December 2, 2022

SUBMITTED ELECTRONICALLY

Internal Revenue Service
CC:PA:LPD:PR (Notice 2022-58)
Room 5203
P.O. Box 7604
Ben Franklin Station
Washington, DC 20044

Dear Sirs/Mesdames:

Re: Request for Comments on Credits for Clean Hydrogen and Clean Fuel Production, Notice 2022-58

Thank you for the opportunity to respond to this request for comments. We strongly support the Inflation Reduction Act of 2022 and its capacity to deliver on net zero aspirations by catalyzing the production of clean hydrogen and clean fuels.

Iogen is one of the world's leading firms in the field of second-generation biofuels with low and negative carbon emissions. Iogen has been in the biofuel business for over 35 years, with $500 million invested in new technology development around the world. Today, Iogen is one of the top five U.S.-registered producers of cellulosic biofuels and feedstocks — both of which are critical to the energy systems that will power our net zero world.

Please accept the attached response to the above-captioned request for comments, submitted on behalf of Iogen Corporation.

Yours very truly,
IOGEN CORPORATION

Lori Evans
Executive Vice President, Strategy and Corporate Development

Request for Comments
on Credits for Clean Hydrogen and Clean Fuel Production

The IRS requests comments on questions arising under § 45V and § 45Z that should be addressed in guidance. Iogen hereby submits the following responses to these requests for comments that are restated below.

Section 3.01 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?

. . .

(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.

Lifecycle greenhouse gas emissions should be "determined under the most recent Greenhouse gases, Regulated Emissions, and Energy use in Transportation model (commonly referred to as the 'GREET model')", in accordance with the express language of the IRA.

GREET uses the principle of displacement for co-products, pursuant to which, if a co-product displaces a more carbon intensive alternative, the attendant savings are applied to reduce to the greenhouse gas emissions of the primary product (e.g. hydrogen).

(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?

The facility should be eligible to claim the § 45V credit for the qualified clean hydrogen it produces and should not be restricted from claiming the § 45V credit entirely for that taxable year.

The IRA is structured to satisfactorily address exactly this situation. The Request for Comment's description of the applicable language in the IRA is both clear and correct:

> *The § 45V credit is calculated by multiplying the applicable amount by the kilograms of qualified clean hydrogen produced (where the applicable amount is) based on the lifecycle greenhouse gas emissions rate that results from the production of qualified clean hydrogen.*[1]

[1] Request for Comments on Credits for Clean Hydrogen and Clean Fuel Production, Section 2.01.

There are numerous diverse examples that show the appropriateness and necessity of this principle:

EXAMPLE 1: Mid-year modification

If an existing conventional hydrogen production facility is modified to become a clean hydrogen production facility mid-year, the "kilograms of qualified clean hydrogen produced" *[emphasis added]* by definition excludes all hydrogen produced prior to that point and, indeed, any hydrogen other than "qualified clean hydrogen" produced at any time during the year. In addition, "the lifecycle greenhouse gas emissions rate that results from the production of qualified clean hydrogen" *[emphasis added]* excludes the emissions of all hydrogen produced prior to that point (and any hydrogen other than "qualified clean hydrogen" produced at any time during the year).

Based on the plain language of the law, we do not believe the Secretary would have a reasonable basis in either law or equity for restricting such a facility from claiming § 45V credit during its first (partial) year of operation. Nor, we note, would such restriction be desirable.

EXAMPLE 2: Modifications of intermittent application

A conventional hydrogen facility may be modified to become a clean hydrogen facility where:

(a) one of the modifications includes the use of low-emissions renewable natural gas ("RNG") as an input to a steam methane reformer; and

(b) when the RNG is fed to the facility, it produces qualified clean hydrogen, and when the RNG is not being fed, it does not.

Again, under the plain language of the law, the Secretary should determine the applicable § 45V credit based on the "kilograms of qualified clean hydrogen produced" and "the lifecycle greenhouse gas emissions rate that results from the production of qualified clean hydrogen" – not the emissions that result from the clean hydrogen plus the emissions that result from the production of conventional or other non-qualified hydrogen.

EXAMPLE 3: Breakdown or failure

A qualified clean hydrogen production plant may have a breakdown or failure event during an identifiable part of the taxable year that results in a substantial increase in its emissions rate so that, during the event, the facility produces hydrogen that is not qualified clean hydrogen. An example of such a failure would be a temporary stop of a CO_2 sequestration operation on a hydrogen plant configured for the production of qualified clean hydrogen. If such an event lasted a month, a week, a day or an hour, it seems entirely inequitable that the facility would be restricted from claiming the § 45V credit entirely for the full taxable year.

We believe that, in such event, the Secretary should count the higher emissions that occur during the failure event against the facility's aggregate annual emissions (this is what would happen if the facility continued to produce qualified clean hydrogen). The basis in law for such an argument when qualified clean hydrogen is not produced would be that the applicable percentage is defined in the IRA in reference to:

> *… any qualified clean hydrogen which is produced through a process that results in a lifecycle greenhouse gas emissions rate of … [●] kilograms of CO2e per kilogram of hydrogen.*[2]

Such a "process" could reasonably be read to include emissions that result from process upsets or failures in the operation of the clean hydrogen production facility. We believe that such an approach would be reasonable but would not and should not result in disallowing the facility from claiming the § 45V credit entirely for that taxable year.

EXAMPLE 4: Flexible design

A facility may be expressly designed to produce qualified clean hydrogen during some periods of the year and non-qualified hydrogen during other periods of the year. In this instance, we believe that the most reasonable way to interpret the statue would be to assess only those periods of time during the year in which qualified clean hydrogen is produced. This would not result in disallowing the facility from claiming the § 45V credit entirely for that taxable year.

(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?

There are two items to verify: (1) the GREET model of a production process accurately represents the configuration of such process; and (2) the inputs and outputs that contribute to emission are accurately characterized (i.e. the right quantities and attributes were accounted for). We support the use of professional engineers to verify that the GREET model of a production process accurately represents the configuration of such process, and for the use of independent verifiers to confirm the quantities of inputs and outputs that contribute to GHG emissions.

[2] H.R. 5376 - 117th Congress (2021-2022): Inflation Reduction Act of 2022, Sec. 13204(a).

(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?

In general, we believe a taxpayer should be able to file a petition for a provisional emissions rate prior to commencing construction of a clean hydrogen production facility. The emissions rate should be verified once the facility is running.

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

The criteria for making a determination regarding provisional emissions rates in respect of processes that are not explicitly set out in the most recent GREET model should depend on the degree of novelty embodied in these processes, which can be differentiated as follows:

(a) Simple Combinations: Processes that are simple combinations of operations already assessed by GREET for which the overall emissions rate can be determined arithmetically from GREET data. An example of this would be a hydrogen production process that uses a renewable natural gas feedstock made with carbon capture. GREET has already assessed renewable natural gas and carbon capture, but has not explicitly calculated the results of combining the two operations.

(b) Improved Processes: Processes that are simple combinations of operations already assessed by GREET, but for which the proponents are proposing improvements that would change the emissions rates assessed by GREET. An example of this would be a hydrogen production process that uses a steam methane reforming process that has a lower emissions rate than the specific steam methane reforming process assessed by GREET due to a design change (perhaps increased recycle rates). In this instance, subject to the process operating as proposed, a relatively simple engineering analysis could be conducted to determine the resulting overall emissions rate.

(c) New Processes: Processes that include operations not considered by GREET. In this case, a more complex de novo engineering analysis would need to be conducted.

For Simple Combinations, the Secretary should grant a provisional emissions rate based upon a petition that includes a process description, an emissions analysis and an affidavit from a third party supporting the emissions analysis.

For Improved Processes, the Secretary should grant a provisional emissions rate based upon (a) a petition that includes a process description, an emissions analysis, an affidavit from a third party supporting the emissions analysis and a testing plan to ensure compliance with proposed provisional emissions rate; and (b) an independent analysis of the testing plan commissioned by

the Secretary to ensure that it is adequate to confirm the improved emissions profile relative to the GREET standard.

For New Processes, the Secretary should grant a provisional emissions rate based upon (a) a petition that includes a process description, an emissions analysis, test data verifying the emissions analysis, an affidavit from a third party supporting the emissions analysis and a testing plan to ensure compliance with proposed provisional emissions rate; and (b) an independent analysis of the testing plan commissioned by the Secretary to ensure that it is adequate to confirm the improved emissions profile relative to the GREET standard.

The Secretary may also consider the Tier 1/Tier 2 approach taken by the California Air Resources Board ("CARB").

(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?

Lifecycle greenhouse gas emissions rates can be demonstrated using standard procedures established by regulatory authorities such as CARB or voluntary schemes such as International Sustainability & Carbon Certification ("ISCC").

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

The lifecycle greenhouse gas emissions rate should be monitored through an annual audit with verification. Organisations such as CARB and ISCC have established technologies and methodologies for such audits and verifications.

(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?

The production, sale and use of clean hydrogen should be measured using verified flow meters, with appropriate calibration routines.

(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?

The production, sale and use of clean hydrogen should be measured using verified flow meters, with appropriate calibration routines.

(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?

A clean hydrogen producer should be permitted to reduce its greenhouse gas emissions based upon the purchase of physical commodities with low-carbon intensity (e.g. renewable electricity or RNG) that have either been delivered directly or been transported over a commercial distribution system (e.g. a transmission grid or pipeline). In order to ensure the integrity of the supply chain, any owner in the supply chain should own BOTH the energy commodity and the environmental attributes. The environmental attributes should not be sold separately.

A producer should not be permitted to reduce its emissions based solely on the purchase of renewable energy credits or the like that do not have a direct physical nexus to the purchase of commodities whose emission performance can be audited and confirmed to match the standards required by the IRA.

This type of requirement is exemplified by the approach taken by EPA in administering the Renewable Fuel Standard for renewable electricity and renewable natural gas.[3] It is also the method used by the European Union as set out in the European Renewable Energy Directive.[4]

Where there is a fungible grid system that operates on a displacement method (like the electricity grid and natural gas grid in the United States), the displacement method should be permitted, with the proviso that the ownership of the energy commodity and the attributes are always together. There should be a verification of connectedness to ensure true displacement. This approach is widely recognized because it has integrity and minimizes costs for consumers.

(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?

For considering the purchase of physical commodities that have been transported over a commercial distribution system:

(a) The timing of delivery should be consistent with the time it takes to move the physical commodity through the commercial distribution system. If the original production of the physical commodity is intermittent (e.g. renewable electricity), then appropriate storage should be provided; and

[3] 40 CFR 80.1426(f)(11).
[4] DIRECTIVE (EU) 2018/2001 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2018 on the promotion of the use of energy from renewable sources.

(b) For commodities like renewable gas that can be stored, storage should be permitted as a part of the supply chain.

We believe that this approach provides reasonable flexibility for clean hydrogen producers and enables efficient use of existing infrastructure, while also ensuring that emissions rates are calculated appropriately and hidden costs are not loaded onto existing infrastructure.