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Internal Revenue Service
CC:PA:LPD:PR (REG-117631-23)
Room 5203, P.O. Box 7604
Ben Franklin Station
Washington, DC 20044

Re: REG-117631-23: Section 45V Credit for Production of Clean Hydrogen; Section 48(a)(15) Election to Treat Clean Hydrogen Production Facilities as Energy Property

StormFisher Hydrogen Ltd. (StormFisher) is pleased to provide input comments regarding the Section 45V Notice of Proposed Rulemaking (REG-117631-23). As a leading developer in the hydrogen project sector, we bring a unique perspective that combines our experience and commitment to advancing renewable hydrogen-derived fuels. Our insights aim to address the challenges and potential adjustments needed in the proposed rulemaking to facilitate the development and operation of clean hydrogen facilities.

Company Background

StormFisher is a project developer, financier, and operator focused on producing renewable, hydrogen-derived fuels that enable the transition to a low-carbon future. Founded in 2006, StormFisher initially focused on developing and operating biogas facilities. We successfully developed several biogas facilities, including one in Orlando, Florida, and another in London, Ontario, Canada. We have turned our focus to clean hydrogen as we see enormous potential and need for infrastructure development in North America. StormFisher is pursuing various pathways for hydrogen, including direct industrial use, conversion to methane for process and thermal heat applications, and conversion to methanol for the marine sector.

Opening and Summary

StormFisher is extremely concerned about the high level of risk and uncertainty for project developers and project owners created by the 45V Proposed Rulemaking. The proposed rules make it nearly impossible to develop and operate a clean hydrogen facility that will qualify for the full \$3 per kilogram production tax credit. We believe that major adjustments to the proposed rules are needed. If major adjustments are not made, it will lead to very few clean hydrogen projects reaching a final investment decision and high hydrogen prices from those projects that do proceed.

In particular, StormFisher sees the following areas within the rulemaking as unnecessarily challenging and requiring improvement:

- A. Calculation of the 45V Credit on an annual basis.
- B. Temporal Matching, particularly strict hourly matching after 2028.
- C. Incrementality, particularly the exclusion of existing clean generation resources.



In these three areas, material adjustments are needed to the rules. In the following pages, StormFisher provides specific feedback and recommendations for the improvement of the Section 45V Credit rulemaking.

Responses to IRS (Internal Revenue Service) requests for comments

In the notice of proposed rulemaking, the IRS has outlined areas where it seeks specific comments. StormFisher’s feedback on these specific matters is outlined below, in order of importance and perceived impact.

1. Procedures for Determining Lifecycle GHG (Greenhouse Gas) Emissions Rates: Calculation of 45V Credit on Annual Basis

As mentioned above, StormFisher is extremely concerned about the high level of risk and uncertainty for project developers and project owners created by the 45V Proposed Rulemaking. In particular, the annual claiming of the 45V credit and the requirement that the lifecycle emissions rate be determined based upon “all hydrogen produced at a qualified clean hydrogen production facility during the taxable year.”

The proposed procedure of determining a GHG emission rate for all hydrogen produced at a facility during the taxable year is extremely challenging and introduces unnecessary risk to facility owners. This proposed procedure in combination with the proposed three pillars approach introduces a major difficulty in ensuring a project reaches the full \$3 per kilogram PTC (Production Tax Credit), also known as the \$3/kg tier, in each year of operation. This risk will lead to fewer projects reaching final investment decision (FID) and higher hydrogen prices from those that are built.

The proposed procedure of determining a GHG emission rate for all hydrogen produced at a facility during the taxable year is extremely challenging and creates unnecessary risk for facility owners.

For Low Temperature Electrolysis Projects, initial GREET (Argonne National Laboratory’s Greenhouse gases, Regulated Emissions, and Energy use in Technologies life cycle analysis tool) modelling suggests that the amount of acceptable grid mix power for consumption, when zero-carbon power supported by qualified EACs (Environmental Attribute Certificates) is not available, is extremely low at roughly 1 to 2% of all power consumption. This leaves an exceedingly small margin of error for all Low Temperature Electrolysis Projects. This 1 to 2% margin will make many projects infeasible and increase risk for others, ultimately leading to fewer projects coming to fruition and higher hydrogen prices from those that do.

Facilities would need to be operated on a minute-to-minute basis because even one minute per hour operating unmatched to renewable could cause a facility to miss the \$3/kg tier. StormFisher understands that the revenue grade metering data used for settlement and the creation of EACs, or RECs (Renewable Energy Certificates) is generally captured in 15-minute increments. With this increment level in mind, it would be nearly impossible to hourly match renewable generation with hydrogen production with less than a 1 to 2 % margin for error. Even in a situation where renewable electricity generation is co-located with hydrogen production, this margin for error is unacceptable.

Furthermore, it is not certain that current electrolyzer technologies will be capable of hourly matching with renewable electricity. A recent article on hydrogeninsight.com outlines this point, stating



“Electrolysers have not fully demonstrated that they are compatible with intermittent renewables.”¹ Therefore, it could be the case that the proposed Procedures for Determining Lifecycle Greenhouse Gas Emissions Rates will eliminate all electrolysis hydrogen facilities from reaching the \$3/kg tier.

2. Temporal Matching

StormFisher believes the proposed rule of hourly matching after 2028 could be appropriate if certain modifications are made. As mentioned in the previous section, StormFisher finds the possibility of falling out of the \$3/kg tier for an entire facility over a full year extremely challenging. In the case of StormFisher’s proposed facilities, this would represent a \$50 to 70 million loss in each year that the threshold was missed. For our project to be financeable, we simply cannot afford to have this outstanding risk for each of the first ten operating years. This risk must be mitigated.

To reduce the risk of such a large loss, StormFisher suggests a carve-out allowance of 10% per year where hourly matching is not required. This would represent 876 hours per year in which hydrogen producers have a margin for error to manage issues such as operating challenges, tracking challenges, and other unforeseen issues. We suggest that hydrogen produced during carved-out hours be subject to annual matching. This would allow producers to eliminate the risk of losing an entire year of PTC.

StormFisher suggests a carve-out allowance of 10% per year where hourly matching is not required.

This suggested approach offers an alternative solution compared to how European Commission Regulations function. Specifically, the European regulations allow for a fraction of fuel production from a facility to be certified as renewable fuel of non-biological origin (RFNBO)². By allowing producers to split their production into tranches of compliant and non-compliant products, European regulations avoid the risk to producers of failing to comply. The proposed carve-out would offer the same risk mitigation without the complication of a non-compliant product stream.

3. Incrementality – Alternatives: Formulaic Approach

StormFisher is supportive of the formulaic approach that would allow 5% (or some fixed amount) of electricity from all existing clean power generators to qualify based on expected curtailment rates. As a hydrogen project developer, we believe the simplicity and consistency of this rule removes uncertainty, which will be critical for unlocking investment in new projects.

Getting into further detail, StormFisher believes that the 5% value should be increased in regions where curtailment exceeds 5%. For example, the curtailment of wind power in 2022 was 9.2% in the Southwest

¹ Green hydrogen | ‘Electrolysers have not fully demonstrated that they are compatible with intermittent renewables’: BNEF, January 18 2024, Article: [Link](#)

² European Commission. (2023). Commission Delegated Regulation (EU) supplementing Directive (EU) 2018/2001 of the European Parliament and of the Council by establishing a minimum threshold for greenhouse gas emissions savings of recycled carbon fuels and by specifying a methodology for assessing greenhouse gas emissions savings from renewable liquid and gaseous transport fuels of non-biological origin and from recycled carbon fuels. EUR-Lex. Retrieved from <https://eur-lex.europa.eu>



Power Pool (SPP)³. There, StormFisher suggests implementing the formulaic approach with a fixed percentage range from 5 to 10% set for each region based on expected curtailment rates.

4. Incrementality – Avoided Retirements Approach

The Treasury Department and the IRS seek comments on whether to recognize an avoided retirements approach that would treat EACs from an existing electricity generating facility as satisfying the incrementality requirement if the facility is likely to avoid retirement because of its relationship with a hydrogen production facility. StormFisher would like to point out that the repowering of generation facilities that are reaching end of life should be included under the avoided retirements approach. Repowered facilities are widely recognized as additional or incremental generation. The IRS can use existing criteria (i.e., the 80-20 test), to determine whether repowered generation requirements can be treated as new.

5. Alternatives to the Three Pillars

StormFisher suggests the adoption of alternative options from strict compliance with the Three Pillars, incrementality, temporal matching, and deliverability. Alternative options for situations where hydrogen generation would not result in further carbon emissions.

The European Commission has adopted several such options in its rules for producing renewable liquid and gaseous transport fuels of non-biological origin:

- A. If the overall grid for a zone (or region) reaches a certain threshold (>90% renewable power or < 18 gCO₂e/MJ in intensity), then electricity in that region used for hydrogen generation can be deemed zero carbon.
- B. Hydrogen produced in hours where the day ahead market price for that zone (or region) was below a price threshold (<25 Euro/MWh) can be deemed zero carbon.
- C. Clean electricity generated in a certain zone (or region) can be moved between regions for the purpose of hydrogen generation in the case where price differentials indicate that power is moving that way (i.e., where arbitrage opportunities exist).

StormFisher recommends that these alternative options or similar ones be implemented as eligible for the Section 45V Tax Credit.

6. Use of energy attribute certificates

Regarding the matching of EACs on one megawatt-hour for hydrogen production to one megawatt-hour of qualifying EACs basis, The Treasury Department and the IRS seek comments on whether a different treatment would be more appropriate to account for transmission and distribution line losses. StormFisher believes the proposed treatment is appropriate. There is no reason to add further burden to the use of EACs beyond the already onerous requirements for regionality, temporal matching, and incrementality.

³ U.S. Department of Energy, Land-Based Wind Market Report: 2023 Edition



It is relevant to point out that the existing renewable energy certification systems, both voluntary and compliance-based, run on a per mega-watt hour-generated basis. StormFisher sees no reason to diverge from that precedent.

7. 45VH2-GREET Model

StormFisher has concerns with the requirement that projects should rely on an annually updated GREET model for certain assumptions. The potential for changing assumptions each year during project operation creates a level of uncertainty that increases project risk and thereby threatens tax equity and project financing. While it is unclear whether changes in the GREET model from year to year would be material, the lack of clarity that this question raises creates potential investor risk that can create a barrier to project financing. StormFisher recommends that the GREET model used by projects should be the most updated version as of the taxable year in which the project commences FID and allow for clean hydrogen producers to lock that level in as the baseline GREET model for the life of the project or opt to adopt a later edition of the GREET model only if preferred. This will allow certainty for clean hydrogen producers that require it as well as allow for improvements based on subsequent calculations if that makes sense for that specific facility.

The 45VH2-GREET Model does not currently include several clean hydrogen production pathways that hydrogen developers are pursuing, including but not limited to, high-temperature water electrolysis from non-nuclear sources. StormFisher supports expanding the 45VH2-GREET model to include these pathways. At present, these pathways are left with increased uncertainty in requiring the use of a provisional emissions rate which may not be approved, leading to significant barriers to obtaining project financing.

8. Verifiable Use

The proposed 45V rulemaking does not allow for application of the credit if the hydrogen is either used to generate electricity that is then directly or indirectly used in the production of more hydrogen, or for venting or flaring of the hydrogen. This is part of an anti-abuse system applied to the credit.

StormFisher is concerned that the anti-abuse system will deter beneficial uses of clean hydrogen. We recognize that hydrogen should not be produced circularly to abuse the credit. However, there are situations where some indirect use of electricity to produce more hydrogen may be beneficial. For example, the conversion of hydrogen to a derivative such as methane, methanol, ammonia, or a liquid organic hydrogen carrier, can result in excess heat production. To avoid waste, this excess heat may be converted to electricity, resulting in an indirect conversion of hydrogen into electricity. Given such situations, StormFisher recommends that indirect use be removed from the anti-abuse system.

9. The Role of Energy Storage

StormFisher believes that energy storage resources such as batteries can play a key role in the production of clean hydrogen. Specifically, energy storage technologies can support high levels of hourly matching of carbon-free electricity with hydrogen production facilities.



We believe it would also be useful for the Treasury to clarify how compliance with the three pillars (incrementality, temporal matching, and deliverability), can be met and substantiated. At present it is unclear whether and how energy storage will contribute to compliance with the hourly matching requirement since the stored electricity will have been generated at a time before it is ultimately used to power the hydrogen production.

Behind-The-Meter (BTM) energy storage should be considered a load modification to the electrolyzer facility, where the taxpayer can use such storage resources to modify their load in service of higher rates of hourly matched clean energy and ultimately higher utilization rates of electrolysis equipment.

Similarly, Front-Of-The-Meter (FOM) energy storage should be considered as part of a “portfolio” of clean energy resources that a taxpayer can use to achieve high levels of hourly clean energy matching. In the same way that a taxpayer can use a BTM energy storage resource to better match their facility load to their intermittent renewable energy supply, a taxpayer who has contracted for control over the energy dispatch of an offsite energy storage resource should receive the same “load modification” treatment as would be used for a BTM battery, for the purposes of calculating levels of hourly matching.

Closing Comments

StormFisher appreciates the opportunity to provide comments and suggestions to the Internal Revenue Service. We are prepared to offer further insights, data, and perspectives to assist in refining these regulations for the benefit of all stakeholders involved. We look forward to the opportunity to engage further on these critical issues and are at your disposal for any additional information or discussions that may be helpful in this process.

Yours truly,

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