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VIA ELECTRONIC FILING

The Honorable Lily L. Batchelder
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Re: Section 45V Credit for Production of Clean Hydrogen, Section 48(a)(15) Election to Treat Clean Hydrogen Production Facilities as Energy Property

Dear Assistant Secretary Batchelder and Mr. Paul:

The undersigned associations—U.S. Chamber of Commerce, The Allegheny Conference on Community Development and its affiliate the Greater Pittsburgh Chamber of Commerce, American Public Power Association, Associated Builders and Contractors, ConservAmerica, Electric Power Supply Association, The Fertilizer Institute, Fuel Cell and Hydrogen Energy Association, National Hydropower Association, and The Truck and Engine Manufacturers Association (collectively "we" or "commenters")[1]—welcome the opportunity to comment on the proposed regulations promulgated under sections 45V and 48(a)(15) of the Internal Revenue Code,[2] which were published in the *Federal Register* on December 26, 2023 (the "Proposed Regulations").[3]

The Inflation Reduction Act of 2022 ("IRA")[4] added section 45V, a tax credit for production of clean hydrogen (the "45V Credit"), to incentivize the rapid growth and deployment of clean hydrogen production in the United States. Clean hydrogen has emerged as an important solution for decarbonizing many hard-to-abate sectors, such as heavy-duty transportation, chemical and industrial processing, ammonia production, steel manufacturing, and more. The commenters recognize the efforts of the U.S. Department of Treasury ("Treasury") and the Internal Revenue Service (the "IRS") in coordination with the U.S. Department of Energy ("DOE"), to accelerate investments in and advance clean hydrogen production. However, the Proposed Regulations, if finalized, would deter and, in some cases, halt investment and

[1] See Appendix A for a description of the undersigned organizations.
[2] Unless otherwise indicated, all textual references to "section" herein are to sections of the Internal Revenue Code of 1986, as amended (the "Code").
[3] Section 45V Credit for Production of Clean Hydrogen; Section 48(a)(15) Election to Treat Clean Hydrogen Production Facilities as Energy Property, 88 Fed. Reg. 89,220 (proposed Dec. 26, 2023).
[4] An Act to provide for reconciliation pursuant to title II of S. Con. Res. 14, Pub. L. 117-169, § 13204, 136 Stat. 1935-1941 (2022).

deployment of clean hydrogen as they are unduly burdensome, suffer from significant legal vulnerabilities, and generate uncertainty regarding a project's eligibility for the 45V Credit. Further, Treasury and the IRS exceeded their statutory authority in implementing the three pillars in the Proposed Regulations because section 45V does not mention the three pillars or authorize Treasury to impose restrictions that require a hydrogen producer meet the three pillars to claim the 45V Credit. Moreover, under the Administrative Procedure Act ("APA"), DOE's Guidelines to Determine Well-to-Gate Greenhouse Gas Emissions of Hydrogen Production using 45VH2-GREET ("DOE's Guidelines") represent a "legislative rule" that can only be issued through notice-and-comment rulemaking.

Background on the 45V Credit

The 45V Credit provides a 10-year production tax credit for clean hydrogen that is produced at a qualified clean hydrogen production facility.[5] In order to qualify for the 45V Credit, the hydrogen must be produced through a process (i) with a lifecycle greenhouse gas ("GHG") emissions rate of not more than four kilograms of carbon dioxide equivalent ("CO2e")/kilogram of hydrogen, (ii) produced (A) in the United States (or a United States territory), (B) in the ordinary course of a trade or business of the taxpayer, and (C) for sale or use, and (iii) the production and sale or use of such hydrogen is verified by an unrelated third party.[6] Section 45V also requires that lifecycle GHG emissions only include emissions through the point of production (i.e., well-to-gate), as determined under the most recent Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation ("GREET") model.[7] Depending on the lifecycle GHG emissions rate as determined under the GREET model, the amount of the 45V Credit varies—the lower the GHG emissions, the higher the credit. In addition, if the qualified clean hydrogen facility meets the prevailing wage and apprenticeship requirements, the full value of the credit is multiplied by five.[8] With wage and apprenticeship requirements met, the value of the credit ranges from $0.60 to $3.00 per kilogram of clean hydrogen produced.

The IRA defines lifecycle GHG emissions by reference to the same term under section 211(o)(1)(H) of the Clean Air Act ("CAA").[9] The lifecycle GHG emissions rate is generally determined using the most recent GREET model, and only if the relevant lifecycle GHG emissions rate has not been determined under the most recent GREET model, the taxpayer may request a provisional emissions rate.[10] The term "most recent

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[5] I.R.C. § 45V(a)(1).
[6] I.R.C. § 45V(c)(2)(A); I.R.C. § 45V(c)(2)(B); *see also* Prop. Treas. Reg. §§ 1.45V-1(a)(9), 88 Fed. Reg. at 89,246 and 1.45V-5, 88 Fed. Reg. at 89,249.
[7] I.R.C. § 45V(c)(1)(B).
[8] I.R.C. § 45V(e).
[9] I.R.C. § 45V(c)(1).
[10] *Id.*

GREET model" means the latest version of 45VH2-GREET developed by Argonne National Laboratory that is publicly available on the first day of the taxpayer's taxable year in which the qualified clean hydrogen for which the taxpayer is claiming the 45V Credit was produced.[11]

Executive Summary

The commenters respectfully recommend that the final regulations address the following:

I. Align the final regulations to further support the Biden-Harris Administration's goals of accelerating economy-wide decarbonization by maximizing production and affordability of clean hydrogen and to be more supportive of current and future offtake arrangements and technologies.

II. Align the final regulations with the statutory language and congressional intent of the 45V Credit to support the production of clean hydrogen through all current and future feedstocks and technologies and revise associated requirements on the use of energy attribute certificates ("EACs") (i.e., (1) incrementality, (2) temporal matching, and (3) deliverability).
    a. Revise the EAC's incrementality requirements (as outlined below), as such requirements will undermine the growth of the U.S. hydrogen industry with no associated environmental benefit.
        i. Provide an exception to the incrementality requirement for qualified clean hydrogen facilities that begin construction before January 1, 2032.
        ii. Implement a transition provision, similar to that in place for temporal matching, that deems the incrementality requirement is satisfied if an insufficient amount of renewable facilities are available
        iii. Exempt nuclear and hydropower facilities from the 36-month incrementality requirement.
        iv. Clarify that the commercial operations date ("COD") includes the originally placed in service date for tax purposes, which will permit an existing clean electricity generating facility to be eligible if such facility satisfies the 80/20 Rule (as defined below).
        v. Adopt a formulaic approach exception that enables 10 percent of hourly generation from minimal-emitting electricity generators placed in service before January 1, 2023 to satisfy the incrementality requirement.

[11] Prop. Treas. Reg. § 1.45V-1(a)(8)(ii), 88 Fed. Reg. at 89, 245.

b. Revise the temporal matching requirements (as detailed below), as such requirements are impossible for clean hydrogen producers to meet, and thus further undermine the fledgling hydrogen industry.
    i. Treasury and the IRS, in coordination with DOE, should not impose temporal matching requirements unless it first certifies the technology and system readiness for implementing those requirements, while allowing impacted facilities at least 18 months of lead time prior to onset of compliance requirements.
    ii. Defer implementation of the transition from annual to hourly temporal matching requirement for qualified clean hydrogen facilities to no sooner than January 1, 2032.
    iii. Provide a temporal matching safe harbor for projects that begin construction before January 1, 2032, such that taxpayers may rely on the annual temporal matching requirements in place at the time the qualified clean hydrogen production facility began construction, and such requirements will apply for the full credit period.
    iv. Clarify that stored electricity in batteries has a time stamp that correlates to the time such electricity is used in the production of clean hydrogen rather than when the electricity was generated or stored.
c. Revise the current deliverability requirement so that the EAC is sourced from the same North American Electric Reliability Corporation ("NERC") region or an adjacent NERC region as the relevant hydrogen production facility.

III. Design and administer the 45VH2-GREET model in a manner that maximizes the incentive to reduce GHG gas emissions, the core goal of the 45V Credit and other clean energy provisions enacted under the IRA, as outlined below.
    a. Eliminate uncertainty by providing taxpayers with the option to use the GREET model in place (i) at the time the final investment decision ("FID") is made, (ii) at the time that the facility is placed in service, or (iii) any model made publicly available on the first day or any day of the taxable year (but within such taxable year) of production that best computes the lifecycle GHG emissions rate based on the taxpayer's facts.
    b. Remove the fixed assumptions in the 45VH2-GREET model and allow facilities greater flexibility to input the actual carbon intensity ("CI") of their feedstock and technology, which will encourage investments in emissions reductions technologies and allow taxpayers to better reflect their lifecycle GHG emissions rate.

IV. Adopt provisions that recognize the full lifecycle benefits of renewable natural gas ("RNG") and natural gas.

a. Incrementality
    i. Eliminate the proposed "first productive use requirement" within the preamble as such a requirement would cause a significant value discrepancy for new projects, added complexity, and higher prices for end-consumers.
b. Temporality
    i. Utilize current RNG and natural gas market operations, such as requiring book-and-claim accounting, to ensure proper tracking of the RNG injected and used; and exclude any temporal matching requirements as it applies to RNG and natural gas.
c. Deliverability
    i. Exempt RNG and natural gas from any geographic restrictions.

V. Adopt "book-and-claim" accounting processes for RNG and natural gas.

Please see below for a detailed summary of each comment.

I. Align the final regulations to further support the Biden-Harris Administration's goals of accelerating economy-wide decarbonization by maximizing production and affordability of clean hydrogen and to be more inclusive of current and future offtake arrangements and technologies.

The 45V Credit's Interplay with the Biden Administration's Clean Hydrogen Initiatives

Hydrogen is recognized as a critical element and significant energy technology that will support the reduction in United States GHG emissions from 2005 levels by 50 to 52 percent in 2030 under the Paris Agreement, create a carbon pollution-free power sector by 2035, and reach net zero emissions no later than 2050.[12] In addition to these commitments, the Biden-Harris Administration, along with Congress, has acknowledged and supported hydrogen's role in meeting the decarbonization and economic goals through its inclusion of $9.5 billion in clean hydrogen initiatives enacted under the Infrastructure Investment and Jobs Act ("Bipartisan Infrastructure Law"),[13] the formation of the Hydrogen Energy Earthshot ("Hydrogen Shot") program, as well as the related federal tax credits enacted that incentivize clean hydrogen under the IRA.[14]

[12] *See* U.S. Dept. of Energy, *U.S. National Clean Hydrogen Strategy and Roadmap* (June 2023), https://www.hydrogen.energy.gov/docs/hydrogenprogramlibraries/pdfs/us-national-clean-hydrogen-strategy-roadmap.pdf.
[13] Bipartisan Infrastructure Law, Pub. L. 117-58 (Nov. 15, 2021).
[14] U.S. Dept. of Energy, *Secretary Granholm Launches Energy Earthshots Initiative to Accelerate Breakthroughs Toward a Net-Zero Economy* (June 2021), https://www.energy.gov/eere/articles/secretary-granholm-launches-energy-earthshots-initiative-accelerate-breakthroughs.

In support of zero- and low-carbon hydrogen playing a key role in a comprehensive portfolio of solutions to achieve a sustainable and equitable clean energy future, and at the direction of Congress, DOE prepared the *U.S. National Clean Hydrogen Strategy and Roadmap*.[15] This report is the result of a collaborative effort from the hydrogen industry and various stakeholders, as well as contributions across multiple agencies and key experts in the Executive Office of the President.[16] The intent of such report was to create an "all of government" approach to increase the production of clean hydrogen.[17] Throughout the roadmap, DOE outlines the opportunity and goals for clean hydrogen to increase production from nearly zero today to 10 million metric tons ("MMT") per year by 2030, 20 MMT per year by 2040, and 50 MMT per year by 2050.[18] The three strategies proposed to reach such goals include: (1) target strategic, high-impact uses for clean hydrogen; (2) reduce the cost of clean hydrogen; and (3) focus on regional networks.[19]

In furtherance of the strategy to reduce the cost of clean hydrogen, the Hydrogen Shot program, the first of DOE's Energy Earthshots, was born. Developed in response to President Biden's April 2021 Climate Summit request to DOE to accelerate progress towards tackling the climate crisis, the Hydrogen Shot program aims to accelerate breakthroughs of more abundant, affordable, and reliable clean energy solutions within the decade while creating good-paying union jobs and growing the economy.[20] The Hydrogen Shot program set a goal of producing clean hydrogen at $1 per kilogram by 2030. To achieve this goal, the cost of producing clean hydrogen from electrolysis must significantly decrease from the current estimate of $5 per kilogram, which is highly sensitive to the cost of electricity.[21] DOE recognizes that access to low-cost energy with a high-capacity factor and incentives, such as the 45V Credit, among other federal programs, can facilitate much lower electricity cost when combined to decrease the cost to produce hydrogen.[22]

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[15] *See* U.S. Dept. of Energy, *U.S. National Clean Hydrogen Strategy and Roadmap* (June 2023), https://www.hydrogen.energy.gov/docs/hydrogenprogramlibraries/pdfs/us-national-clean-hydrogen-strategy-roadmap.pdf.

[16] *Id.*

[17] *Id.*

[18] *Id.*

[19] *Id.*

[20] *Id.*

[21] *Id.* Note the $5 per kilogram is the levelized cost of hydrogen calculated using the DOE's H2A model using a conservative $1,500/kW for PEM electrolyzer capital cost (at low volume manufacturing), a $50/MWh electricity price, and a capacity or utilization of 90 percent. In comparison, using today's $29/MWh for solar and 35 percent capacity factor, based on the 2020 National Renewable Energy Laboratory Annual Technology Baseline, results in a levelized hydrogen cost of about $7.50 per kilogram. U.S. Dept. of Energy, *Cost of Electrolytic Hydrogen Production with Existing Technology* (Sept. 22, 2020), https://www.hydrogen.energy.gov/pdfs/20004-cost-electrolytic-hydrogen-production.pdf.

[22] *Id.*

In addition to the issue of high electricity cost, the hydrogen market also faces obstacles obtaining long-term offtake agreements (e.g., power purchase agreements ("PPAs")). These types of agreements were also critical for the scale-up of the wind and solar industries.[23] Long-term PPAs are important in securing financing for hydrogen projects as such agreements mitigate both volume and price risk. This is further highlighted by the fact that only 10 percent of the 12 MMT per year clean hydrogen production capacity announced in the United States has reached FID, which DOE largely attributes to the lack of long-term offtake agreements.[24]

In its hydrogen roadmap, DOE further elaborated on the importance of reduced hydrogen prices and a supportive policy environment to the 45V Credit's success, explaining that "[s]takeholders on the production, demand, and financing sides highlight hesitancy to commit resources due to lack of price transparency and risks in clean hydrogen supply. Regulatory drivers at the state and federal level could help provide these long-term demand signals. Catalyzing long-term offtake would ensure that clean hydrogen production projects break ground while tax credits are active, allowing for production cost-downs in the 2020s and early 2030s."[25]

The 45V Credit's Importance to the Environmental Protection Agency's ("EPA") Power Plant Rule

In addition to curbing GHG emissions through various DOE initiatives and federal incentives, the EPA has proposed new carbon dioxide ("CO2") emission guidelines for power plants.[26] If implemented as proposed, the new source performance standards ("NSPS") would require existing and new electric generating facilities utilizing coal, natural gas, and/or oil as its feedstock to invest in carbon capture and sequestration ("CCS"), low-GHG hydrogen co-firing, and natural gas co-firing technologies to meet the mandated emission standards.

The NSPS relies on and specifically cites the clean energy incentives under the IRA, such as sections 45Q and 45V, in applying the best system of emission reduction, which takes into account costs, energy requirements, and other statutory factors.[27] As the U.S. Chamber of Commerce previously analyzed in *A Closer Look at EPA's*

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[23] *Id.*
[24] *Id.*
[25] *See* U.S. Dept. of Energy, *U.S. National Clean Hydrogen Strategy and Roadmap* (June 2023), https://www.hydrogen.energy.gov/docs/hydrogenprogramlibraries/pdfs/us-national-clean-hydrogen-strategy-roadmap.pdf.
[26] New Source Performance Standards for Greenhouse Gas Emissions From New, Modified, and Reconstructed Fossil Fuel-Fired Electric Generating Units; Emission Guidelines for Greenhouse Gas Emissions From Existing Fossil Fuel-Fired Electric Generating Units; and Repeal of the Affordable Clean Energy Rule, 88 Fed. Reg. 33,240.
[27] *Id.*

Powerplant Rule, the EPA expects compliance with the proposal to depend on large amounts of low-cost hydrogen.[28] Specifically, the EPA's rule projects that the power sector will need enough hydrogen to generate 108 terawatt-hours of electricity in 2040—an amount equivalent to two percent of nationwide generation. This compliance projection relies on the 45V Credit to incentivize the production of clean hydrogen in amounts sufficient to achieve co-firing of 30 percent (by volume) low-GHG hydrogen (i.e., hydrogen produced with less than 0.45 kilogram of CO2e/kilogram of hydrogen from "well-to-gate") with natural gas by 2032 and 96 percent by 2038.[29] The proposed rule assumes a clean hydrogen price of just $1 per kilogram through 2032, declining to 50 cents per kilogram thereafter, as "tax credits and market forces are expected to accelerate innovation and drive down costs even further over the next decade."[30] Clearly, there is misalignment between the EPA and the Proposed Regulations. In order for the EPA's vision of large-scale use of affordable clean hydrogen in the power sector to be realized, the 45V Credit must be structured in a manner that does not unduly restrict investment in hydrogen production.

The commenters agree with DOE on the potential of hydrogen to enable economy-wide decarbonization, and strongly supports the strategies outlined within the *U.S. National Clean Hydrogen Strategy and Roadmap*. However, as currently drafted, the Proposed Regulations will not help achieve the goals of the Hydrogen Shot program, much less incentivize investors and developers to build clean hydrogen production facilities, as there is a concern that the 45V Credit may be unattainable, as discussed in more detail below. Furthermore, the Proposed Regulations may also preclude new and existing electric generating facilities from meeting the NSPS, as the market may not respond to the near-term hydrogen demand without the certainty of flexible 45V Credit requirements.

Treasury and the IRS should consider the impacts of the Proposed Regulations on the affordability of and market demand for low-GHG hydrogen. Therefore, we respectfully request Treasury and the IRS implement final regulations that align with and further support the Biden-Harris Administration's goals of economy-wide

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[28] *See* Chamber of Com. of the U.S.—Global Energy Inst., *A Closer Look at EPA's Powerplant Rule* (June 2023), https://www.globalenergyinstitute.org/sites/default/files/2023-06/USCC_EPA%20Powerplant%20Rule%20Analysis_2023.FINAL_.pdf.

[29] *See* U.S. Dept. of Energy, *U.S. National Clean Hydrogen Strategy and Roadmap* (June 2023), https://www.hydrogen.energy.gov/docs/hydrogenprogramlibraries/pdfs/us-national-clean-hydrogen-strategy-roadmap.pdf.

[30] U.S. Env't Prot. Agency, Regulatory Impact Analysis for the Proposed New Source Performance Standards for Greenhouse Gas Emissions from New, Modified, and Reconstructed Fossil Fuel-Fired Electric Generating Units; Emissions Guidelines for Greenhouse Gas Emissions from Existing Fossil Fuel-Fired Electric Generating Units; and Repeal of the Affordable Clean Energy Rule (May 2023), https://www.regulations.gov/document/EPA-HQ-OAR-2023-0072-0007.

decarbonization and to be more inclusive of current and future offtake arrangements and technologies.

II. Align the final regulations with the statutory language and congressional intent of the 45V Credit to support the production of clean hydrogen through all current and future feedstocks and technologies and revise associated requirements on the use of EACs (i.e., (1) incrementality, (2) temporal matching, and (3) deliverability).

The Proposed Regulations are not grounded in the authority granted in section 45V, and so, in order to create a viable regulation, Treasury and the IRS must align the final regulations with the statutory language and congressional intent. The Proposed Regulations provide that as an alternative to using electricity from the regional electricity grid (as currently represented in 45VH2-GREET) for claiming the 45V Credit, an EAC may be considered under certain conditions when documenting purchased electricity inputs and assessing emissions impacts of electricity used in the production of hydrogen.[31] For such situations, the Proposed Regulations impose three pillars that the hydrogen production must meet to obtain EACs and claim the 45V Credit: (1) incrementality, (2) temporal matching, and (3) deliverability.[32]

The Creation of the Three Pillars Exceeds Treasury's Rulemaking Authority

While the commenters understand the potential concerns regarding unintended consequences for grid emissions, we are also concerned that the Proposed Regulations are not consistent with the statute. Treasury and the IRS exceeded their statutory authority in implementing the three pillars because Congress did not give them the authority in section 45V to impose such restrictions on eligibility. Congress made it clear that the amount of the 45V Credit was to be determined based on the "lifecycle greenhouse gas emissions" through the point of production (i.e., well-to-gate), as determined under the GREET model. In the Proposed Regulations, Treasury and the IRS are now mandating that certain criteria (i.e., the three pillars) must be met, even if a taxpayer procures an EAC from a grid connected, directly connected, or co-located zero-emitting or low-emitting source. If the three pillars are not met, then the EAC is disregarded, and the taxpayer must compute the lifecycle GHG emissions by using the average emissions from the regional electricity grid where such taxpayer's facility is located. However, the statute simply does not allow the imposition of any such restriction.

Under section 45V(f), Congress mandated that not later than one year after the date of enactment of section 45V, Treasury must issue regulations or other guidance

[31] 88 Fed. Reg. at 89,227.
[32] Prop. Treas Reg. § 1.45V-4(d)(3), 88 Fed. Reg. at 89, 249.

to carry out the purposes of section 45V, which includes guidance on determining lifecycle GHG emissions. If adopted, the three pillars in the Proposed Regulations would exceed the authority granted by Congress in section 45V. Like other administrative agencies, Treasury has "no power to act . . . unless and until Congress confers power upon it,"[33] and such authority is expressly limited by the statutory text in section 45V.

Congress granted Treasury with limited rulemaking authority "[t]o carry out the purposes of [section 45V], including regulations or other guidance for determining lifecycle greenhouse gas emissions."[34] Section 45V does not authorize Treasury to introduce new qualification requirements in the form of the three pillars, as such requirements are contrary to the plain language of section 45V. Moreover, the implementation of the three pillars directly undermines the statutory language and its broader objective to incentivize large-scale clean hydrogen production.

Updated GREET Model May be Subject to the APA's Notice-and-Comment Requirements

Additionally, the APA defines a "rule" as "[a]n agency statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy. . . ."[35] When such a rule binds the public or, as a practical matter, has the force and effect of law, it is a "legislative rule" that must comply with the APA's requirements for notice-and-comment rulemaking.[36] DOE's Guidelines and its interposition of the new user interface on the GREET model are the primary means of determining eligibility for and value of the 45V Credit for hydrogen producers. Their substantive impact is enormous and, as a practical matter, they have the force-and-effect of law. Thus, they cannot be put into place without going through the notice-and-comment process required by the APA.

Congressional Support for Flexible 45V Credit Guidance

A letter from eleven members of the U.S. Senate to Secretary Yellen, Secretary Granholm, and Mr. John Podesta confirms that Congress intended for the 45V Credit guidance to be appropriately flexible. Such letter indicates that Congress wanted the Proposed Regulations for the 45V Credit to be consistent with their "intent to provide a robust and flexible incentive that will catalyze and quickly scale a domestic

[33] La. Pub. Serv. Comm'n v. FCC, 476 U.S. 355, 374 (1986).
[34] I.R.C. § 45V(f).
[35] Administrative Procedures Act, 5 U.S.C. § 551(4).
[36] *See, e.g.*, Nat'l Mining Ass'n v. McCarthy, 758 F.3d 243, 251–52 (D.C. Cir. 2014); Nat'l Ass'n of Home Builders v. U.S. Army Corps of Eng'rs, 417 F.3d 1272, 1285 (D.C. Cir. 2005); Am. Mining Cong. v. Mine Safety & Health Admin., 995 F.2d 1106, 1112 (D.C. Cir. 1993).

hydrogen economy."[37] These eleven senators expressed their hope that Treasury and the IRS would avoid evolving and complex eligibility—such as the overly stringent additionality [i.e., incrementality], deliverability, and time matching [i.e., temporal matching] requirements. Stringent requirements could raise costs, suppress hydrogen production, feedstock and production pathway innovation, and private-sector investment, while discriminating against some regions based on their existing clean energy mixes.[38] The senators further stated that—

> [Section] 45V was intended to be technology-agnostic and clearly states that GHG lifecycle assessments (LCA) should be determined using the well-established GREET model through the point of production. While the 45V Credit allows for 'a successor model (as determined by the Secretary),' this additional flexibility was included as a safeguard in the unlikely event the GREET model was no longer available at some future date and should not be interpreted as a license to create a new LCA model or additional regulatory prescriptions.[39]

Further evidence that the three pillars were intentionally not included in the statue as written and run counter to the congressional intent of section 45V may be found in a colloquy between Senators Carper and Wyden:

> Mr. CARPER: [S]ection 13024 of Title I of the [IRA] provides a production and investment tax credit for the production of clean hydrogen. In Section 13204, the term 'lifecycle greenhouse gas emissions' for a qualified hydrogen facility is determined by the aggregate quantity of greenhouse gas emissions through the point of production, as determined under the most recent [GREET] model. It is also my understanding of the intent of Section 13204, is that in determining 'lifecycle greenhouse gas emissions' for this Section, the Secretary shall recognize and incorporate indirect book accounting factors, also known as a book and claim system, that reduce effective greenhouse gas emissions, which includes, but is not

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[37] United States Senate, Letter Re: Implementation of the Section 45V Clean Hydrogen Production Tax Credit (Nov. 6, 2023).

[38] *Id.*; *see also* Anna Cybulsky, Michael Giovannielo, Tim Schittekatte, and Dharik S. Mallapragada, *Producing Hydrogen from Electricity: How Modeling Additionality Drives the Emissions Impact of Time Matching Requirements,* Massachusetts Institute of Technology Energy Initiative (Apr. 2023), https://energy.mit.edu/wp-content/uploads/2023/04/MITEI-WP2023-02.pdf; Melany Vargas and Kara McNutt, *Green Hydrogen: What the Inflation Reduction Act Means for Production Economics and Carbon Intensity*, Wood Mackenzie (March 14, 2023), https://www.woodmac.com/news/opinion/green-hydrogen-IRA-production-economics/#form; American Council on Renewable Energy, *Analysis of Hourly & Annual GHG Emissions: Accounting for Hydrogen Production* (Apr. 2023), https://acore.org/resources/analysis-of-hourly-annual-ghg-emissions-accounting-for-hydrogen-production/

[39] *Id.*

> limited to, renewable energy credits, renewable thermal credits, renewable identification numbers, or biogas credits. Is that the chairman's understanding as well?
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> Mr. WYDEN: Yes.[40]

Similar to the concerns expressed by the senators, we respectfully request that Treasury and the IRS revise the requirements under three pillars on the use of EACs, as it will undermine the congressional intent of section 45V. Moreover, the three pillars are premised on an assumption that hydrogen demand is highly correlated with increased fossil fuel generation (i.e., that electricity demand necessary for clean hydrogen production will cause fossil fuel power generation to increase, thereby replacing renewable resources drawn upon by clean hydrogen production). However, as described in more detail below, that assumption overlooks the evolution of supply and demand, the current percentage of clean electricity generation sources in the United States, and the overwhelming amount of clean carbon-free emitting sources in the interconnection queue. Furthermore, the 45V Credit was intended to be technology agnostic, meaning Congress intended to create a level playing field for all clean hydrogen producers through a robust and flexible incentive that encourages the use of all feedstock and technology types. Therefore, Treasury and the IRS should remove all fixed assumptions and allow hydrogen producers greater flexibility to input the actual CI of their feedstock and technology, which will encourage investments in emissions reductions technologies and allow taxpayers to better reflect their lifecycle GHG emissions rate.

The Three Pillars—Incrementality, Temporal Matching, and Deliverability

The incrementality requirement (also known as additionality) states that hydrogen producers must source electricity from generation facilities that began operation no more than three years before the hydrogen facility is placed in service.[41] Under the temporal or time-matching requirement, a hydrogen producer must match the electricity used to produce hydrogen with the clean power generation on an annual basis until January 1, 2028, after that, producers must match production with clean power generation on an hourly basis.[42] The deliverability requirement provides that the hydrogen producer source electricity from a power producer within the same geographic region as the hydrogen facility.[43] These "regions" are defined in the

[40] 168 Cong. Rec. S4165-S4166 (daily ed. Aug. 6, 2022).
[41] Prop. Treas. Reg. § 1.45V-4(d)(3)(i)(A), 88 Fed. Reg. at 89,249.
[42] Prop. Treas. Reg. § 1.45V-4(d)(3)(ii)(A), 88 Fed. Reg. at 89,249.
[43] Prop. Treas. Reg. § 1.45V–4(d)(3)(iii), 88 Fed. Reg. at 89,249.

proposed regulations as those identified in the National Transmission Needs Study that was released by the DOE on October 30, 2023.[44]

Six days prior to the publication of the Proposed Regulations, the EPA responded to Treasury's request that they provide information related to the definition of lifecycle GHG emissions under the CAA to support Treasury's interpretation and implementation of section 45V.[45] Section 45V(b)(2) creates a system of tiers under which the amount of the tax credit varies based on, *inter alia*, the "lifecycle greenhouse-gas emissions rate" of the production process.[46] In its response, the EPA "emphasizes that it has not analyzed the lifecycle greenhouse-gas emissions associated with or conducted a lifecycle analysis for electrolytic hydrogen production. Nor has it interpreted CAA section 211(o)(1)(H) in the context of hydrogen production."[47] However, based on the EPA's prior implementation of CAA section 211(o)(1)(H), the EPA believes it would be reasonable and consistent with the agency's precedent for Treasury to determine that induced grid emissions are an anticipated real-world result of electrolytic hydrogen production that must be considered in lifecycle greenhouse-gas analyses under section 45V. EPA asserted that such interpretation would be consistent with the EPA's long-standing interpretation and application of CAA section 211(o)(1)(H) in the context of the renewable fuel standard ("RFS") program. Additionally, the EPA believes that Treasury can reasonably rely on EACs with attributes that meet the specific criteria discussed below to document and verify claims of zero GHG-emitting electricity use and to serve as a methodological proxy in lieu of quantifying certain indirect GHG emissions associated with electrolytic hydrogen production.[48]

The application of CAA section 211(o)(1)(H) in the context of the RFS program is based on a 2010 notice-and-comment rulemaking establishing the regulatory framework for such program, which was based on certain facts and the policy framework of that specific program.[49] Assuming that the statute should be applied in the same way in the context of the Proposed Regulations for electrolytic hydrogen is questionable due to both the significantly different underlying statutory programs and the significantly different factual context. Specifically, the RFS program governs renewable fuel transported via pipeline, an established infrastructure system that is

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[44] U.S. Dept. of Energy, *National Transmission Needs Study* (Oct. 30, 2023), https://energy.gov/sites/default/files/2023-12/National%20Transmission%20Needs%20Study%20-%20Final_2023.12.1.pdf.
[45] *See* Letter from Env't Prot. Agency to Assistant Sec'y Lily Batchelder (Dec. 20, 2023), https://home.treasury.gov/system/files/136/45V-NPRM-EPA-letter.pdf.
[46] *See* I.R.C. § 45V(b)(2).
[47] *See* Letter from Env't Prot. Agency to Assistant Sec'y Lily Batchelder (Dec. 20, 2023), https://home.treasury.gov/system/files/136/45V-NPRM-EPA-letter.pdf.
[48] *Id.*
[49] *Id.*

not comparable to clean energy production and the associated electricity transmission necessary to support it. Therefore, the EPA's conclusion that the three pillars' requirements is reasonable in this circumstance is illogical. Accordingly, the commenters recommend that Treasury and the IRS refashion their proposed application of CAA section 211(o)(1)(H) to align with the statutory intent of section 45V.

Future Electricity Generation Sources are Increasingly Clean

Contrary to the assumption that clean hydrogen production will induce fossil fuel power generation, the U.S. Energy Information Administration ("EIA") recently published an article highlighting the dramatic diversification of resources used to generate electricity in the United States.[50] In 2022, for the first time, renewable energy sources surpassed coal as a generation resource: 22.6 percent of total generation at utility-scale facilities in the United States came from renewable sources compared to 19 percent from coal-based generation.[51] "In total, **more than 40 percent of America's electricity came from clean, carbon-free resources in 2022**, including nuclear energy, hydropower, solar, and wind, putting clean resources at parity with natural gas generation, which provided approximately 40 percent of the country's total electricity generation in 2022 (emphasis added)."[52] Furthermore, as of 2023, the interconnection queues in the United States are 94.4 percent renewable resources.[53] One study concludes that 473 gigawatts of that capacity is comprised of dispatchable resources, such as battery storage, and an another 690 gigawatts are a combination of battery storage co-located with a renewable energy generation source, which is more than double the amount of natural gas fired generation capacity in the United States.[54] This proportion of clean power delivered to the grid will only accelerate as a result of the IRA and other policies. In 2035, EIA projects that 75 percent of U.S.

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[50] *See Today in Energy: Renewable Generation Surpassed Coal and Nuclear in the U.S. Electric Power Sector in 2022*, U.S. Energy Information Administration (Mar. 27, 2023), https://www.eia.gov/todayinenergy/detail.php?id=55960&src=email; *See also* Electric Power Monthly: Data for Feb. 2023—Table 1.1 Net Generation by Energy Source: Total (All Sectors), 2013-Feb. 2023 (Mar. 24, 2023), https://www.eia.gov/electricity/monthly/xls/table_1_01.xlsx; and EIA, Electric Power Monthly: Data for February 2023—Table 1.1.A. Net Generation from Renewable Sources: Total (All Sectors) (Mar. 24, 2023), https://www.eia.gov/electricity/monthly/xls/table_1_01_a.xlsx.

[51] *Id.*

[52] *Id.*

[53] Tony Lenoir, *U.S. Interconnection Queues Analysis 2023*, S&P Global (Aug. 28, 2023), https://www.spglobal.com/marketintelligence/en/news-insights/research/us-interconnection-queues-analysis-2023.

[54] U.S. Energy Info. Admin., *Electricity Explained—Electricity Generation, Capacity, and Sales in the United States*, https://www.eia.gov/energyexplained/electricity/electricity-in-the-us-generation-capacity-and-sales.php.

electricity generation will be carbon free, further indicating that power demand for new hydrogen production will be met by an even-cleaner generation.[55]

Impact of the Proposed Regulations on the Regional Clean Hydrogen Hubs

As part of the Bipartisan Infrastructure Law, DOE announced $7 billion in funding to launch seven Regional Clean Hydrogen Hubs ("H2Hubs") across the United States and accelerate the commercial-scale deployment of low-cost, clean hydrogen.[56] These H2Hubs will kickstart a national network of clean hydrogen producers, consumers, and connective infrastructure while supporting the production, storage, delivery, and end-use of clean hydrogen. The H2Hubs selected by DOE are geographically diverse and will produce hydrogen from a variety of sources including, renewables, natural gas with CCS, nuclear, and hydropower, ultimately reducing 25 million metric tons of CO2 emissions from end-uses each year.[57]

In preparing for DOE's funding opportunity announcement ("FOA"), the H2Hubs were encouraged to use the GREET 1 Series (fuel cycle) model (i.e., the predecessor of the R&D GREET model, before such model was renamed in December 2023, and the GREET model in effect on the date the IRA was enacted) for completing their LCA.[58] DOE stated, it "will use GREET [1 Series] to consistently evaluate the well-to-gate carbon intensity and criteria air pollutant emissions estimated by the applicant for hydrogen production within each H2Hub" and further elaborated that the definition of "well-to-gate" and "lifecycle" are consistent with such terms in section 45V.[59] In addition, the FOA provided applicants with guidance on computing their upstream emission sources.[60]

The H2Hubs were permitted to use the GREET 1 Series model in computing their respective well-to-gate lifecycle GHG emissions, which includes computing emissions related to the direct connection to renewables or integration with the electricity grid. The FOA did not include the use of EACs and the associated three pillar qualification requirements, as introduced in the Proposed Regulations. The FOA

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[55] U.S. Energy Info. Admin, *Annual Energy Outlook 2023, Table 8: Electricity Supply, Disposition, Prices, and Emissions*, https://www.eia.gov/outlooks/aeo/data/browser/#/?id=8-AEO2023&cases=ref2023&sourcekey=0.

[56] U.S. Dept. of Energy, *Biden-Harris Administration Announces $7 Billion for America's First Clean Hydrogen Hubs, Driving Clean Manufacturing and Delivering New Economic Opportunities Nationwide* (Oct. 13, 2023), https://www.energy.gov/articles/biden-harris-administration-announces-7-billion-americas-first-clean-hydrogen-hubs-driving.

[57] *Id.*

[58] U.S. Dept. of Energy, *Regional Clean Hydrogen Hub Funding Opportunity Announcement* (Sept. 2022), https://oced-exchange.energy.gov/FileContent.aspx?FileID=40a1ff87-622d-4ef5-8d7c-89bfe089fd11.

[59] *Id.*

[60] *Id.*

required an applicant to disclose whether it intended to "pursue federal (or state) incentives, such as the 45V Credit, and clearly state the credit value that they are targeting."[61] However, the H2Hubs computation of their LCAs under the GREET 1 Series model and the GREET model mandated under the Proposed Regulations are not analogous and will have different results, with the latter GREET model placing the H2Hubs under an undue burden to comply with the three pillars.

Many in the hydrogen industry, including those directly and indirectly impacted by the overwhelming uncertainty associated with the three pillars, have expressed concern that the proposal will result in project delays or potential withdrawal of projects altogether. Collectively, it is estimated that the H2Hubs will directly create approximately 334,300 jobs.[62] However, such job creation may be at risk as expressed by North America's Building Trade Unions and Laborer's International Union of North America, among others, in letters to Secretary Yellen and Senior Advisor Podesta regarding the implementation of the three pillars' requirements.[63]

The California Alliance for Renewable Clean Hydrogen Energy Systems ("ARCHES") and a consortium of states in the northeast led by New York State Energy & Research Development Authority submitted respective comment letters in response to a solicitation for comments under IRS Notice 2022-58, with the economic wellbeing on behalf of their respective regional clean hydrogen hubs and respective clean energy goals in mind. The Northeast state representatives specifically wrote: "The undersigned have concerns with attaching overly burdensome obligations, known as 'Additionality,' 'Time Matching,' and 'Geographic Matching' to the hydrogen production tax credit provisions."[64] Although the Northeast state representatives provide several valid points for eliminating the three pillars, one common theme is the impact the three pillars will have on the economics of clean hydrogen projects. They note for example that "a preliminary look at work being performed on hydrogen for Connecticut indicates that hourly matching would approximately double the cost of clean hydrogen as compared to annual matching."[65] ARCHES shared similar sentiments, stating "we write to urge that policies and regulations ensure a level playing field for hydrogen to other energy technologies. It is critical that pathways for

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[61] *Id.*

[62] U.S. Dept. of Energy, *Biden-Harris Administration Announces $7 Billion for America's First Clean Hydrogen Hubs, Driving Clean Manufacturing and Delivering New Economic Opportunities Nationwide* (Oct. 13, 2023), https://www.energy.gov/articles/biden-harris-administration-announces-7-billion-americas-first-clean-hydrogen-hubs-driving.

[63] *See* Letter from N. Am.'s Bldg. Trades Union to Sec'y Yellen and Senior Advisor Podesta (Aug. 9, 2023); *see also*, Letter from Laborers' Int'l Union of N. Am. to Sec'y Yellen (Aug. 24, 2023).

[64] New York State Energy Research and Development Authority, *Response to Request for Comments on Credits for Clean Hydrogen and Clean Fuel Production: Northeast Regional Clean Hydrogen Hub States* (Aug. 3, 2023).

[65] *Id.*

market liftoff not single out and overburden one technology or resource with onerous geographic, time matching, and 'additionality' requirements."[66]

Consistent with the ARCHES and Northeast state representatives' comments, we kindly request that Treasury and the IRS revise the three pillars' requirements associated with the use of EACs. The addition of such harsh stipulations will negatively impact clean hydrogen producers, such as the H2Hubs, and the exemplary projects selected by DOE to accelerate the commercial-scale deployment of low-cost, clean hydrogen.

The Three Pillars Will Create Regional Disparities

Despite the consensus goal that successful economy-wide decarbonization will require broadly available hydrogen networks throughout the country, under the proposed three pillars structure, certain regions of the country would win, and others would lose. That is because the three pillars would drive cost-effective clean hydrogen production to the handful of areas where new, maximum amounts of renewable power can be quickly built and operationalized. Other regions lacking those capabilities will be left without access to the credit, and in turn, potential to scale their own hydrogen economies.[67] As the aforementioned group of senators duly recognized, the development of clean electricity grid sources and associated infrastructure is often geographically variable; consequently, some regions would unfairly face discrimination based on their existing clean energy mixes or lack thereof.[68]

Should Treasury and the IRS decide to finalize the three pillars structure in its current form, or a modified version thereof, then the commenters would nonetheless propose a grandfathering provision that provides taxpayers flexibility to apply (1) the three pillars' requirements in place at the time the clean hydrogen production facility is placed in service for the full credit period, or (2) the three pillars' requirements in place in the year the qualified clean hydrogen is produced, whichever is more beneficial. Such a provision would provide investors and developers with the necessary assurance to understand the qualification requirements and associated benefit for projects that will rely upon EACs.

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[66] California Alliance for Renewable Clean Hydrogen Energy Systems, *RE: Notice 2022-58 – Response to Request for Comments on Credits for Clean Hydrogen (H2) and Clean Fuel Production* (Aug. 23, 2023).

[67] *New 'Clean' Hydrogen Rules Will Favor Some Regions More Than Others*, Canary Media (Jan. 4, 2024), https://www.canarymedia.com/articles/hydrogen/new-clean-hydrogen-rules-will-favor-some-regions-more-than-others?utm_medium=email.

[68] United States Senate, Letter Re: Implementation of the Section 45V Clean Hydrogen Production Tax Credit, (Nov. 6, 2023).

We discuss the individual pillars, describe their likely impacts on the hydrogen industry, and propose recommendations for Treasury and the IRS's consideration below.

a. **Revise the EAC's incrementality requirements, as such requirements would undermine the growth of the U.S. hydrogen industry with no associated environmental benefit.**

Under the Proposed Regulations, the incrementality requirement would require qualifying EACs to represent incremental source electricity, such as electricity from an electricity generating facility that has a recent COD that is no more than 36 months before the hydrogen production facility for which the EAC is retired was placed in service.[69]

Due to the 36-month COD requirement (and deliverability requirement discussed in more detail below), clean hydrogen facilities will face challenges sourcing clean electricity for hydrogen production. Therefore, the commenters recommend that, at a minimum, Treasury and the IRS (i) provide an exception to the incrementality requirement for qualified clean hydrogen facilities that began construction before January 1, 2032, or (ii) implement a transition provision, similar to that in place for temporal matching, that deems the incrementality requirement is satisfied if an insufficient amount of renewable facilities are available to meet the incrementality requirement.

Currently, insufficient availability of new, clean electricity generating facilities and associated transmission infrastructure under development exists across the United States for a qualified clean hydrogen facility to procure EACs within its designated region, as discussed in more detail below. As noted by the Princeton University Zero Lab's *Rapid Energy Policy Evaluation and Analysis Toolkit*, the IRA could cut U.S. GHG emissions by roughly 1 billion tons per year in 2030.[70] That outcome depends on more than doubling the historical pace of electricity transmission expansion over the last decade.[71] A large roadblock to expanding transmission and the development of clean electricity generating facilities are the permitting challenges, meaning the economics only work in a few regions of the United States where it is easier to construct such projects. Absent a legislative solution to the existing permitting roadblocks, the deployment of clean electricity generating facilities will remain heavily constrained, greatly limiting the potential production of clean hydrogen.

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[69] Prop. Treas. Reg. § 1.45V-4(d)(3)(i)(A), 88 Fed. Reg. at 89,249.
[70] Rapid Energy Policy Evaluation and Analysis Toolkit, *Electricity Transmission is Key to Unlock the Full Potential of the Inflation Reduction Act* (Sept. 2022), https://repeatproject.org/docs/REPEAT_IRA_Transmission_2022-09-22.pdf.
[71] *Id.*

Furthermore, the incrementality requirement effectively excludes existing nuclear and hydropower resources from being an available clean electricity generation source for producing clean hydrogen. In the preamble of the Proposed Regulations, Treasury and the IRS acknowledge the implications of such rule including retirement risk for many clean power plants, such as nuclear, and acknowledged that additional revenue from selling EACs and electricity to clean hydrogen producers may improve the financial outlook of the plant and help avert retirement.[72] Exemptions should be provided for nuclear and hydropower facilities from the incrementality provisions.

In addition, the incrementality requirement is misaligned with other clean energy incentives under the IRA that may be paired with the 45V Credit, including the zero-emission nuclear power production credit under section 45U ("45U Credit"). The 45U Credit is available for qualified nuclear power generated from a facility that was placed in service before August 16, 2022 (i.e., the enactment date of the IRA) whereas the 45V Credit is available for qualified clean hydrogen production facilities placed in service on or after January 1, 2023, with certain exceptions for modified or retrofitted facilities. Based on the placed-in-service date under the 45U Credit, it is highly improbable that any facilities generating qualified nuclear power will be eligible to sell EACs and electricity to qualified clean hydrogen production facilities as even the "early mover" clean hydrogen production facilities do not plan to begin operations within 36 months of August 16, 2022.

Similar to retirement issues faced by existing nuclear power plants, merchant renewable electricity facilities that entered into operations more than three years ago may be unfairly disadvantaged in future power markets, especially if electricity costs decline over time. Having an option to sell EACs and electricity to produce clean hydrogen could provide another pathway for revenue and encourage investments in aging renewable facilities. Therefore, we request that Treasury and the IRS clarify that COD for purposes of the incrementality requirement includes the originally placed in service date for tax purposes, which will permit an existing clean electricity generating facility to qualify if such facility satisfies the 80/20 Rule.[73]

In the preamble of the Proposed Regulations, Treasury and the IRS recognized the consequences to existing minimal-emitting electricity generators (e.g., wind, solar, nuclear, and hydropower), and therefore solicits comments on whether a formulaic approach to addressing incrementality from such existing generators would be a viable option.[74] Treasury and the IRS solicit comments on whether it should deem 5

[72] 88 Fed. Reg. at 89,230.

[73] A facility may establish a new date on which it is considered originally placed in service for tax purposes, even though the facility contains some used property, provided the fair market value of the used property is no more than 20 percent of the facility's total value ("80/20 Rule"); *see* Rev. Rul. 94-31, 1994-1 C.B. 16; Notice 2008-60, 2008-2 C.B. 178.

[74] 88 Fed. Reg. at 89,231.

percent of the hourly generation from minimal-emitting electricity generators placed in service before January 1, 2023 as satisfying the incrementality requirement. We confirm that such an option would be reasonable, however, we propose a 10 percent allowance approach rather than 5 percent, to reflect the trend of curtailment rates across the U.S., as contemplated in the Proposed Regulations.[75] A higher threshold of 10 percent will ensure that clean hydrogen projects can be developed across the U.S. without penalizing certain states that are predominantly powered by hydropower or nuclear rather than wind or solar.

b. Revise the temporal matching requirements, as such requirements are impossible for clean hydrogen producers to meet, and thus further undermine the fledgling hydrogen industry.

Under the Proposed Regulations, an EAC satisfies the temporal matching requirement if the electricity represented by the EAC is generated in the same hour that the taxpayer's hydrogen production facility uses electricity to produce hydrogen.[76] The Proposed Regulations provide a transition rule to allow an EAC that represents electricity generated before January 1, 2028 to satisfy the temporal matching requirements if the electricity represented by the EAC is generated in the same calendar year that the taxpayer's hydrogen production facility uses electricity to produce hydrogen.[77]

DOE has advised that hourly matching is necessary to properly address significant indirect emissions from electricity use and that the tracking systems and related contractual structures for hourly matching will take some time to develop to an appropriate level of maturity. In the preamble of the Proposed Regulations, Treasury and the IRS also recognize that hourly tracking systems are not yet broadly available and will take some time to develop.[78]

Specifically, a DOE white paper accompanying the Proposed Regulations details extensive challenges that must first be overcome in order for requirements to be effectively implemented, stating:[79]

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[75] 88 Fed. Reg. at 89,245.
[76] Prop. Treas. Reg. § 1.45V-4(d)(3)(ii)(A), 88 Fed. Reg. at 89,249.
[77] *Id.*
[78] 88 Fed. Reg. at 89,233.
[79] U.S. Dept. of Energy, *Assessing Lifecycle Greenhouse Gas Emissions Associated with Electricity Use for the Section 45V Clean Hydrogen Production Tax Credit* (Dec. 2023). https://www.energy.gov/sites/default/files/2023-12/Assessing_Lifecycle_Greenhouse_Gas_Emissions_Associated_with_Electricity_Use_for_the_Section_45V_Clean_Hydrogen_Production_Tax_Credit.pdf.

> Hourly tracking systems for EACs are not yet broadly available across the country and…widespread availability and functionality will take time. . . [A survey revealed that] tracking systems identified a number of challenges to hourly tracking that will need to be overcome, including cost, regulatory approval, interactions with state policy, sufficient stakeholder engagement, data availability and management, and user confusion (Terada 2023). Once the tracking software infrastructure is in place nationally, it may take additional time to transactional structures and efficient hourly EAC markets to develop. Among the issues that require resolution as EAC tracking systems move to hourly resolution is the treatment of electricity storage. Given the current lack of highly functional hourly tracking capabilities across the entire U.S., different requirements may be required in the near term.[80]

By providing a transition provision, Treasury and the IRS anticipate a slow deployment of hourly matching technology at a scale necessary to meet market needs. The reality—evident in DOE's own warnings about the obstacles facing hourly matching—is that such a system will likely not be ready by January 1, 2028, further causing uncertainty for developers and investors as to a clean hydrogen facilities ability to satisfy the three pillars.

In addition to technology uncertainties, investors and developers are concerned with production cost increases associated with hourly matching requirements. One analysis estimated that hourly matching alone could add up to $3.50 per kilogram to the cost of clean hydrogen price.[81] Another study performed by Plug Power identified potential costs increase by approximately $1.30 per kilogram.[82] These costs increases are driven by a variety of factors. First and foremost, the temporal matching requirement will limit the number of hours a clean hydrogen production facility can claim the credit if each hour of electricity consumed must be matched with clean electricity generated in the same hour (e.g., solar facilities do not generate electricity at nighttime). Furthermore, clean hydrogen producers will be at a disadvantage in the market relative to other industries that also procure large quantities of electricity but are not required to meet temporal matching requirements, thereby reducing clean electricity generating sources available for hydrogen producers and ultimately resulting in lean hydrogen producers paying a premium for EACs. Accordingly, the following alternatives are recommended:

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[80] *Id.*

[81] Jean Chemnick, *What the Hydrogen Tax Credit Means for EPA's Power Plant Rule*, Politico (Jan. 25, 2024), https://subscriber.politicopro.com/article/eenews/2024/01/25/what-the-hydrogen-tax-credit-means-for-power-plant-carbon-1-00137702.

[82] Plug Power, *The Road to Clean Hydrogen: Getting the Rules Right* (July 2023), https://www.plugpower.com/wp-content/uploads/2023/07/The-Road-to-Clean-Hydrogen-Getting-the-Rules-Right-Report-Final-530pm.pdf.

1. The IRS, in coordination with DOE, should not impose temporal matching requirements until and unless it first certifies the technology and system readiness for implementing those requirements, while allowing impacted facilities at least 18 months of lead time prior to the onset of compliance requirements.
2. Defer implementation of the transition from annual to hourly temporal matching requirement for qualified clean hydrogen facilities to no sooner than January 1, 2032.
3. Provide a temporal matching safe harbor for projects that begin construction before January 1, 2032, such that taxpayers may rely on the annual temporal matching requirements in place at the time the qualified clean hydrogen production facility began construction, and such requirements will apply for the full credit period.
4. Clarify that stored electricity in batteries has a time stamp that correlates to the time such electricity is used in the production of clean hydrogen rather than when the electricity was generated or stored.

c. Revise the current deliverability requirement so that the EAC is sourced from the same NERC region or an adjacent NERC region as the relevant hydrogen production facility.

Under the Proposed Regulations, an EAC meets the deliverability requirements if the electricity represented by the EAC is generated by a source that is in the same region as the relevant hydrogen production facility.[83] Currently, Treasury and the IRS segregated the United States into 13 regions based on the National Transmission Needs Study.[84] Treasury and the IRS requested comments on whether there are additional ways to establish deliverability, such as circumstances indicating that electricity is actually deliverable from an electricity generating facility to a hydrogen production facility, even if the two are not located in the same region or if the clean electricity generator is located outside of the United States.[85]

The commenters ask Treasury and the IRS to reconsider the current inclusion of a geographic restriction on purchasing EACs as it would prevent clean hydrogen facilities from sourcing power from much of the United States' existing zero carbon feedstock and would undermine the development of the H2Hubs across the country. Moreover, a limited geographic correlation guidance could create disparate tax credit

[83] Prop. Treas. Reg. § 1.45V–4(d)(3)(iii), 88 Fed. Reg. at 89,249.
[84] U.S. Dept. of Energy, *National Transmission Needs Study* (Oct. 30, 2023) https://energy.gov/sites/default/files/2023-12/National%20Transmission%20Needs%20Study%20-%20Final_2023.12.1.pdf.
[85] 88 Fed. Reg. at 89,233.

eligibility impacts due to the variability of renewable resources from state to state, as well as related factors such as solar irradiance, wind speed, local utility rules, regulatory environment, and community acceptance.

The purpose of the National Transmission Needs Study was to identify high-priority national electric transmission needs—specifically, to identify geographic areas where the bulk power grid would benefit from new, uprated, or upgraded transmission facilities.[86] In the study, DOE evaluated the different entities responsible for regional transmission planning, transmission system operations and reliability, then organized the transmission need results by geographic region, to the extent possible.[87]

As part of the study, DOE analyzed current interconnection queues by technology type and region.[88] DOE acknowledged, "the enormous amount of solar, wind, and storage in the interconnection queues demonstrates that market and economic trends will lead to continued shifts in the United States's resource mix, requiring a different approach to transmission planning and development" and further provided that the duration between an interconnection request and commercial operation has increased from three years in 2015 to five years in 2022.[89] Although a number of drivers have led to the longer delays, a lack of access to transmission is a major barrier, along with unanticipated changes to project economics and available policy incentives.[90] For example, DOE recognized that in many cases the interconnecting generator must bear the transmission upgrade costs needed for interconnection, and some developers often incur costs to upgrade the broader, high-voltage transmission grid.[91]

The GREET model currently permits clean hydrogen producers to compute emissions rates based on electricity from (1) a specific generator or combination of generators that meet the EAC requirements or (2) or the average annual grid mix in the NERC region that the hydrogen production facility is located. The use of the NERC regions, as compared to the 13 regions designated in the National Transmission Needs Study, would provide clean hydrogen producers with more optionality to comply with the three pillars and neutralizes the "regional winners and losers" result created under the Proposed Regulations. Therefore, we request that Treasury and the IRS consider (i) revising the term "region" to mean the existing six NERC regions or a region adjacent to such NERC region in which the hydrogen production facility is located and (ii) allow the use of interregional EACs.

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[86] *Id.*
[87] *Id.*
[88] *Id.*
[89] *Id.*
[90] *Id.*
[91] *Id.*

III. Design and administer the 45VH2-GREET in a manner that maximizes the incentive to reduce GHG emissions, the core goal of the 45V Credit and other clean energy provisions enacted under the IRA.

Under section 45V(c)(1)(B), the term "lifecycle greenhouse gas emissions" includes only emissions through the point of production (well-to-gate), as determined under the most recent GREET model.[92] The Proposed Regulations clarify that the term "most recent GREET model" means the latest version of 45VH2–GREET that is publicly available on the first day of the taxpayer's taxable year in which the qualified clean hydrogen for which the taxpayer is claiming the 45V Credit was produced.[93]

By permitting annual or more frequent updating of the GREET model, project developers will face uncertainty that a clean hydrogen production facility will qualify as the lifecycle GHG emissions rate for the full credit period may vary year-to-year. A rule that allows continuous updates to the GREET model is punitive and will likely prevent taxpayers from obtaining the level of certainty needed to reach FID when evaluating whether to construct clean hydrogen facilities; effectively, the uncertainty resulting from future GREET model changes may make clean hydrogen production facilities un-financeable. To eliminate the uncertainty, the commenters recommend that taxpayers be provided the option to use the GREET model in place (i) at the time the FID is made, (ii) at the time that the facility is placed in service, or (iii) on the first day or any day of the taxable year (but within such taxable year) of production that best computes the lifecycle GHG emissions rate based on the taxpayer's facts.

Certain parameters in the GREET model are fixed assumptions (or "background data"). Examples of background data include upstream methane loss rates, CO2 emissions rates, emissions associated with power generation from specific generator types, and emissions associated with regional electricity grids. According to the Preamble of the Proposed Regulations, Treasury and the IRS view such background data as parameters for which bespoke inputs from hydrogen producers are unlikely to be independently verifiable with high fidelity, given the current status of verification mechanisms.[94] However, the commenters disagree. Technology advancements today, along with other regulatory requirements, allow taxpayers to better assess their GHG emissions and carbon intensity of a facilities direct and indirect emissions.

For example, to encourage GHG emissions reductions in the natural gas supply chain taxpayers should be able to demonstrate true reductions in methane and CO2 based on the taxpayer's individual facts and circumstances. Furthermore, the

[92] I.R.C. § 45V(c)(1)(B).
[93] Prop. Treas. Reg §1.45V–1(a)(8)(ii), 88 Fed. Reg. at 89,245.
[94] 88 Fed. Reg. at 89,225.

EPA has implemented or proposed several programs that currently, or will soon require, taxpayers to provide information regarding their emission portfolios. The Methane Emission Reduction Program ("MERP") is a program being implemented as part of the IRA that will require companies to show reduced methane emissions or face monetary penalties. Programs such as the MERP will provide taxpayers with actual real-time data sets that reflect their efforts to reduce their GHG emissions in the upcoming years. Additionally, the Mandatory Greenhouse Gas Reporting Program is another program that can provide real emissions data.

Another area in which the Proposed Regulations do not allow hydrogen produced from natural gas to recognize the emissions reductions achieved and the actual CI of the hydrogen produced is in the area of steam. Hydrogen produced with natural gas creates steam, a usable coproduct, during the production process. The Proposed Regulations and the most recent GREET model assume that for hydrogen produced from natural gas with CCS, the steam created as part of the hydrogen production process is equal to the amount of steam needed to power the carbon capture equipment. Taxpayers are not allowed to change this assumption in the model. Thus, the most recent GREET model does not allow a hydrogen production pathway to take credit for excess steam created during the production process when a more efficient CCS technology is used. The excess steam generated can be used to replace higher CI energy sources in other parts of an energy complex (non-hydrogen operations).

Both of these examples illustrate how taxpayers should be able to leverage the verification of the actual CI of their natural gas supply chain. A failure to recognize the lower CI of the natural gas used to produce hydrogen will discourage investment and will dampen the efforts to reduce fugitive methane emissions that are critical to cleaning up the natural gas supply chain. In addition, for steam, the Proposed Regulations and most recent GREET model recognize the excess steam for grey (unabated) hydrogen production pathway, but do not extend the same treatment to hydrogen produced with natural gas with CCS.[95]

One other consideration for supporting the removal of fixed assumptions in the GREET model is the safeguard through the verification of qualified clean hydrogen production and sale or use requirements.[96] Specifically, a qualified verifier must, among other items, verify the data the taxpayer entered into the most recent GREET model to determine the lifecycle GHG emission rate. Accordingly, we request that Treasury and the IRS remove all fixed assumptions and allow facilities for the flexibility to input the actual CI of their feedstock and technology, which will

[95] 88 Fed. Reg. 89,225.
[96] Prop. Treas. Reg. § 1.45V-5(c)(1)(ii)(A), 88 Fed. Reg. 89,249-50.

encourage investments in emissions reductions technologies and allow taxpayers to better reflect their lifecycle GHG emissions rate.

IV. Adopt provisions that recognize the full lifecycle benefits of renewable natural gas and natural gas.

The preamble to the Proposed Regulations provides that Treasury and the IRS intend to provide rules addressing hydrogen production pathways that use RNG or other fugitive sources of methane for purposes of the 45V Credit.[97] Such rules would apply to all RNG used for the purposes of the section 45V Credit and would provide conditions that must be met before certificates for RNG or fugitive methane (representations of the environmental attributes of the methane) and the GHG emissions benefits they are meant to represent may be taken into account in determining lifecycle GHG emissions rates for purposes of the 45V credit. Treasury and the IRS provide that such conditions would be "logically consistent" with, but not identical to the incrementality, temporal matching, and deliverability requirements for electricity derived EACs.[98] Specifically, the Proposed Regulations are designed to reflect the ways in which additional RNG or demand for fugitive methane can impact lifecycle GHG emissions and also to address the differences between electricity and methane, including but not limited to the different sources of emissions, markets, available tracking and verification methods, and potential for perverse incentives response to the IRS's request for comments on the RNG and fugitive methane rules. The commenters provide the following recommendations.

RNG refers to biogas that has been upgraded to be equivalent in nature to fossil natural gas, and comes from a variety of sources including landfills, livestock farms and waste treatment plants. As RNG provides a very low carbon intensity feedstock for clean hydrogen production, all feedstock types should be permitted for the GREET model, which is consistent with the original intent of the legislative text.

In particular, the commenters have several concerns with respect to the Proposed Regulations as it relates to RNG and are aligned with the RNG Coalition's positions and in-depth analysis on this issue[99].

1. *Incrementality:* The "first productive use" requirement is not authorized by statute and overly strict to exclude viable RNG projects that could support clean hydrogen production today. The requirement would cause a significant

[97] 88 Fed. Reg. at 89,238.
[98] *Id.*
[99] The Coalition for Renewable Natural Gas, *Section 45V Credit for Production of Clean Hydrogen; Section 48(a)(15) Election to Treat Clean Hydrogen Production Facilities as Energy Property, Notice of Proposed Rulemaking and Notice of Public Hearing, 88 Fed. Reg. 89,220 (Dec. 26, 2023),* (Feb. 26, 2024).

value discrepancy for new RNG projects creating a market distortion, greater risk of stranded RNG for existing projects, added complexity, and higher prices for end-consumers. This is counter to the goals of the IRA. There should be no restrictions on RNG to ensure investor confidence in developing RNG supply. In addition, requiring the RNG project and the hydrogen production facility to come on-line in the same year (or for the RNG project to come on-line after) is simply unworkable to ensure the viability of the project. RNG facilities all face uncertain and volatile markets for their product and depending on developments in unrelated markets, those projects may be compelled to commence flaring or venting the methane they currently capture, whereas participation in the section 45V program may have kept them economically viable and operational. For example, venting may occur at dairy sites where emissions are not currently regulated, which is not a desirable outcome. On the other hand, it is speculative to believe that RNG in existing uses will be diverted for hydrogen production and backfilled with fossil fuels. There is ample supply to meet growing demand, provided the right incentives are available. Nonetheless, to address potential concerns, Treasury and the IRS could find projects built prior to 2030 meet any such "additionality" requirements with a check on the market impacts of increased hydrogen production to determine if any such patterns can be discerned.

2. *Temporal Matching:* The temporal matching requirements for electricity should logically not be applied to RNG because of the drastic differences between electricity generation and RNG production: (i) wind and solar power generation are intermittent, and RNG production is not, and (ii) there is no substantial storage infrastructure for power, whereas there is extensive storage available for RNG and natural gas. Where fossil natural gas is displaced by RNG that is injected into the same natural gas commercial pipeline system, utilization of current market operations is sufficient to ensure that the volume of RNG made available matches the amount of gas used by the hydrogen producer as feedstock or process energy. Moreover, unlike renewable electricity credits that are subject to different rules by region affecting their value, this is not the case for RNG. Due to the operations of the natural gas market, overly stringent time-matching requirements will likely be impractical if not impossible to achieve, serving to disincentivize RNG use. The industry standard for settled gas transactions is to balance supply and demand on a monthly basis, and hydrogen production is often tracked on a quarterly basis. In addition, unlike electricity, RNG is extensively "stored" much like a country-sized battery when injected into the pipeline system where it is pressurized and can be withdrawn for use on demand. On occasions where RNG is stored and

dispatched in a different month than when injected, records of gas storage can and should be provided.

3. *Deliverability:* We also note that natural gas markets are different from electricity markets by nature of the natural gas pipeline value chain. The interstate pipeline system enables injected physical molecules to be accounted for and tied to equivalent molecules that can be dispensed elsewhere in the network carrying associated environmental attributes with assurance. Because of the interconnectedness of the natural gas pipeline used in the United States and based on the tracking systems long established, there is no need to impose regional geographic restrictions for RNG. The entire natural gas pipeline system is the proper geographic scope for the 45V tax credit.

V. Adopt "book-and-claim" accounting processes for RNG and natural gas.

RNG and natural gas feedstocks would be delivered to hydrogen production facilities via the natural gas pipeline value chain. Currently, the "book-and-claim" system is the industry standard enabling the economic development of emissions abatement in the agriculture sector that is often far from demand centers and has few alternatives to decarbonize. Book and claim accounting processes should be allowed for RNG and natural gas feedstocks for clean hydrogen production, supporting efficient use of existing infrastructure, while also encouraging further investments.

These systems have worked, and existing frameworks should continue to be available for hydrogen production facilities to show use of RNG as a feedstock or as process energy for electrolysis. Although we do not believe an electronic system is required, there is an electronic tracking system for RNG that is available today (e.g., "M-RETS"), which could be available as an option for parties to utilize. In lieu of a national registry, the existing policies and procedures under the RFS program and CARB will provide adequate support for the use of RNG for hydrogen production.

EPA's RFS program and California's Low Carbon Fuel Standard allow for book-and-claim accounting treatment of biogas (e.g., RNG) in their rules. The commenters recommend that taxpayers be permitted to use such existing policies that are heavily audited and scrutinized through regulatory agencies (i.e., the EPA and CARB, respectively) to substantiate the carbon intensity of the RNG used for hydrogen production. We encourage Treasury and the IRS to not develop a separate administratively burdensome process and associated requirement that would likely be inconsistent with the regulations and policies currently in place under the RFS program and the LCFS, among other regulations and policies administered by state regulatory agencies.

VI. Conclusion

The 45V Credit was designed by Congress to not only drive rapid growth and deployment of domestic clean hydrogen production facilities, but ultimately to provide supply-side incentives necessary to stimulate demand for end-use sectors to purchase and consume that clean hydrogen in order to achieve the Biden-Harris Administration's economy-wide emissions reductions goals. The commenters share these ambitious goals. However, as demonstrated, the Proposed Regulations may inadvertently halt and deter investors and developers from pursuing critical clean hydrogen development. Therefore, the commenters respectfully request that Treasury and the IRS consider the issues and recommendations outlined herein.

Thank you for your consideration.

Sincerely,

The Allegheny Conference on Community Development and its affiliate the Greater Pittsburgh Chamber of Commerce
American Public Power Association
Associated Builders and Contractors
ConservAmerica
Electric Power Supply Association
The Fertilizer Institute
Fuel Cell and Hydrogen Energy Association
National Hydropower Association
The Truck and Engine Manufacturers Association
U.S. Chamber of Commerce

cc: The Honorable Jennifer Granholm, Secretary, U.S. Department of Energy
The Honorable Ronald L. Wyden, Chairman, Committee on Finance, United States Senate
The Honorable Michael D. Crapo, Ranking Member, Committee on Finance, United States Senate
The Honorable Jason T. Smith, Chairman, Committee on Ways and Means, United States House of Representatives
The Honorable Richard E. Neal, Ranking Member, Committee on Ways and Means, United States House of Representatives
Thomas A. Barthold, Chief of Staff, Joint Committee on Taxation, United States Congress

Appendix A

The U.S. Chamber of Commerce (Chamber) is the world's largest business federation, representing approximately 300,000 direct members and indirectly representing the interest of more than three million companies and professional organizations of every size, in every industry sector, and from every region of the country. As such, the abundance and affordability of hydrogen are important issues to our members, including both those members who own and operate hydrogen facilities that are directly regulated by Treasury and the IRS's proposed regulations and those that will offtake the supply.

The Greater Pittsburgh Chamber of Commerce, the advocacy arm of the Allegheny Conference on Community Development, serves as the 10-county Pittsburgh region's advocate at all levels of government to secure public sector investment and legislative and regulatory improvements to improve the economy and quality of life. As a region with a deep industrial legacy, where emissions from the sector are twice the national level, we face unique challenges related to decarbonization. We believe that clean hydrogen presents a particular opportunity to address our unique environmental challenges, while building resilience and competitiveness of our industrial sector and creating strong economic value for all our communities.

The American Public Power Association (APPA) is the voice of not-for-profit, community-owned utilities that power 2,000 towns and cities nationwide. We represent public power before the federal government to protect the interests of the more than 49 million people that public power utilities serve, and the 96,000 people they employ. Our association advocates and advises on electricity policy, technology, trends, training, and operations. Our members strengthen their communities by providing superior service, engaging citizens, and instilling pride in community-owned power.

Associated Builders and Contractors (ABC) is a national construction industry trade association representing more than 23,000 member companies. ABC and its 68 chapters help members develop people, win work and deliver that work safely, ethically and profitably for the betterment of the communities in which ABC and its members work. ABC's membership represents all specialties within the U.S. construction industry and is comprised primarily of general contractors and subcontractors that perform work in the industrial and commercial sectors for government and private sector customers.

ConservAmerica is a non-profit organization dedicated to pursuing market-based, fiscally responsible solutions to our nation's most pressing environment and energy challenges. Toward that end, ConservAmerica develops and supports policies

that are grounded in the principles of v free markets, the rule-of-law, private property rights, subsidiarity, and cooperative federalism. ConservAmerica engages policymakers and the public through a variety of fora, including in major agency rulemakings impacting air and water pollution, the development and deployment of advanced energy sources, wildlife conservation, and access to public lands and waters.

The Electric Power Supply Association (EPSA) is the national trade association representing America's competitive power suppliers. EPSA advocates for well-functioning competitive wholesale electricity markets and believes that markets provide the best foundation to reliably power our nation at the lowest cost while fostering the innovation necessary to achieve critical environmental progress. EPSA members own and operate reliable and competitively priced, environmentally responsible generation facilities using a diverse mix of fuels and technologies, including natural gas, wind, solar, hydropower, battery storage, nuclear, and coal. EPSA members' assets represent approximately 20% of the nation's installed capacity.

The Fertilizer Institute (TFI) represents companies engaged in all aspects of the United States' fertilizer value chain. Half of all grown food around the world today is made possible through the use of fertilizer production in the U.S. and foreign markets,[1]-and fertilizer is critical to feeding a growing global population that is expected to surpass 9.5 billion people by 2050. The industry supports 487,000 American jobs with annual wages in excess of $34 billion. The process of manufacturing ammonia-based nitrogen fertilizer requires a significant amount of energy both as fuel and feedstock in order to react nitrogen with hydrogen at tremendously high temperatures and pressures to produce ammonia. The process can also be reversed to separate the molecules and extract the hydrogen from the ammonia. Therefore, hydrogen can be both fuel and feedstock on the one end and output on the other end. Accordingly, TFI's interest in the implementation of the 45V tax credit program is significant.

The Fuel Cell and Hydrogen Energy Association (FCHEA) is the national industry association representing over one hundred leading companies and organizations advancing innovative, clean, safe, and reliable hydrogen energy technologies and solutions. FCHEA's members represent the entire global supply chain of the fuel cell and hydrogen industry including component suppliers, vehicle manufacturers, aviation companies, hydrogen producers, fuel distributors, utilities, end-users, and fuel cell and electrolyzer stack and system manufacturers. For over 30 years FCHEA has provided a consistent industry voice to policymakers and regulators, driving support at the federal

[1] Stewart, W.M., Dibb, D.W., Johnston, A.E. and Smyth, T.J. (2005), The Contribution of Commercial Fertilizer Nutrients to Food Production. Agron. J., 97: 1-6. https://doi.org/10.2134/agronj2005.0001.

level to promote the environmental and economic benefits of hydrogen energy and fuel cell technologies.

The National Hydropower Association (NHA) is a non-profit national association dedicated to securing waterpower as a clean, carbon-free, renewable, and reliable energy source that provides power to an estimated 30 million Americans. The association's membership consists of more than 320 organizations, including public and investor-owned utilities, independent power producers, equipment manufacturers, and professional organizations that provide legal, environmental, and engineering services to the waterpower industry. NHA promotes innovation and investment in all waterpower technologies, including conventional hydropower, marine energy and hydrokinetic power systems, and pumped storage hydropower to integrate other clean power sources, such as wind, solar, and hydrogen.

The Truck and Engine Manufacturers Association (EMA) represents the world's leading manufacturers of medium-and heavy-duty commercial vehicles, internal combustion engines, and zero-emission powertrains. EMA works with governments and other stakeholders to help the nation achieve its goals of cleaner air and lower greenhouse gas emissions, and to ensure that regulatory standards are technology feasible, cost effective, and successful. By continually improving commercial vehicle and powertrain technologies, EMA's members are in the forefront of providing clean and efficient products that meet their customers' business needs and protect the environment.