

February 26, 2024

Submitted via-regulations.gov

Office of the Associate Chief Counsel (Passthroughs and Special Industries)
CC:PA:LPD:PR (REG-117631-23)
Room 5203
Internal Revenue Service
P.O. Box 7604, Ben Franklin Station
Washington, DC 20044

RE: Comments with respect to proposed regulations implementing Section 45V as amended by the Inflation Reduction Act of 2022 (IRS REG-117631-23)

Dear Sir or Madam:

HGenium, Inc. (“HGenium”) respectfully submits comments to the U.S. Department of the Treasury (“Treasury”) regarding the proposed regulations under Code¹ Section 45V (the “PTC”) published on December 26, 2023 at 88 Fed. Reg. 89220 (generally, the “Proposed Regulations”). The Proposed Regulations interpret certain provisions of the Code, as amended by Public Law 117-169, 136 Stat. 1818 (August 16, 2022), commonly known as the Inflation Reduction Act of 2022 (“IRA”).²

HGenium urges Treasury to recognize that hydrogen production facilities need certainty and predictability when deciding whether to pursue a new technology or pathway to produce hydrogen. The Proposed Regulations subject producers of hydrogen using emerging technologies to unnecessary uncertainty regarding the logistics of receiving and using a provisional emissions rate (“PER”). Taxpayers must expend significant resources to obtain a PER, and Treasury should honor this time, money, and effort by allowing them to use the PER for many years after it is established. The Proposed Regulations, however, provide that a PER can be immediately invalidated by a new pathway in the new annual 45VH2- GREET (“GREET”).

The IRA is the United States Congress’s greatest commitment to addressing climate change.³ Most of these commitments come from the IRA’s tax title, which enhances and expands previously enacted provisions and provides new incentives for clean and renewable energy production.⁴ The credit for production of clean hydrogen under Code Section 45V was established to incentivize the United States energy transition to a renewable fuel source. The Proposed Regulations, however, disincentivizes the development of new technologies to produce clean hydrogen.

We respectfully request that Treasury and the IRS promptly revisit the Proposed Regulations to account for hydrogen producers that intend to obtain a PER for their hydrogen production systems.

¹ All references to the “Code” herein are to the Internal Revenue Code of 1986, as amended and restated, including by IRA.

² Inflation Reduction Act of 2022 (IRA), H.R. 5376, 117th Cong. (2022).

³ IRA, *supra* note 2.

⁴ *Id.* § 13101–13903.

These hydrogen producers should be rewarded for developing new pathways to produce clean hydrogen and should be afforded certainty and foreseeability for how long they will be allowed to use their PER.

1. Background

a. HGenium

HGenium, Inc. is a Pasadena, California based company focused on commercializing the production of clean hydrogen thru a novel thermochemical water splitting technology (“TCWS”) developed at the University of California Institute of Technology (Caltech).

TCWS utilizes thermal energy and earth-abundant non-toxic materials in a reaction that splits water to produce hydrogen. Thermal energy is distinctively different than electrical energy and can be provided by various low-carbon emitting means such as concentrated solar energy and nuclear energy. Waste heat from an industrial process such as steel making can also be used, thus accomplishing hydrogen production at the point of use and eliminating the technological and logistical strain and inefficiency of transporting hydrogen.

Further, peer reviewed research has shown that TCWS is a more energy efficient hydrogen production method than electrolyzer technologies⁵ and does not require precious catalyst metals (which may not be produced in a sustainable manner).

2. The Department of Energy should not have unlimited discretion to act on and determine emissions values.

The Proposed Regulations provide that, before a taxpayer can file a PER petition with the Treasury, it must first obtain an emissions value from the Department of Energy (“DOE”) setting forth DOE’s analytical assessment of the lifecycle GHG emissions associated with the facility’s production pathway. However, the Proposed Regulations do not outline any time period that the DOE must make a determination on the hydrogen facility’s emissions value.

This is problematic on multiple levels. First, because there is no required response time for DOE to review emissions value applications, taxpayers have no guarantee that DOE will ever respond or do so in a timely manner. The PTC was created to make clean hydrogen facilities more economically viable. However, an uncertain response timeline will significantly impact the feasibility of the facility. In addition, there is no mandatory timeline for DOE to must issue guidance and procedures for applicants to request and obtain an emissions value. This is troubling because it is well-documented that governmental agencies have historically declined to act on applications for new fuel pathways.⁶

⁵ Stéphane Abanades, *Metal Oxides Applied to Thermochemical Water-Splitting for Hydrogen Production Using Concentrated Solar Energy*, CHEMENGINEERING 4 July 2019.

⁶ Erin Voegelé, *Letter Urges EPA to Process Pending RFS Fuel Pathway Applications*, ADVANCED BIOFUELS USA (June 12, 2019), <https://abf.magazoon.com/letter-urges-epa-to-process-pending-rfs-fuel-pathway-applications>; see also *RFS Power Coalition Commends Rep. Garamendi for Introducing Bill Requiring EPA Action on eRINs*, 2

This vagueness is unnecessary. A taxpayer may request an emissions value from DOE only after front-end engineering design or similar indication of project maturity has been achieved. If a robust third-party verification method such as that used in the context of verifying production of hydrogen is utilized here, DOE and Treasury personnel should have everything they need to verify the emissions value for the taxpayer's pathway. Providing *specific* guidelines for any third-party verification report would only serve to increase DOE's and Treasury's confidence in the verified emissions value.

a. Proposed revision.

Treasury should revise Section 1.45V-4(c) of the Proposed Regulations as follows:

(3) *Process for filing a PER petition.* To file a PER petition with the Secretary, a taxpayer must submit a PER petition attached to the taxpayer's Federal income tax return for the first taxable year of hydrogen production ending within the 10-year period described in section 45V(a)(1) for which the taxpayer claims the section 45V credit for hydrogen to which the PER petition relates and for which a lifecycle GHG emissions rate has not been determined, as defined under paragraph (c)(2)(i) of this section. A PER petition must contain an emissions value obtained from the DOE setting forth DOE's analytical assessment of the lifecycle GHG emissions associated with the facility's hydrogen production pathway, which must be consistent with the lifecycle GHG emissions framework provided in the section 45V regulations, and a copy of the taxpayer's request to the DOE for an emissions value, including any information provided by the taxpayer to the DOE pursuant to the emissions value request process provided in paragraph (c)(5) of this section. **If DOE has not denied or approved the taxpayer's application for an emissions value determination within the time period set forth in paragraph (c)(5), the taxpayer's assessment of the lifecycle GHG emissions associated with the facility will be deemed to be accepted and approved by the DOE and the taxpayer may submit its emissions value report for purposes of obtaining a PER.** If the taxpayer obtained more than one emissions value from the DOE, the PER petition must contain the emissions value setting forth the lifecycle GHG emissions rate of the hydrogen for which the section 45V credit is claimed on the Form 7210, *Clean Hydrogen Production Credit*, to which the PER petition is attached.

...

(5) *Department of Energy (DOE) emissions value request process.* An applicant that submits a request for an emissions value must follow the procedures specified by the DOE to request and obtain such emissions value. Emissions values will be evaluated using the same well-to-gate system boundary that is employed in 45VH2-GREET. Additionally, if applicable, background data parameters in

RENEWABLE ENERGY MAGAZINE (Nov. 16, 2021), <https://www.renewableenergymagazine.com/biogas/rfs-power-coalition-commends-rep-garamendi-for-20211116>.

45VH2–GREET will also be treated as background data (with fixed values that an applicant cannot change) in the emissions value request process. Treatment of EACs and other proposals outlined in the regulations in this part under section 45V will be consistently applied in the emissions value request process. 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, as determined by the DOE, such as project specification and cost estimation sufficient to inform a final investment decision has been completed for the hydrogen production facility. The DOE may decline to review applications that are not responsive, including those applications that use a hydrogen production technology and feedstock already in 45VH2–GREET or applications that are incomplete. **Notwithstanding the foregoing, if a taxpayer submits a complete emissions value application, and the DOE fails to approve or deny the emissions value within 120 days of receipt of the application, the emissions value determined by the taxpayer will be deemed to be accepted and approved by the DOE.** Guidance and procedures for applicants to request and obtain an emissions value from the DOE will be published by the DOE **by December 31, 2024**, including a process for, under limited circumstances, a revision to the DOE's initial analytical assessment of an emissions value on the basis of revised technical information or facility design and operation.

These revisions to the Proposed Regulations aim to eliminate any potential bottlenecks that may occur due to DOE not promptly addressing emissions value applications.

3. The GREET model should not preempt existing PERs.

The Proposed Regulations outline the procedures under which a taxpayer can obtain and use a PER when a lifecycle GHG emissions rate has not been determined under the most recent GREET model.⁷ Unfortunately, the Proposed Regulations introduce significant uncertainty for taxpayers that intend to pursue a PER. This position disincentivizes hydrogen producers from finding new pathways to produce hydrogen and could significantly impact the economic viability of some projects to continue to produce hydrogen.

a. Current PER process.

Under the Proposed Regulations, there are significant restrictions on how long a taxpayer may use a PER. Specifically, the Proposed Regulations provide that, “A taxpayer may use a PER . . . to calculate the amount of the section 45V credit . . . at a qualified clean hydrogen production facility . . . *until the lifecycle GHG emissions rate of such hydrogen has been determined (for purposes of section 45V(c)(2)(C)) under the most recent GREET model.*”⁸ Thus, a taxpayer that has gone

⁷ Prop. Treas. Reg. § 1.45V-4(c)(2)(i).

⁸ Prop. Treas. Reg. § 1.45V-4(c)(6) (emphasis added); *see also* Prop. Treas. Reg. § 1.45V-4(2)(ii) (“[F]or the taxable year in which the hydrogen production facility's hydrogen production pathway is first included in an updated version of 45VH2–GREET, the updated version of 45VH2–GREET will be considered the most recent GREET model with respect to the hydrogen produced by the taxpayer at the hydrogen production facility during such taxable year, and for

through the process of gathering data and submitting it to the DOE for approval could also be required to use the GREET model, despite already expending resources to get an emissions value approval from DOE.⁹ The Treasury's approach to PERs in the Proposed Regulations is poor tax policy and must be changed.

Treasury's approach to PERs creates significant uncertainty for taxpayers. A hydrogen producer could go through the exercise of obtaining a PER, model its entire 10-year operations based on the PER, and then have its PER preempted by a new pathway in the GREET model. For example, a taxpayer could develop a pathway to produce hydrogen that yields a lifecycle GHG emission of 0.40 kg of CO₂e per kilogram of hydrogen. Accordingly, after that emission value is approved by the DOE and accepted by the IRS, the facility will qualify for the full \$3 per kg of hydrogen produced. However, if the DOE then includes the same pathway in the 45V H₂ GREET model and determines that it has a lifecycle GHG emissions value of 0.80 kg of CO₂e per kilogram of hydrogen because of, for example, a slightly different set of facts, the taxpayer would either have to buy electricity attribute credits (EACs) (or a yet-to-be-determined equivalent for other energy inputs) to lower its GHG score or accept a lower credit amount. Either way, the new GREET model would significantly impact the taxpayer's profitability despite changing nothing in respect of its own process of producing hydrogen.

The Proposed Regulations also disincentivize innovation in clean hydrogen production technology. Because there is no guarantee that a PER will last the full ten years in which the PTC can be claimed, taxpayers are effectively incentivized to use only pathways in the 45V H₂ GREET because only those pathways will be predictable enough to be financeable. However, there is no guidance that states how to obtain a new pathway or that sets forth any kind of timeline for when Argonne National Lab must consider or publish new pathways. This is particularly problematic because most new hydrogen production technology is developed by emerging companies that do not have significant resources.

This method inappropriately invalidates the time, resources, and expense that the taxpayer must incur to obtain a PER and casts doubt on DOE's ability to objectively evaluate data provided by taxpayers. PERs must account for a particular process and feedstock that a taxpayer may use to produce hydrogen and taxpayers have every reason to expect that the information DOE will require to approve a provisional emissions rate will be detailed and robust. This is the case in other programs that utilize the Argonne GREET model or a variation thereon. For example, California's low carbon fuel standard ("LCFS") permits taxpayers to obtain a pathway for a particular facility and rely on it for 10 years before renewing its application.¹⁰ Similarly, under the EPA's renewable

purposes of section 45V(c)(2)(C), a lifecycle GHG emissions rate for such hydrogen will be considered to have been determined.").

⁹ See Prop. Treas. Reg. § 1.45V-4(c)(2)(i) ("If a taxpayer's request for an emissions value pursuant to paragraph (c)(5) of this section with respect to the hydrogen produced by the taxpayer at a hydrogen production facility is pending at the time such facility's hydrogen production pathway becomes included in an updated version of 45VH₂-GREET, the taxpayer's request for an emissions value will be automatically denied.").

¹⁰ EPA, *How to Prepare an Efficient Producer Petition under the Renewable Fuel Standard Program*, <https://www.epa.gov/renewable-fuel-standard-program/how-prepare-efficient-producer-petition-under-renewable-fuel> (last updated May 19, 2023).

fuel standard, there is a petition process to obtain a company-specific pathway that may be relied on for many years.¹¹ These programs require producers to submit detailed, verified information about a facility's operations while still using certain assumed information. Taxpayers have no reason to think that any less will be expected of them by DOE in a PER application process.

Further, the LCFS and RFS programs demonstrate that pathways provided to producers outside of the default GREET model can significantly incentivize new approaches to producing hydrogen. Nonetheless, we are sensitive to the administrative burden that this type of model places on the government. We suggest, however, that it is possible for Treasury to strike a balance between taxpayer foreseeability and administrative ease here by permitting taxpayers to obtain a PER for a new process (as opposed to a specific facility) and allow the applicant to rely on that PER in the long term. In any event, Treasury should not penalize emerging companies that have expended resources to obtain a PER by forcing them to use a new pathway in the 45V H2 GREET model, which no taxpayer has any guarantee will be premised on substantially similar data.

b. Proposed revision.

To provide taxpayers more certainty when applying for and receiving a PER, Proposed Regulations Section 1.45V-4(c) should be modified as follows:

(2) Rate not determined —(i) In general. For purposes of section 45V(c)(2)(C), a taxpayer may not file a petition for a PER unless a lifecycle GHG emissions rate has not been determined under the most recent GREET model with respect to hydrogen produced by the taxpayer at a hydrogen production facility. A lifecycle GHG emissions rate has not been determined under the most recent GREET model with respect to hydrogen produced by the taxpayer at a hydrogen production facility if either the feedstock used by such facility or the facility's hydrogen production technology is not included in the most recent GREET model. A facility's hydrogen production pathway is not included in the most recent GREET model if the feedstock used by such facility or the facility's hydrogen production technology is not included in the most recent GREET model. ~~If a taxpayer's request for an emissions value pursuant to paragraph (c)(5) of this section with respect to the hydrogen produced by the taxpayer at a hydrogen production facility is pending at the time such facility's hydrogen production pathway becomes included in an updated version of 45VH2-GREET, the taxpayer's request for an emissions value will be automatically denied. In such case, the taxpayer must determine the lifecycle GHG emissions rate with respect to such hydrogen under paragraph (c)(2)(ii) of this section.~~

(ii) Subsequent inclusion in 45VH2-GREET. Notwithstanding the definition of the most recent GREET model provided at § 1.45V-1(a)(8)(ii), for the taxable year in which the hydrogen production facility's hydrogen production pathway is first

¹¹ EPA, *How to Prepare an Efficient Producer Petition under the Renewable Fuel Standard Program*, <https://www.epa.gov/renewable-fuel-standard-program/how-prepare-efficient-producer-petition-under-renewable-fuel> (last updated May 19, 2023).

included in an updated version of 45VH2-GREET, the updated version of 45VH2-GREET will be considered the most recent GREET model with respect to the hydrogen produced by the taxpayer at the hydrogen production facility during such taxable year, and for purposes of section 45V(c)(2)(C), a lifecycle GHG emissions rate for such hydrogen will be considered to have been determined. **Notwithstanding the foregoing, if a taxpayer has filed a PER petition in accordance with 1.45-4(c)(3), then such taxpayer may use the lifecycle GHG emissions determined by or deemed to be determined by the DOE for 10 consecutive years beginning on the placement in service date for the first project in respect of which the taxpayer files a tax return that includes such PER petition.**

...

(6) *Effect of PER.* A taxpayer may use a PER determined by the Secretary to calculate the amount of the section 45V credit under section 45V(a) and § 1.45V-1(b) with respect to qualified clean hydrogen produced at a qualified clean hydrogen production facility, provided all other requirements of section 45V are met, **during the time period set forth in § 1.45V-4(c)(2)(ii) until the lifecycle GHG emissions rate of such hydrogen has been determined (for purposes of section 45V(c)(2)(C)) under the most recent GREET model.** The Secretary's PER determination is not an examination or inspection of books of account for purposes of section 7605(b) of the Code and does not preclude or impede the IRS (under section 7605(b) or any administrative provisions adopted by the IRS) from later examining a return or inspecting books or records with respect to any taxable year for which the section 45V credit is claimed. For example, the verification report submitted under section 45V(c)(2)(B)(ii) and § 1.45V-5 and any information, representations, or other data provided to the DOE in support of the request for an emissions value are still subject to examination. Further, a PER determination does not signify that the IRS has determined that the requirements of section 45V have been satisfied for any taxable year.

Finally, Treasury should hasten to issue guidance to reverse its position on when taxpayers may petition for a PER. In the preamble of the Proposed Regulations, Treasury states, “the PER process will not address other hydrogen production pathways using biogas and RNG until after the final regulations are issued.”¹² Due to the potential that Treasury may not timely issue final regulations, it should immediately clarify that hydrogen producers that need to obtain a PER because their current pathway is not included in the GREET model can do so prior to final regulations being published.

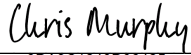
4. Conclusion

Congress and President Biden worked together to enact IRA to address climate change, facilitate the American energy transition, and invest in American innovations and jobs. Hydrogen will play

¹² 88 Fed. Reg. at 89240.

a pivotal role in this transitioning into a major hard-to-decarbonize industry. Further, the Biden administration has set lofty goals for the nationwide adoption of hydrogen.¹³ The Proposed Regulations, however, significantly deter the development of new hydrogen production facilities. By not imposing strict timelines on the DOE to approve emissions values, many projects could be stuck waiting on the DOE instead of producing hydrogen. Further, because taxpayers may lose their PER in the year after they obtained them, taxpayers are effectively discouraged from producing hydrogen using anything other than current pathways in the 45V H2 GREET model. Congress certainly did not intend to create a tax credit that placed significant uncertainty on taxpayers and significantly dampens the innovation America needs to transition to clean energy.

We urge Treasury to adopt these measures as soon as possible.

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Chris Murphy, CEO

HGenium

¹³ <https://www.energy.gov/eere/fuelcells/hydrogen-shot> (stating that the DOE is seeking to reduce the cost of clean hydrogen by 80% to \$1 per kilogram in one decade).