November 14, 2022

RE: ***Comments to the U.S. Department of Energy Clean Hydrogen Production Standard Draft Guidance***

Submitted Electronically via: Cleanh2standard@ee.doe.gov

The American Clean Power Association (ACP)[1] appreciates the opportunity to submit the following comments in response to the Department of Energy's (DOE) Draft Guidance for a Clean Hydrogen Production Standard (CHPS),[2] implementing section 40315 of the Infrastructure Investment and Jobs Act of 2021 (IIJA).

ACP supports DOE's approach in the draft guidance to create an effective initial standard for the carbon intensity of clean hydrogen production in accordance with the IIJA. As DOE acknowledges, the CHPS should be developed to promote investment in the burgeoning clean hydrogen sector. Accurately quantifying well-to-gate lifecycle greenhouse gas (GHG) emissions for hydrogen production projects is a threshold requirement for characterizing their relative ability to contribute to the clean energy transition, as well as determining product eligibility for low-carbon hydrogen grant and incentive programs. Establishing such an assessment methodology will also facilitate the emerging hydrogen industry by developing a standard consistent with international best practices and the hydrogen production tax credit in the Inflation Reduction Act (IRA).

ACP encourages DOE to evaluate the possibility of allowing power purchase agreements (PPAs), including virtual PPAs (VPPAs), and tolling agreements with wholesale storage providers

[1] ACP is the national trade association representing the renewable energy industry in the United States, including in all aspects of offshore wind energy, bringing together over 1,000 member companies, 120,000 members, and a national workforce located across all 50 states with a common interest in encouraging the deployment and expansion of renewable energy resources in the United States. By uniting the power of wind, solar, storage, and transmission companies and their allied industries, ACP seeks to enable the transformation of the U.S. power grid to a low-cost, reliable, and renewable power system. The views and opinions expressed in this filing do not necessarily reflect the official position of each individual member of ACP.

[2] Available at https://www.energy.gov/eere/fuelcells/articles/clean-hydrogen-production-standard.

to count toward the achievement of the objectives of the IIJA, as well as the IRA, with respect to characterizing the intensity of electricity emissions from grid-connected green hydrogen production. We appreciate the need to develop a framework for emissions accounting criteria related to these instruments that supports a shift to green hydrogen and ensures its contribution to a clean energy transition, as well as carbon emission reductions.

As discussed further below, as DOE considers frameworks for assessing well-to-gate GHG emissions of grid-connected electrolytic hydrogen, we urge it to prioritize the following principles for establishing an emissions accounting scheme: (a) regionality—electrolyzers should be powered by zero-carbon resources located in the same region; (b) additionality—ensure electrolytic hydrogen is powered by carbon-free energy that is driven by new demand from electrolyzers; and (c) double counting—double claiming of benefits associated with the "greenness" of the electricity should be prohibited.

With respect to the issue of considering temporal requirements for grid-connected electrolyzer-produced hydrogen, in order to ensure electrolyzers can be cost-effectively operated and the industry develops, we encourage DOE to adopt a time of use standard based on an annual basis. However, we appreciate the need to consider and weigh the merits of imposing, in the future, alternative temporal requirements between renewable electricity and hydrogen production. To that end, we encourage DOE to create a task force, involving a collaborative stakeholder process, to explore the costs and benefits of such alternative temporal requirements. As part of that process, we also encourage DOE to carefully evaluate a range of options regarding mechanisms to demonstrate additionality. ACP looks forward to working with DOE and other stakeholders on weighing the respective benefits and limitations of these various approaches and options.

I. COMMENTS

A. A Well-To-Gate Methodology for the CHPS Will Best Support the Growth of the Clean Hydrogen Industry and Climate Goals

While the IIJA initially defined clean hydrogen as 2 kg CO2e/kg H2 at the point of production, it affords flexibility for DOE to consider additional criteria in further defining "clean hydrogen." Given the degree to which GHG emissions arising upstream of the point of production can dictate the final emissions profile of hydrogen production pathways, ACP urges DOE to employ this discretion to develop a carbon intensity threshold that rigorously accounts for a well-

to-gate life cycle assessment (LCA) on the basis that it will better support sustainable reductions in GHG emissions as compared to a "point of production" methodology. Indeed, this will serve as a foundational requirement for establishing a clean hydrogen market since it accounts for greater GHG emissions associated with aspects of hydrogen use.

DOE's well-to-gate LCA will establish consistent GHG reduction from hydrogen facilities, accounting for emissions associated with feedstock production, flaring, hydrogen production, carbon capture, and storage, as well as others. Quantifying these emissions from well-to-gate will aid in conducting a fair and unbiased competitive grant program, helping to reduce subjectivity and supporting a scientific-based approach focused on decarbonizing systems. Clearly defined emissions parameters, including the stopping and starting points of calculation, can also help remove ambiguity from the process of determining "clean hydrogen" and lower the opportunity for market distortion and unfair competition (e.g., through congestion and/or negative pricing). As a technology-agnostic approach, this approach creates a common and an appropriately inclusive methodology, opening a pathway for competition to thrive if the hydrogen production can meet the desired LCA emissions threshold, regardless of technology, and gives more weight to proposals with the lowest emission profiles.

While the CHPS is not a regulatory standard, and under the IIJA, DOE can select projects that do not necessarily meet it, DOE is required to select projects that "demonstrably aid the achievement" of the CHPS by mitigating emissions as much as possible across the supply chain (*e.g.*, use of clean electricity).[3] Additionally, the Clean Hydrogen Research and Development Program directs DOE to establish "a series of technology cost goals oriented toward achieving the CHPS."[4] Thus, these programs are expressly designed to reduce the carbon intensity of hydrogen production from diverse feedstocks over time. Accordingly, while projects selected under these programs may not necessarily be required to meet the CHPS, DOE should ensure that they, at a minimum, demonstrably aid the achievement of the CHPS: to ensure a reduction in carbon intensity of hydrogen production. While DOE-funded activities may not be required to achieve the target set forth in the CHPS, we also encourage DOE to expect stakeholders to reduce emissions across the supply chain as aggressively as technologically and economically feasible, giving

[3] 42 U.S.C. 16166(b).
[4] Inflation Reduction Act of 2020, Sec. 13204, https://www.congress.gov/bill/117th-congress/house-bill/5376/text.

preference to funding applicants based on their ability to reduce emissions alongside other selection criteria.

Finally, we agree with DOE that the LCA target proposed in the draft guidance aligns well with section 13204 of the 2022 of the IRA, which creates a new 10-year production tax credit (the 45V Credit) for "qualified clean hydrogen," defined with reference to the LCA GHG emissions rate of hydrogen production.[5] This standard focuses on carbon intensity to increase certainty and reduce subjectivity. To qualify for a credit in the IRA, hydrogen must be produced through a process that results in a lifecycle GHG rate of not greater than 4 kilograms of CO2e per kilogram of hydrogen. As that target for the CHPS aligns with the new clean hydrogen policy drivers established in the IRA for the 45V Credit, this will create harmony between the two statutory provisions that will best support the growth of clean hydrogen.

B. The Adoption of the Boundary Conditions from the International Partnership for Hydrogen in the Economy is Key for Aligning Development of Clean Hydrogen in the U.S.

ACP believes that the use of the system boundary employed by the International Partnership for Hydrogen in the Economy (IPHE), as proposed in the CHPS, will enable the burgeoning domestic clean hydrogen industry in the U.S. better integrate with global hydrogen markets. More than twenty countries have been coordinating since 2019 to harmonize emissions analysis methodologies and boundary conditions for hydrogen pathways through IPHE's Hydrogen Production Analysis Task Force (H2PA TF), which is co-led by the U.S.

This methodology appropriately accounts for the emissions from each unit of hydrogen across the supply chain, including emissions upstream and downstream of the point of production. This system has been demonstrated by DOE and its National Laboratories in previous work, is consistent with international best practices, and will support the implementation of the 45V Credit in the IRA. Thus, its use should provide confidence regarding boundary conditions.

The methodology should be used across all hydrogen production pathways and is aligned with internationally agreed-upon best practices for evaluating the emissions of fuel production. This is beneficial since the federal and state governments could replicate these well-established

[5] *Id.*

and carefully considered conditions. To this end, the U.S. market will have the advantage of being coordinated with the global market. This will facilitate easy international trade in clean hydrogen through shared practices to produce clean hydrogen.

The IPHE methodology is based on flexibility that will support the clean hydrogen market as it emerges. It provides transparency regarding the assumptions within the IPHE methodology that supports creating confidence in the approach and stimulating innovation. Its focus on compatibility is important for the emergence of the clean hydrogen market since it will allow comparison of emissions from hydrogen to emissions from other sources, supporting the growth of cleaner hydrogen production methods. Finally, the IPHE approach will mature along with the clean hydrogen market, ensuring that best practices are adopted domestically and abroad for clean hydrogen production.

C. DOE Should Allow Market-Based Clean Electricity Procurements in Characterizing the Intensity of Electricity Emissions from Grid-Connected Green Hydrogen and Consider Reasonable Methods for Verification and Matching Grid Electricity Consumption with Procured Clean Generation

Cost-effective hydrogen infrastructure may require, to be competitive,[6] high utilization rates that are often in excess of that which can be provided solely by onsite renewable resources. Current limitations can make it challenging to maintain a high-level of utilization for an electrolyzer that is co-located with a renewable project and intended to serve as its load-providing energy source. For instance, green electrolytic hydrogen demand may not always be near low-cost renewable energy output. In fact, facilities in the U.S. are frequently far from potential demand centers and likely will remain so until an integrated hydrogen network and infrastructure is developed.

Given such realities, to operate at high utilization rates and minimize the cost of electrolysis derived from hydrogen will often require hydrogen producers to have the option to use a combination of onsite renewable and grid power ultimately sourced from offsite renewable sources. ACP therefore believes the CHPS should consider allowing decoupling of load from generation while still maintaining a high emission reduction standard. In other words, for green hydrogen operators to benefit from diversified renewable energy generation, they need the flexibly

[6] For instance, absent these high utilization rates, the benefits of the hydrogen production tax credit are canceled out by the resulting higher levelized cost of hydrogen production.

to use a combination of grid power sourced from green sources coupled with onsite renewables. Further, PPAs, virtual PPAs, and tolling agreements with clean energy storage providers should be permitted to be used in characterizing the intensity of electricity emissions for green hydrogen production.

This flexibility and the use of these instruments will facilitate the growth of the green hydrogen market, by giving developers the flexibility to put an electrolyzer near the customer or customers for the hydrogen but not necessarily have the electrolyzer directly connected to the renewable project that it claims as the source of electricity. This flexibility is especially important as the nascent green hydrogen market begins to blossom, by providing more flexibility for producers and end-users, increasing competition, and helping overcome near-term barriers to large-scale infrastructure development. This will also create opportunities to reduce the levelized cost of hydrogen if electrolyzers are able to operate at higher efficiencies by utilizing supplemental grid power. This flexibility paired with certain limitations and effective verification rules, noted below, effective emission decreases can be ensured.

- ***Verification***

Through the establishment of data or tools to assign unique attributes to the renewable power virtually consumed, projects should be able to verify the emission reductions associated with green hydrogen. ACP supports DOE considering the development of additional infrastructure and mechanisms to help verify the use of these instruments with respect to green hydrogen in a way that supports development of the industry and helps these instruments be accounted for as a source of clean electricity. For instance, a "book-&-claim" approach could be implemented in which regionally supplied clean energy can be carefully quantified to satisfy the "renewable" component of grid-connected hydrogen production.

- ***Regionality***

Regionality establishes a geographical boundary within which both the clean energy project and the electrolyzer must be located. ACP supports DOE adopting a requirement that the electrolyzer be in the same region as the renewable project that it claims as the source of electricity. This enables operators of green hydrogen to draw power from the local utility, e.g., if they have a PPA, virtual PPA, or storage tolling agreement, so long as it is within the same financially settled, balancing authority or organized market. If those balancing areas are too small, the boundaries should be extended to include connected, adjacent balancing authorities. Regionality incentivizes

a more balanced build out of renewable energy projects and infrastructure, including storage, contributing to grid stability and lower market volatility.

- ***Additionality***

To help ensure grid-connected electrolytically-produced hydrogen contributes to emissions reductions, ACP supports DOE considering mechanisms that ensure electrolytic hydrogen is powered by renewable energy that is driven by new demand from electrolyzers. However, current mechanisms to demonstrate additionality could risk doing more harm than good to the nascent green hydrogen industry and, therefore, require further assessment by DOE. We encourage DOE, as part of the process discussed below, to carefully evaluate a range of options regarding additionality in cooperation with stakeholders.

- ***Double Counting***

DOE should consider establishing requirements to ensure no double claiming of benefits so that any environmental attributes associated with the electricity used to produce green hydrogen are retired and not claimed under any other program.[7]

- ***Temporal Accounting***

Temporal accounting refers to the degree of alignment between the times when the electrolyzer is consuming grid power for operation and times when procured clean energy projects are generating. Grid-tied electrolyzers are typically most economic when operating as close to 100 percent capacity as possible, which means that to meet a true green standard, they typically need to procure power as a block around the clock from wind and solar, and potentially storage resources—allowing the electrolyzers to run at high-capacity factors. At this time, this might be not possible or cost effective to realize at scale in all regions of the country without impeding the growth of electrolyzer-produced hydrogen. Therefore, we encourage DOE to adopt a time of use standard based on an annual basis (i.e., the carbon-free energy must be produced within the same year the hydrogen is produced).

ACP nevertheless appreciates the need to consider the benefits and costs of various approaches to time matching. To that end, we encourage DOE to create a task force, involving a collaborative stakeholder process with ample opportunity for engagement and comment, to explore

[7] Some exceptions however should be provided; for instance, the electricity should be able to be claimed for the federal renewable fuel standard operated by the Environmental Protection Agency or for a regional cap-and-trade program (provided that the electricity is not claimed in the cap-and-trade program's voluntary renewable electricity program).

the merits of various alternative temporal requirements between renewable electricity and hydrogen production.

There are multiple approaches to achieving such time of use standards (*e.g.*, quarterly, monthly, weekly, intra-day on/off peak, hourly), ranging in complexity and rigor. They should each be carefully considered and modeled, with input and evaluation by stakeholders, before any alternative approach is chosen by DOE. The task force should determine the state of tools and technology required to perform and verify each of these alternative approaches. They should also each be carefully considered and modeled with the following goals in mind: expanding electrolyzer-produced green hydrogen and renewable energy deployment, as well as effectively reducing carbon emissions and maintaining well-functioning electricity markets. ACP looks forward to working with DOE and other stakeholders on weighing the respective benefits and limitations of these various approaches.

II. CONCLUSION

ACP appreciates the opportunity to provide these comments and hopes DOE will take them into account in finalizing the guidance establishing the CHPS. ACP hopes to stay actively involved in this process as DOE moves forward and considers actions that may impact the future development of the green hydrogen market in the U.S. Please do not hesitate to contact us if you have any questions.

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