December 3, 2022

Secretary Yellen
Department of the Treasury
1500 Pennsylvania Avenue, NW
Washington, DC, 20220
Submitted electronically via the Federal eRulemaking Portal at www.regulations.gov
RE: Request for Comments on the Credit For Clean Hydrogen and Clean Fuel Production (Notice 2022-58)

Dear Secretary Yellen:

Thank you to your team, the Treasury Department and the Internal Revenue Service (IRS), for progressing with guidance on §45V of the Internal Revenue Code (45V and 45Z) as amended by the Inflation Reduction Act (IRA). We believe that it represents a remarkable opportunity for our country and its efforts to reduce greenhouse gas emissions. However, the bill as it is currently structured will not always incentivize behaviors that result in reduced emissions. In some cases, the bill will clearly incentivize activities that **increase** carbon dioxide emissions.

We would like to propose the following scenario for your consideration: An end user in Colorado is considering adopting clean hydrogen as a fuel source to create steam to use in their food processing operations. This end user requires 1,000 kilograms (kg) per day. The two available options for the purchase of clean hydrogen are:

1) A centralized hydrogen production facility located 400 miles away producing hydrogen at 0.4kg CO2 per kg of hydrogen.
2) A distributed hydrogen production facility co-located with the end user's existing facilities, producing hydrogen at 0.5kg CO2 per kg of hydrogen.

To meet the 1,000 kg per day demand, Scenario 1 would require three daily deliveries of ~350kg to maintain operations (trailer capacities are constrained by DOT to ~380kg). These deliveries today are fulfilled by gaseous tube trailers powered by Class 8 vehicles burning diesel fuel. If we account for the 400 mile delivery, Scenario 1 results in an additional 5.6kg of carbon dioxide emitted per kilogram of hydrogen delivered. The truck returning empty to its production facility effectively doubles the CO2 emissions generated in transit. The lifecycle emissions of that hydrogen is now ~11.5kg CO2 per kilogram of hydrogen delivered, exceeding the standards set by the IRA to qualify as "clean" by a factor of almost 3, and greater than the ~10kg CO2 per kg of H2 produced by Steam Methane Reformation (SMR) systems in place around the US today without carbon capture equipment.

Scenario 2 has no additional carbon footprint before the hydrogen is used. Because the hydrogen is produced on site, there is no transportation required. This hydrogen has lifecycle emissions of 0.5kg CO2 per kg H2.

Under the current reading of the rule, hydrogen procured under Scenario 1 is eligible for up to $3.00 per kilogram in tax credit, and Scenario 2 is eligible for only up to $1.00 despite having less than 4% of the total lifetime emissions of Scenario 1. This structure inadvertently incentivizes behavior that could yield a future state where widespread hydrogen use materially **increases** the greenhouse gas emissions profile of the industrial sector. Delivery, Transportation, and Storage emissions costs are significant and materially impact the lifetime greenhouse gas profiles of any hydrogen user and should be factored in when calculating the production credit eligibility.

We greatly appreciate the Treasury Department and the IRS' request for commentary as the implementation of the IRA goes forward and thank you for listening to our concerns. We have enclosed more detailed comments below regarding Section 3 and its subsections:

- 3.01.(1).(a)
- 3.01.(1).(d)
- 3.01.(1).(e)
- 3.01.(1).(e).i
- 3.01.(1).(e).ii
- 3.01.(2)
- 3.01.(3).(a)
- 3.01.(3).(b)
- 3.01.(4).(a)
- 3.01.(4).(f)
- 3.01.(4).(g)
- 3.01.(5).(b)

3.01.(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?

We believe that if implemented as written, activities that increase greenhouse gas emissions may be incentivized because of the exclusion of emissions associated with transportation, distribution, and storage of hydrogen. Well-to-gate analysis ignores what will be one of the most emissions-intensive aspects of hydrogen use across the economy, and we feel those emissions are worth factoring into these credits. Hydrogen that is delivered to the end customer with lower total emissions, for example via transportation via dedicated pipeline (instead of trucks), or via hydrogen production that is co-located with the end customer, should be favored for the credits.

3.01.(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?

To be considered a "clean hydrogen production facility", the facility in question should be required to clear a given clean production threshold based on their total annual output. A minimum of 50.1% of the facility's operating year output needs to qualify as "clean", as measured by the carbon intensity per kilogram of its produced hydrogen. If said facility produced 1000kg during the year, at least 501 of those kilograms should be "clean" to qualify the facility for any credit. Once this level is reached, each qualifying kilogram should be eligible for its respective credit.

3.01.(1).(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?

If using electricity for the production processes, two options should be considered. One, if a Power Purchase Agreement (PPA) or equivalent commodity energy agreement can be procured that can cover the entirety of the annual energy capacity for the hydrogen production facility, that should be adequate for verification. If no such collection of agreements can be procured, verification should be conducted at monthly intervals using meter readings for the facility at the minute resolution.

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

Clean hydrogen production facilities should use mass balance and system balance approaches to determine what other energy sources were consumed during hydrogen production. These should be verified either by government regulated metrology equipment (ex. Gas meters) or through a third party audit of financial and supply records.

(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?

Due to the volatility of a number of local electrical markets, data should be required to be kept at the 5-minute level of granularity. For processes that have durations longer than that granularity, a weighted average based on production volumes and energy input should be used.

3.01.(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?

For the purposes of the § 45V credit, the well-to-gate analysis should also include the emissions associated with the transportation, delivery, and storage of the hydrogen before use. Drawing an artificial boundary post production and ignoring the resources required to deliver hydrogen to its point of use ignores a major component of the total lifetime emissions footprint of hydrogen. This structure will likely encourage behavior that increases the total greenhouse gas emissions of hydrogen adopters not local to production facilities.

3.01.(3).(a) 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 eligible to file the petition for a provisional emissions rate once site drawings and system engineering drawings have been completed and filed with the proper regulatory agencies with oversight of the facility. If a facility is a duplicate or is modular in nature to existing hardware deployed elsewhere, that emissions rate should be used as a placeholder until a definitive rate can be determined.

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

Approaches based on fundamental mass and energy balances should be considered.

3.01.(4).(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?

If relying upon the electrical grid for energy, producers should be required to show electrical grid operator data at a maximum interval duration of 5 minutes. Real time or as close to real-time ISO data should be required in order to accurately determine the emissions intensity of the consumed electricity. If 100% of possible output can be covered by power purchase contracts, exemptions should be granted given other rules around Additionality and Locality are put in place and followed. Other required documentation should include:

- **Energy consumption time series data**
- **Hydrogen output time series data**
- **Mass input time series data**
- **Water consumption data**
- **Byproduct mass and/or volume time series data**

- **Power purchase or other energy commodity agreements**
- **Feedstock gas or biomass contracts and time-series utilization data**
- **Flue gas or exhaust gas chemistry**

3.01.(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?

Indirect book accounting factors should be considered when determining an effective greenhouse gas emission rate.

3.01.(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?

There are several considerations that should be made when determining the applicability of certain book accounting practices impact on § 45V credit. Origination time, volume, rate of offtake, origination location should all be considered. Electricity purchased from a wind farm on the Eastern seaboard should not be eligible for use towards credit in a California electrolyzer. Additionality should be a key requirement of the credit system to ensure that renewable electricity is not being diverted from other grid applications. Otherwise hydrogen producers may stress many grid systems to the point of requiring additional fossil-fuel peaker plants to be used, which could neutralize or potentially even worsen electrical grid CO2 intensity, eliminating any net benefit provided by the hydrogen use. Other governments have recognized this problem too; this is why in the European Union, the hydrogen rules under evaluation are pointing towards green power used to make "fully renewable" H2 must be sourced from dedicated new capacity, or from curtailed renewable energy or from green electricity purchased from the grid via strictly regulated power purchase agreements (PPAs).

3.01.(5).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 certification parties should share ownership with hydrogen users, producers, equipment manufacturers, service providers, or any other entity involved in the hydrogen production landscape. Companies, Organizations, or Joint Ventures with shared ownership between hydrogen users and producers should have regular third-party audits of calibrated metrology equipment, flowmeters, and indirect book accounting practices to ensure stated production volumes are not inaccurate.

Thank you again for the opportunity to submit our response, we're grateful for the Treasury Department's request for comments.

Sincerely,

DocuSigned by:
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Tony Pan, CEO,
Modern Electron