual or hourly matching requirements, as applicable). Any charge that is not matched by EAC procurement is deemed to be non-renewable electricity. The battery operator would then retire those EACs. Next, upon discharge, a battery operator will issue new EACs up to the amount of electricity for which it retired EACs, less RTE losses. Any

[4] Animal waste-to-RNG projects should be viewed in contrast to carbon dioxide or greenhouse gas removal projects, such as afforestation or direct air capture technologies, that have the ability to result in net negative emissions over the life of a project. *See* The Intergovernmental Panel on Climate Change, Frequently Asked Questions 4.2, https://www.ipcc.ch/sr15/faq/faq-chapter-4/.

discharge in excess of retired EAC inventory would be treated as non-renewable electricity. RTE must be tracked in some fashion - we would propose giving the battery owner flexibility to track and apply monthly or annual RTE, with RTE losses applied on the charging cycle.

For example, a taxpayer that owns a 100Mwh battery operating with 90% RTE charges that battery from 0-90% during periods of peak energy production, and purchases EACs for that 90% intake. Another 10% is charged from the grid without EAC procurement. In sum, the taxpayer has purchased 111 MWh of electricity to fully charge the battery (100 MWh/ 90% RTE), of which 100 MWh are from EACs and approximately 11 MWh are from the grid. The taxpayer must retire 10 MWh of EACs as RTE losses (i.e., 10% of the 100 MWh of EACs), and holds the remaining EACs purchased. At night, during limited renewable electricity production periods, the battery discharges 95% of its power. That battery may then re-issue EACs for 90% of its discharge, and a hydrogen producer that powers its electrolyzers during this nighttime discharge period should be allowed to purchase those re-issued EACs to satisfy its hourly matching obligations. Any discharge in excess of 90% would not allow for EAC issuance, thereby ensuring the battery can't discharge more renewable electricity that it took in. The re-issued EACs would carry the same information as the original EAC purchased with the exception that the time of generation will be revised to the time that it is discharged from the battery.

Lastly, given that a battery is not an electricity generating facility, and therefore, most of the information with respect to the re-issued EAC will trace back to the electricity generating facility that sold such EAC to the battery storage facility, we propose that the IRS clarify that the incrementality rule does not apply to battery storage facilities. Hydrogen facilities should be permitted to use any battery to shift the timing of EACs in order to meet the hourly matching rules once those rules are in effect.

Conclusion

As noted above, we are generally supportive of the draft regulations issued by Treasury on 45V. We believe the responses to Treasury's questions, and our proposals above will further the long-term viability of the hydrogen industry in the United States long after the section 45V tax credits have expired. If there is a desire to discuss any of our comments, please do not hesitate to reach out to us.

Sincerely,

Michael Wheeler
Vice President, Government Affairs