NOVO HYDROGEN

1st December 2022

RE: Comments to Department of Treasury on the Notice 2022-58, Credits for Clean Hydrogen and Clean Fuel Production

We appreciate the opportunity to provide our comments on the Clean Hydrogen and Clean Fuel Production Credits in the Inflation Reduction Act. Given the undeniable need and urgency for energy transition at a global scale, we believe that it is imperative to focus on cleaner burning molecules, and clean hydrogen continues to emerge as a commercial clean fuel alternative to traditional fossil fuels. We appreciate the Federal focus on this especially important topic

In our response below, we provide comments on the questions shared by Treasury in Notice 2022-58, followed by clarifying questions from our end, where we will appreciate additional steer

Thank you for the opportunity to submit comments

We would greatly appreciate if you could confirm receipt of our comments.

Sincerely,

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.01 Credit for Production of Clean Hydrogen

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?
    - We would appreciate further guidance on the application of the GREET model and which specific version should be used to conduct the LCA of clean hydrogen projects. We suggest establishing one version for consistency and fair comparison across projects. At the very least, the GREET model version in place when a project starts construction should govern throughout the life of that project.
    - We would appreciate more clarity on what constitutes clean power for the process of electrolysis. Said another way, how will the emissions be calculated from the electricity used for the electrolysis process? Does procuring power from the grid combined with Renewable Energy Credits ("RECs") constitute as clean power and will be counted as zero lifecycle emissions? We strongly recommend establishing three boundary conditions to the definition of clean power 1) geographic correlation of RECs, 2), temporal correlation of RECs, and 3), allowance of unbundled RECs meeting those criteria:
        - Establishing geographical boundaries for REC procurement (e.g. RECs must be procured in the same region that electrolysis occurs. We believe "region" should be defined as the Regional Transmission Organization or Load Balancing Authority such as PJM, MISO, etc.). Geographical correlation between the point of REC generation and its use is important because zero and low-carbon hydrogen needs to meet a high bar of credibility, tracking and transparency regarding emissions reduction. This is partly because conventional hydrogen has a lower carbon intensity (if not considering fugitive methane emissions) than electrolytic hydrogen produced with an average grid mix in the US. In addition, RECs purchased in a market that is electrically disconnected from the production market does not incentivize local decarbonization. Clear guidance on geographical correlation requirements is needed to ensure new DOE clean hydrogen production standards result in emissions reductions and acceleration of the hydrogen industry. To the extent reasonable, permissible RECs should face increasingly strict geographical correlation requirements over time.
        - Implement temporal correlation of RECs on a monthly basis, similar to European Union hydrogen production standards. By the end of the decade (2030) the standard should require hourly matched RECs. This will allow the industry time to implement the necessary digital infrastructure, REC registries, accounting standards, and REC tracking required. This requirement has a similar impact to geographical correlation; it increases the legitimacy

and credibility of the REC used and helps ensure that the hydrogen produced is as low-carbon as claimed.

- Both bundled and unbundled RECs should be permitted in the DOE's standards. If DOE includes geographical and temporal correlation of RECs, unbundled RECs will have similar credibility to bundled RECs. Allowing unbundled RECs to be used will allow grid power to firm up hydrogen production at new solar and wind facilities. This is critically important for industrial consumers that need a continuous supply of heat and/or chemical reactants. Requiring all RECs to be bundled will prevent adoption of hydrogen by industry in places where other options for sourcing RECs, such as utility green tariffs, are not available or fully subscribed. Allowing projects to use unbundled RECs will also increase the additionality of DOE's standards, as many projects with new-build solar and wind will also need grid support to meet reliability requirements for clean hydrogen offtake needs. Disallowing unbundled RECs will stop these projects and prevent new solar and wind from being built
- For the avoidance of doubt, clean hydrogen production that is physically connected to zero-carbon electric resources should count as zero carbon electricity towards the carbon intensity calculation of the 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?

- We support the holistic well-to-gate approach. Upstream and midstream methane emissions should be captured in case of any technologies utilizing natural gas (methane) as the feedstock to produce hydrogen
- Similarly, there needs to be an established procedure for measuring carbon sequestration or usage for CCUS and recurring monitoring to avoid any leakage

(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

- We believe that if the primary product from a process is hydrogen, all emissions should be attributed to the production of hydrogen. It will be complicated to allocate emissions from a system to different product streams
- Certain clean hydrogen production processes have carbon intensive by-products, like carbon black. If a producer's sale of this by product to a third party and its subsequent use leads to GHG emissions, these should be taken into account

(c) 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?

- If hydrogen is not the primary product from a process, then it should not be eligible for the 45V (or section 48) tax credit. Taxpayer money needs to incentivize clean hydrogen production that would otherwise not happen without the tax credits, which will not be the case where hydrogen is a by-product. In other words, the decision to undergo this process is not dependent on hydrogen but instead on the primary product. Therefore providing tax credits for the hydrogen will not contribute to the decision of running the process and therefore is an inefficient use of taxpayer funds.

(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?

- Facilities should be eligible to claim partial 45V credits for any compliant low-carbon hydrogen produced during a taxable year. If a facility produces an amount of non-qualified hydrogen during the year, the facility should not be precluded from claiming credits for any qualified clean hydrogen it produces. This standard allows flexibility that will incentivize more low-carbon hydrogen production

(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?

I. How might clean hydrogen production facilities verify the production of qualified clean hydrogen using other specific energy sources?

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?

- Similar to our response to question 1, we strongly recommend establishing three boundary conditions to the definition of clean power 1) geographic correlation of RECs, 2), temporal correlation of RECs, and 3), allowance of unbundled RECs meeting those criteria
    - Geographic correlation - defined as areas under the same Regional Transmission Organization or Load Balancing Authority such as PJM, MISO, etc.

- Temporal correlation – Refers to accounting RECs for specific time frames. We suggest monthly correlations, with an eventual goal of hourly correlation for projects that start construction in 2030 or later.
- Allowance of unbundled RECs – that will allow firming of grid power for hydrogen production process
- Behind the meter renewable resources or renewable electric generators that are physically connected to the hydrogen production facility, appropriately metered and reported, should qualify as zero-carbon in the GREET model's calculations, in addition to any electricity sourced from the grid with RECs that meet standards described above
- Ultimately, whatever is decided should be locked in place for a project once it starts construction. Those rules then govern for the life of that project (10 years if 45V PTC or 5 years if 48 ITC)

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 CO_2-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?

- We strongly endorse establishing the same well to gate boundary criteria for CHPS and 45V

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?

- A record or account of RECs corresponding to meter info. RECs will need to have temporal and geographic information consistent with standards at the time
- In case of CCUS, devices to ensure no emissions / leaks at various points of the value chain should be installed, monitored, and verified on a recurring basis

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

- Similar to current REC accounting, RECs need to be retired once they are claimed and be taken out of circulation
- Power Purchase Agreements (PPAs) capturing the makeup of agreed tariff for the project, and inclusion of RECs

(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?

- Third party audits for emissions and RECs accounting
- Record of executed contracts with offtakers

(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?

- Third party audits for emissions and RECs accounting to ensure credibility
- Record of executed contracts with offtakers capturing CI score of hydrogen supplied

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?

- Production should be allocated based on percentage ownership of each project partner. The same rules for partnership flip accounting as previously implemented for solar ITC/wind PTC should be replicated here.

(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?

- Precedent from rulings regarding solar generation energy property and associated energy storage should be used as the baseline here. Specifically, hydrogen

production equipment, compression, and hydrogen storage should all be considered energy property for purposes of section 48.

- If 45V is elected for hydrogen production, hydrogen storage equipment should qualify as energy property under section 48 as it meets the definition of energy storage.

(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?"

- If the production facility involves only renewable resources as the inputs such as electrolytic hydrogen produced from clean electricity and water, then it should be considered to comply with this statement. For facilities that use a carbon-based input, such as methane, the facility must both have the necessary equipment to capture the associated carbon emissions from the process as well as a clear design for long term storage, sequestration, or use of the carbon emissions.

Clarifying Questions

- Request early Treasury steer on GREET model application to enable us, and other entities active in the clean hydrogen industry, calculate lifecycle GHG emissions appropriately and model the impact on projects
- Our understanding is that hydrogen production credits from 45V and 45Z cannot be used together. However, does the hydrogen producer have the option of using either 45V or 45Z credits in projects?
- 45V guidance, Footnote 1, Pg. 2 – Appreciate steer on the meaning of 'unless the facility is altered or repaired after that date' regarding application of prevailing wage and apprenticeship requirements to maximize credit
- Request further steer on third party verification process for production and sale of hydrogen. What verification is required, and what entities / individuals need to verify