

February 23, 2024

The Honorable Janet Yellen  
Secretary  
United States Treasury  
1500 Pennsylvania Avenue, N.W.  
Washington, D.C. 20220

Internal Revenue Service  
CC:PA:LPD:PR (Notice 2022-58), Room 5203  
P.O. Box 7604  
Ben Franklin Station  
Washington, DC 20444

Via Federal eRulemaking Portal at [www.regulations.gov](http://www.regulations.gov)

**Re: Comments on Credits for Clean Hydrogen Production (“45V”)**

Dear Secretary Yellen,

On behalf of Utility Global and Syzygy Plasmonics, we would like to jointly provide comments on the proposed regulations to amend the Income Tax Regulations (26 CFR part 1) under sections 45V and 48(a)(15) of the Internal Revenue Code (Code), as added by the Inflation Reduction Act of 2022 (IRA). Both our companies are developing first-of-a-kind clean energy hydrogen facilities that provide alternatives to renewable energy electrolysis for hydrogen production.

In Utility’s case, we utilize the inherent oxidizing properties found in waste gases today, along with high-temperature steam to produce clean hydrogen (“H<sub>2</sub>”), while also providing a concentrated carbon dioxide (“CO<sub>2</sub>”) stream. We refer to this as “chemical electrolysis”. The H<sub>2</sub> is then used as an alternative heating source within the industrial facility, replacing hydrocarbons such as coal, natural gas, etc. In addition, excess H<sub>2</sub> can then be used in alternative sectors like mobility. We approach the hard-to-abate sectors such as steel, chemicals, etc. In addition, our technology is also being sought for converting bio-digestion gases into H<sub>2</sub> for mobility purposes. Our concentrated CO<sub>2</sub> streams are then much more economical to capture and reuse in the circular economy or sequester. Utility has a demonstration plant at a steel mill today and expect to provide commercial units in 2025. Our technology scales easily and does not need the renewable power investments required for electrical electrolysis. As you might imagine, our capital cost and geographic footprint are fractions of what electrical electrolysis requires and can be performed comfortably inside the fence of industrial sites. We expect to scale up production to produce hundreds of tons of H<sub>2</sub> per year for major industrial customers.

For Syzygy Plasmonics, we are pioneering a new type of chemical reactor designed to produce low-carbon industrial chemicals such as ammonia, methanol and clean hydrogen at low cost. The basis of our technology is plasmonic photocatalysis where chemical reactions are driven by light rather than heat, enabling a substantially more efficient process that eliminates combustion

emissions typical of existing chemical production and taps into low-cost renewable electricity sources. Our technology platform has the potential to positively impact many hard-to-abate sectors including steel, chemicals, fuels, fertilizers and more. Syzygy is currently entering the market with field trials in the U.S and abroad. Our customers are interested in deploying our technology due to the potential for low cost and low emissions chemical production. In particular, customers are excited by Syzygy's potential to produce clean hydrogen and SAF at costs 20%+ and 40%+ lower than electrolytic pathways. This cost advantage is driven by the fact that Syzygy's processes consume 80% less electricity vs electrolysis. Our modular technology scales linearly and can be placed in virtually any configuration. Upon successful demonstrations in the field, we anticipate installing commercial units by 2026. Of importance to this rulemaking, our customer interest is driven by the advantages we can display vs other clean technologies and their ability to diligence / underwrite impact and economics. ***It is imperative for novel technologies like Syzygy and Utility Global, which do not fit neatly into existing boxes, be afforded the same inclusion within regulatory frameworks as existing incumbent (and more costly) technologies.***

As it pertains to 45V, neither of our technologies requires the same degree of investment in renewable power to operate as compared with electrolyzers for hydrogen production – as mentioned above Utility Global doesn't require significant electricity while Syzygy Plasmonics reduces the power requirement by 80%+. The current guidance does not consider these alternative, lower-cost forms of producing H<sub>2</sub>. In particular, the language “as determined under the most recent Greenhouse gases, Regulated Emissions, and Energy use in Transportation model, referred to as the ‘GREET model’” is highly exclusionary for new technologies. The regulation must expand to include alternative forms like ours to rapidly advance the development of clean hydrogen.

The problems with traditional electrolysis are widely known. Electrolysis from renewable power does not scale well as it must be located in geographies with wind and/or sunshine. Renewable-sourced electrolysis has utilization rates around 50% at best. The renewable assets are often located away from major industrial centers for space needs, and transporting molecules of H<sub>2</sub> where needed is expensive and uneconomical. Getting H<sub>2</sub> pipelines permitted requires many community constituents to all agree. We realize the recently announced H<sub>2</sub> hubs are intended to resolve many of these issues, however, technologies that can produce clean hydrogen on industrial sites without the same level of infrastructure investment can be incentivized under 45V by including these costs in the evaluation of the technology.

Another element which we believe Treasury has the authority to address is adding a user-defined system for technologies selected for meeting hydrogen production metrics under this rule. Within the current GREET-45V model, users are required to select one of 6 automated options for technology options from a dropdown menu – SMR, electrolysis, high temp nuclear electrolysis, coal gasification, biomass gasification, and ATR. While the manual suggests additional pathways are under development, the approach of defining technology pathways individually in a highly innovative space will slow the very innovations this tax credit is attempting to spur. Instead, we suggest adding the same user-defined pathway used in the GREET model should be duplicated in

the GREET-45V model to provide more consistency, transparency and efficacy for speeding new technologies to market.

Proposed § 1.45V-4(c)(5) would also provide that an applicant may request an emissions value from the DOE only after a front-end engineering and design (FEED) study or similar indication of project maturity, such as project specification and cost estimation sufficient to inform a final investment decision, has been completed for the hydrogen production facility. While we understand the DOE and IRS concerns that the project should be progressed sufficiently to warrant the use of staff time in determining an emissions value, we believe that technologies that have demonstrated performance whether at lab or pilot scale and have been verified by 3<sup>rd</sup> parties should be sufficient for requesting an emissions value from DOE. For novel technologies, the value of the 45V credit is integral to the techno-economic analysis for the project well before final investment decisions are made. Any delay in this critical element of project evaluation will place an undue burden on the commercialization of novel technologies.

As it pertains to stacking, we understand the intent of the regulations is to bar claiming both 45V and Carbon Capture (“45Q”) tax credits for producing clean hydrogen. We want to encourage Treasury to further clarify in the final rule that H<sub>2</sub> technology providers operating within a non-owned industrial site without any affiliation to the site owner, will be allowed to earn the 45V credit, even as the site owner may qualify to claim 45Q credits for CO<sub>2</sub> capture on its industrial operations.

Finally, Treasury and IRS sought comments about the inclusion of methane release data in foreground, rather than background data. We believe there is sufficient data for more granular inclusion of methane emissions data in foreground data used in GREET-45V model.

We respectfully request you expand the guidance to embrace alternative H<sub>2</sub> production technologies such as ours. We thank you for your consideration of these most important points, and ask you to include them in the final regulations. We remain available to you for further questions.

Sincerely,



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