



December 3, 2022

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

Internal Revenue Service  
CC:PA:LPD:PR (Notice 2022-58)  
Room 5203  
P.O. Box 7604,  
Ben Franklin Station  
Washington, DC 20044

**RE: Comments on Notice IRS-2022-58 and IRA §13204**

The Fuel Cell and Hydrogen Energy Association (FCHEA) appreciates the opportunity to respond to the Department of Treasury's Request for Comments on Clean Hydrogen Production Incentives.

FCHEA is the national industry association representing over ninety 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 fuel cell and electrolyzer stack and system manufacturers, component suppliers, vehicle manufacturers, aviation companies, hydrogen producers, transporters, fuel distributors, utilities, end-users, and more. For over 30 years, FCHEA has provided a consistent industry voice to policymakers and regulators, working with Congress and administration officials to educate decisionmakers and support hydrogen-focused tax and policy incentives.

FCHEA is a longtime advocate of hydrogen, its potential uses, and its contribution to a clean energy future. For years, FCHEA has provided advice, guidance, and served as a resource for the DOE, Department of Transportation (DOT), Department of the Treasury (Treasury), federal policymakers, and other industry leaders. FCHEA appreciates the Biden Administration's commitment to developing an investment tax credit for hydrogen storage property and looks forward to being a resource to IRS and Treasury throughout the guidance process. FCHEA offers these comments leveraging its leadership, mentorship, and expertise within the hydrogen industry.

The Biden Administration has set [\*bold national decarbonization goals\*](#), including 100 percent carbon pollution-free electricity by 2035 and net-zero GHG emissions by 2050. Hydrogen energy is increasingly viewed as an essential decarbonization option across the United States and around the world for a wide range of sectors. [\*The Road Map to a US Hydrogen Economy\*](#) report found that hydrogen could constitute 14 percent of the US energy demand, resulting in a 16 percent national reduction in CO<sub>2</sub> emissions and 36 percent reduction in NO<sub>x</sub> emissions, a significant win for mitigating climate change and improving public health. In addition, the Road Map further estimates that by 2050 the hydrogen sector would generate \$750 billion per year in revenue and create 3.4 million jobs, demonstrating this sector's incredible economic as well as environmental potential.

Recognizing hydrogen’s crucial role in decarbonization, the Biden Administration has provided critical support for the growing hydrogen economy. A pillar of the Biden Administration’s support for key clean hydrogen programs is the inclusion of \$9.5 billion in the Infrastructure Investment and Jobs Act, the centerpiece of which is the Regional Clean Hydrogen Hubs initiative. This program recently announced \$7 billion in funding for 6-10 projects to develop holistic large-scale hydrogen production, distribution, and utilization networks across the country. This support, including the recent draft publication of the first [National Clean Hydrogen Strategy and Roadmap](#) by the Department of Energy (National Hydrogen Strategy), shows the commitment that the executive branch has made to the hydrogen economy. Another pillar of the Biden Administration’s support for key clean hydrogen is Section 13204 of the IRA, which created the clean hydrogen production tax credit under Section 45V of the Internal Revenue Code. This credit will drive monumental investments into the development and deployment of clean hydrogen production facilities across the United States. By driving down the cost of clean hydrogen, existing hydrogen markets will be able to switch to cleaner hydrogen feedstocks, emerging applications in transport and power will be more cost-competitive with incumbent technologies, and new industries will be able to adopt this low- and zero-carbon fuel.

## I. Notice 2022-58

FCHEA appreciates the opportunity to provide feedback on Notice 2022-58 relating to Section 45V Clean Hydrogen Production Credit.

### .01(1) Definition of “Qualified Clean Hydrogen”

#### **(1) Section 45V provides a definition of the term “qualified clean hydrogen.” What, if any, guidance is needed to clarify the definition of qualified clean hydrogen?**

FCHEA respectfully requests clarification regarding the definition of a “qualified clean hydrogen production facility.” Section 45V(c)(3) defines “qualified clean hydrogen production facility” as a “facility – (A) owned by the taxpayer, (B) which produces qualified clean hydrogen, and (C) the construction of which begins before January 1, 2033.” Through this definition, Congress articulated three key criteria: (i) ownership; (ii) production of qualified clean hydrogen; and (iii) beginning of construction. Regarding criteria (ii), FCHEA recommends that the facility should be defined to solely include such property as is necessary to effectuate the production of the qualified clean hydrogen. Specifically, we propose and request confirmation that a qualified clean hydrogen production facility may be defined as each generational unit capable of producing qualified hydrogen. In the context of electrolytic pathways, each additional electrolyzer module at a green production situs would constitute separate “qualified clean hydrogen production facilities,” whereupon the taxpayer can claim the Section 45V credit for ten years after such generational unit is placed in service (if in compliance with the other requirements of Section 45V).

This proposed framework is consistent with the plain language of Section 45V(c)(3) and provides an important incentive to expand and reinvest in hydrogen production sites. For example, in the wind industry, it is common practice to repower an existing wind facility to take advantage of new improvements in technology. This scenario is similarly applicable within the electrolytic hydrogen space. Proton exchange membrane stacks currently can operate for approximately 80,000 hours, at which point the stacks have degraded and use significantly more electricity than originally designed for or as compared to a new generation of stacks. A significant capital expenditure investment is required to repower these stacks. Repowering these sites through electrolyzer/stack replacement should commence a ten-year period for each such repowered qualified clean hydrogen production facility/generational unit. This framework will ensure that first generation electrolyzer projects remain competitive with later generation projects benefitting from both technological innovations and Section 45V.

*A Qualified Clean Hydrogen Production Facility may include additional property for by-product hydrogen production*

Relatedly, a qualified clean hydrogen facility should be defined by the property necessary to effectuate the production of qualified hydrogen for sale or use. For by-product hydrogen facilities, a second appurtenant facility may process and purify waste product into useable/saleable qualified clean hydrogen. Hydrogen-containing byproduct from certain industrial processes, for example chlor-alkali facilities, should not be considered “qualified clean hydrogen” under Section 45V unless it is of appropriate quality and purity to be for sale and use in the ordinary course of a trade or business of the taxpayer (as required in Section 45V(c)(2)(B)). Such waste product hydrogen typically contains substantial impurities, such as nitrogen and argon, that necessitate substantial purification to process the waste byproduct into saleable qualified clean hydrogen. For byproduct chlor-alkali sites, we request clarification that property which purifies hydrogen-containing waste byproduct and effects the availability for sale and use may be considered part of a qualified clean hydrogen production facility under Section 45V(c)(3). This interpretation is consistent with the legislative intent – to incent the development of new facilities and ensure a robust supply of qualified clean hydrogen for sale and use. If a site is constructed to perform purification and other activities necessary to process hydrogen-containing waste byproduct into “qualified clean hydrogen” available for “sale and use,” such property may be properly deemed part of the “qualified clean hydrogen production facility.”

Section 45V(d)(4) provides that a qualified clean hydrogen production facility includes any facility that was originally placed in service before January 1, 2023, did not previously produce qualified clean hydrogen, and is subsequently modified to produce qualified clean hydrogen, if amounts paid or incurred with respect to such modification are properly chargeable to the capital account of the taxpayer. In such case, the modified facility is deemed to have been originally placed in service as of the date of the completion of the modification.

Section 45V(d)(4) is an important provision because it allows taxpayers to upgrade or improve the operation of facilities that are not producing clean hydrogen through reducing the facility’s lifecycle emissions. Modifications to existing facilities and operations may be more efficient and will provide for the more immediate production of clean hydrogen than constructing entirely new facilities, at least in the near term. Treasury guidance should encourage such activity by providing clear and flexible rules to meet the requirements of section 45V(d)(4). Taking this step will also contribute to the overarching goal of the Biden Administration and legislative intent of the provisions of reducing greenhouse gas emissions.

There are several ways that taxpayers may incur capital expenditures to begin producing qualified clean hydrogen with respect to an existing nonconforming facility. The most obvious are modifications to the facility itself. To encourage taxpayers with nonqualifying facilities to bring such facilities into compliance with section 45V standards, Treasury guidance should clarify that *any* capital expenditures paid or incurred with respect to the modification, no matter the amount, are sufficient under section 45V(d)(4).

A second type of capital expenditure relates to the feedstocks required to produce hydrogen. Taxpayers should be encouraged to switch feedstocks with respect to an existing nonconforming facility if this is the most efficient and fastest way to produce qualified clean hydrogen. Treasury guidance should clarify that the acquisition of new feedstocks necessary to produce qualified clean hydrogen at a previously nonconforming facility may give rise to a new qualified facility under section 45V(d)(4), regardless of whether the feedstock expenditure is chargeable to capital. For this purpose, the acquisition of new feedstocks should include the acquisition of clean energy attributes under a book-and-claim method.

Finally, Treasury guidance should clarify that section 45V(d)(2) rule that precludes clean energy

facilities from taking section 45V production credits if they previously claimed credits under section 45Q does not apply in the case of clean hydrogen production facilities newly refurbished in accordance with section 45V(d)(4). Such treatment is appropriate because section 45V(d)(4) treats the modified facility as originally placed in service following the modification.

## .01(1)(b)(i) & .01(1)(c)(i) – Lifecycle Emissions for Clean Hydrogen as an Industrial By-Product

**(b)(i) How should lifecycle greenhouse gas emissions be allocated to co-products from the clean hydrogen production process? For example, a clean hydrogen producer may valorize steam, electricity, elemental carbon, or oxygen produced alongside clean hydrogen.**

**(c)(i) How should lifecycle greenhouse gas emissions be allocated to clean hydrogen that is a by-product of industrial processes, such as in chlor-alkali production or petrochemical cracking?**

Treasury is seeking comment on how greenhouse gas emissions should be allocated to co-products from the hydrogen production process, noting systems such as “system expansion, energy-based approach, [and] mass-based approach.”<sup>1</sup> FCHEA recommends that Treasury adopt a system in which taxpayers producing multiple products including hydrogen should be permitted to utilize any reasonable allocation method for the purposes of determining the lifecycle greenhouse gas emissions among co-products (e.g., energy / mass-based / displacement / economic allocation) absent compelling facts that such a method is patently unreasonable or would be abusive. The GREET model today supports several methods for co-products methodology that all should be supported as useable for the purposes of this credit, including mass-based allocation, market value-based allocation, energy-based allocation, and displacement method.<sup>2</sup>

As an example, steam is an important co-product in many hydrogen production facilities, and the use of steam often displaces carbon dioxide emissions that would have otherwise occurred from, for example, operating a natural gas fired boiler. In this case, a displacement allocation method would be most appropriate. Mass-based allocation is another common method of greenhouse gas allocation among co-products that should be included. FCHEA suggests that Treasury provide additional clarity with regard to appropriate methods of allocation for both coproducts and byproducts within the lifecycle assessment.

In the case of byproduct hydrogen processing, it is important that the net effect of redirecting the byproduct gas is considered. In many cases, the redirection of byproduct gas to hydrogen requires the substitution of natural gas or other energy in the primary process. In these cases, it is important that the carbon intensity calculation for the primary process includes this additional energy.

## .01(1)(d) – Credit Eligibility for Facilities that Do Not Exclusively Produce Clean Hydrogen

**(d) If a facility is producing qualified clean hydrogen during part of the taxable year, and also produces hydrogen that is not qualified clean hydrogen during other parts of the taxable year (for example, due to an emissions rate of greater than 4 kilograms of**

<sup>1</sup> 87 Fed. Reg. 58,776 (Sep. 28, 2022), pp. 8.

<sup>2</sup> [https://greet.es.anl.gov/files/greet\\_building\\_guide\\_2021](https://greet.es.anl.gov/files/greet_building_guide_2021)

**CO<sub>2</sub>-e per kilogram of hydrogen), should the facility be eligible to claim the § 45V credit only for the qualified clean hydrogen it produces, or should it be restricted from claiming the § 45V credit entirely for that taxable year?**

FCHEA believes that a facility producing qualified clean hydrogen should be eligible to receive the §45V credit for all qualifying clean hydrogen produced at the facility. This position would both align with the intent of the legislation and its mission of accelerating reductions of greenhouse gas emissions. Restricting credit eligibility to facilities that exclusively produce qualified clean hydrogen would leave project developers uncertain of their ability to access requisite financing to develop cost-intensive projects.

As discussed below in response to .01(1)(c) with regards to GREET Model Calculations, there are natural variations in carbon intensity for commercial-scale deployments of hydrogen production owing to a variety of factors. For example, a facility may generally produce hydrogen with a CO<sub>2</sub> equivalent of 3.8 kg, which would be eligible for the credit. However, that same facility may also occasionally produce hydrogen with an emissions factor higher than 4.0 kg of CO<sub>2</sub> equivalent during periods in which there is intermittent access to renewable electricity. FCHEA believes that under this example, the facility should be eligible to claim the §45V credit for either all hydrogen produced that meets the emissions factor (weighted average of high and low values is less than 4.0 kg of CO<sub>2</sub> equivalent) or just the quantity of hydrogen produced that meets the 3.8 kg of CO<sub>2</sub> equivalent excluding the quantity produced above 4.0 kg of CO<sub>2</sub> equivalent as established in the statute. This approach would provide a level playing field and ensure facilities are not artificially excluded from attaining the credit given variations outside of their control.

## **.01(1)(e) – GREET Model Calculations**

**(e) How should qualified clean hydrogen production processes be required to verify the delivery of energy inputs that would be required to meet the estimated lifecycle greenhouse gas emissions rate as determined using the GREET model or other tools if used to supplement GREET?**

**(i) How might clean hydrogen production facilities verify the production of qualified clean hydrogen using other specific energy sources?**

**(ii) What granularity of time matching (that is, annual, hourly, or other) of energy inputs used in the qualified clean hydrogen production process should be required?**

FCHEA believes all producers must properly establish a GHG baseline and track GHG reduction relative to it. There should also be annual independent third party verification to assure that the plant operates in a manner that supports the credit claim made with Treasury. FCHEA continues to engage in substantial efforts to ensure its member’s products demonstrate verifiable climate benefits including all energy inputs that are required to determine the carbon intensity of qualified clean hydrogen.

FCHEA also believes the §45V crediting should enable an entity applying for the credit to account for natural variations in carbon intensity for commercial-scale deployments over the course of the crediting period. Actual carbon intensity values “vary over time due to a variety of factors, including but not limited to seasonality, feedstock properties, plant maintenance, and unplanned interruptions and shutdowns.”<sup>3</sup> Such normal variations would not necessarily include major plant modifications, changes in feedstock, or new, permanent energy inputs, which may require a new lifecycle analysis and carbon intensity certification. Small temporary changes can cause large relative variations, especially when emissions are low. As a result, the §45V crediting should account for natural variation by evaluating over an annual period, which would reduce the regulatory burden for producers and create greater predictability. FCHEA would recommend that a suitable averaging period would be annually and will prevent producers from benefiting or being punished

<sup>3</sup> Cal. Code Regs. Tit. 17, § 95488.4 - Relationship of Pathway Carbon Intensities to Units of Fuel Sold in California, <https://www.law.cornell.edu/regulations/california/17-CCR-95488.4>.

for temporary variation that does not reflect the overall carbon reduction benefits of a facility. In any event, producers should also be allowed to demonstrate their own methodology for approval, given sufficient robustness and verifiability. All of the energy inputs and data sources – whether from monitoring inside the operation (e.g., self-generated electricity or steam) or from outside the operation (e.g., utility purchases and records), would be detailed in the entity’s proposed methodology and verified independently at the time of credit application.

Please note that this ability to average operational variations over an appropriate time period applies even in the cases where an entity might elect to report two different carbon intensities in a crediting period either due to operational or feedstock variability.

## .01(2)– Alignment with Clean Hydrogen Production Standard

**(2) Alignment with the Clean Hydrogen Production Standard. On September 22, 2022, the Department of Energy (DOE) released draft guidance for a Clean Hydrogen Production Standard (CHPS) developed to meet the requirements of § 40315 of the Infrastructure Investment and Jobs Act (IIJA), Public Law 117-58, 135 Stat. 429 (November 15, 2021).<sup>4</sup> The CHPS draft guidance establishes a target lifecycle greenhouse gas emissions rate for clean hydrogen of no greater than 4.0 kilograms CO<sub>2</sub>-e per kilogram of hydrogen, which is the same lifecycle greenhouse gas emissions limit required by the § 45V credit. For purposes of the § 45V credit, what should be the definition or specific boundaries of the well-to-gate analysis?**

FCHEA supports alignment between the CHPS and §45V crediting ‘well-to-gate’ boundaries. Currently, DOE requested comments on its draft guidance for CHPS, for which FCHEA has submitted extensive comments. Please refer to the Appendix for FCHEA’s comments regarding the CHPS.

## .01(4)(a)(b) – Recordkeeping and Reporting

### **(4) Recordkeeping and Reporting.**

**(a) What documentation or substantiation do taxpayers maintain or could they create to demonstrate the lifecycle greenhouse gas emissions rate resulting from a clean hydrogen production process?**

**(b) What technologies or methodologies should be required for monitoring the lifecycle greenhouse gas emissions rate resulting from the clean hydrogen production process?**

FCHEA recommends that the Guidance confirm that certification by a qualified engineer of the GREET (or similar model) calculation should be sufficient to allow a taxpayer to claim the Clean Hydrogen Production credit. In the instance that the Guidance predicates eligibility to claim the credits upon taxpayer receipt of a government-issued approval of the taxpayer’s environmental performance calculations, the association urges that streamlined approval procedures be included that provide for a limited period for government review, with absence of a negative communication by the end of the review period to be deemed approval.

FCHEA believes that any such documentation must be consistent with the key parameters that were used in calculating the carbon intensity including when an applicant has requested a provisional emission rate. This documentation may include, but not be limited to, carbon dioxide measurement, product and co-product flow measurement, analysis of stream composition, utility invoices for purchased energy, etc. We believe that the parameters to be monitored should be proposed by the applicant when the provisional emission rate is applied for in the form of a monitoring plan, which Treasury should approve when

approving the provisional emission rate. Approving the monitoring plan in advance will provide certainty to both the applicant and Treasury while facilitating the eventual independent verification process.

## .01(6)(c) – Coordination with 45Q

### (6) Coordinating Rules.

**(c) Coordination with § 45Q. Are there any circumstances in which a single facility with multiple unrelated process trains could qualify for both the § 45V credit and the § 45Q credit notwithstanding the prohibition in § 45V(d)(2) preventing any § 45V credit with respect to any qualified clean hydrogen produced at a facility that includes carbon capture equipment for which a § 45Q credit has been allowed to any taxpayer?**

IRC sec. 45V(d)(2) includes explicit language prohibiting double counting of the 45V credit and 45Q credit for carbon capture and sequestration (CCS), stating that “[n]o credit shall be allowed under this section with respect to any qualified clean hydrogen produced at a facility which includes carbon capture equipment for which a credit is allowed to any taxpayer under section 45Q for the taxable year or any prior taxable year.” FCHEA believes that the best understanding of section 45V(d)(2) is to prevent a taxpayer from obtaining a windfall by claiming both the 45V and 45Q credits for a single CCS-based hydrogen process train. We welcome Treasury’s clarification of this prohibition. As explained below, however, Treasury should confirm and clarify that taxpayers with separate process trains may be eligible for 45V and 45Q credits for such separate trains even if co-located in a complex, which is a distinct issue from stacking or double counting.

As an initial matter, the language of sec. 45V(d)(2) and Treasury’s inquiry focus on a single “facility,” rather than multiple *facilities* that may or may not be co-located as part of a larger manufacturing complex at a single geographic location. It is important to note that many taxpayers are either pursuing or planning to pursue multiple concurrent production methods for clean hydrogen—ranging from steam methane reforming (SMR) with CCS to carbon-free electrolysis with renewable electricity and more. For some taxpayers, these different production methods will be co-located in one geographic area as part of a broader complex. Such co-location is, in many cases, the most efficient and effective way for companies to implement these projects, which can benefit from experienced personnel and operational expertise. For that reason, a single complex can have multiple SMR units (each with its own CCS equipment) and separate electrolysis units, which are operated independently from the SMR units, producing separate streams of clean hydrogen even where discreet pieces of equipment may be scattered over a large geographic area.

Taxpayers commonly treat separate process trains as separate facilities for their own internal accounting purposes as well as for tax purposes.<sup>4</sup> For purposes of sec. 45V(d)(2), therefore, these facilities are separate and would not be limited in claiming separate 45V or 45Q credits, as long as the two different credits are not being claimed for the same process train. It may be helpful for Treasury to clarify this point given the many advantages for producers to co-locate different types of clean hydrogen production that will promote

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<sup>4</sup> Treasury and the IRS have recognized previously in the context of the 45Q credit that “multiple qualified facilities” may co-exist at the same geographic location. See IRS Notice 2020-12 § 8.01. In Notice 2020-12, IRS and Treasury do not question whether “multiple qualified facilities” may be co-located, but rather establish a test for determining whether there are circumstances in which those multiple facilities “may be treated as a single qualified facility” for purposes of determining when construction has begun within the meaning of 45Q. Notice 2020-12 establishes several relevant factors for this determination, including whether the multiple qualified facilities are “are constructed in the same general geographic location or on adjacent or contiguous pieces of land.” In addition, “single process train” is determinative of equipment for 45Q credit under Treas. Reg. section 1.45Q-2(c)(3) and was implemented in Rev. Rul. 2021-13, 2021-30 IRB 152.

both emissions reduction and clean hydrogen production consistent with the legislation’s objectives.

With regard to the question posed by Treasury, where a taxpayer has not designated separate facilities within the same complex but is producing separate streams of clean hydrogen through *both* non-CCS process trains (e.g., through electrolysis) *and* CCS-based process trains, that facility should be able to claim the applicable credit, 45V or 45Q, for each of those processes. For the reasons referenced above, it makes economic sense for a taxpayer to develop new clean hydrogen projects at existing complexes, making it commonplace for there to exist multiple hydrogen production process trains at a single facility. As long as the separate production can be segregated and accounted for separately, there should be no prohibition for each separate process train to qualify for the applicable 45V or 45Q credit for which the resulting clean hydrogen is eligible.

As another example, a taxpayer might construct a power plant next to the electrolyzer to power the electrolyzer. Assume the power plant’s generation of electricity emits carbon dioxide, and the taxpayer installs carbon capture equipment to capture the carbon dioxide and, accordingly, the taxpayer could claim a section 45Q credit with respect to such capture. In that case, even though the carbon capture equipment is part of the same plant and physically co-located with the electrolyzer, the carbon capture activity is wholly unrelated to the hydrogen production process. This is because the carbon capture is occurring in connection with the power source and is not the capture of carbon emitted in the hydrogen production process. In this scenario, the availability of a section 45Q credit has incentivized the installation of carbon capture equipment on the power plant and the availability of the section 45V credit has incentivized the production of clean hydrogen. Thus, two activities have been incentivized and both should be rewarded with the appropriate credits. Unless the prohibition on claiming both credits is clarified to mean credits claimed with respect to carbon capture equipment *in the qualified clean hydrogen production process*, the carbon capture activity would not be incentivized.

In sum, Treasury should issue guidance under sec. 45V(d)(2) to provide that no single CCS-based hydrogen production process train can claim *both* the 45V and 45Q credits. To implement this rule, guidance should interpret the phrase “hydrogen produced at a facility which includes carbon capture equipment” to mean “hydrogen produced at a facility which includes carbon capture equipment *in the qualified clean hydrogen production process* and for which a credit is allowed to any taxpayer.” Treasury can also provide additional clarity whereby taxpayers may designate separate facilities within one co-located complex as multiple, unrelated process trains of clean hydrogen production that may separately be eligible for either the 45V or 45Q credit. Treasury should also clarify that where a taxpayer has only one designated facility within a complex that has multiple unrelated process trains to produce clean hydrogen that separately and independently qualify for the 45V and 45Q credits, the taxpayer may be able to claim the applicable credit for each.

Furthermore, with regard to section 45V(d)(4) Treasury should issue guidance to clarify that this section applies even if section 45Q tax credits were previously claimed with respect to the existing nonconforming facility, making section 45V(d)(2) inapplicable in case of modified facilities. Such treatment is appropriate because section 45V(d)(4) treats the modified facility as originally placed in service following the modification.

## Prevailing Wage and Apprenticeship Requirements

*Clarify, under IRC § 45V(e)(3) and (4), that the Prevailing Wage and Apprenticeship requirements do not apply to the construction and or repair of equipment or components in the conversion of clean hydrogen to ammonia and liquefaction of ammonia that are placed in service in conjunction with a Qualified Clean Hydrogen Production Facility.*



Section 45V(e)(3) and (4) apply to a Qualified Clean Hydrogen Production Facility. Under § 45V(c)(3), a Qualified Clean Hydrogen Production Facility is a facility owned by the taxpayer, which produces qualified clean hydrogen, and commences construction before January 1, 2033. Thus, while FCHEA believes it is clear that the Prevailing Wage and Apprenticeship requirements do not apply to equipment or components past the hydrogen production gate, such as equipment or components to convert the Qualified Clean Hydrogen into ammonia or the equipment or components for the liquefaction and storage of such ammonia — in order to avoid any ambiguity or uncertainty, Treasury should issue guidance making clear that those requirements do not apply beyond that point. Although Treasury notes in recent guidance on Prevailing Wage and Apprenticeship Standards released on November 30, 2022, the requirements would apply to “construction, alteration, or repair” of hydrogen production facilities, it would be helpful for Treasury to issue guidance to make clear that the requirements do not apply to equipment past the hydrogen production gate that do not involve hydrogen production.

*Clarify, under IRC § 45V(e)(3) and (4), that the Prevailing Wage and Apprenticeship requirements, as provided under IRC § 45(b)(8), do not apply to the construction and/or repair of carbon capture equipment placed in service at a Qualified Clean Hydrogen Production Facility that does not claim § 45Q tax credits on the captured qualified carbon oxide from such facility.*

Section 45V(e)(3) provides that Prevailing Wage requirements apply to a Qualified Clean Hydrogen Production Facility. Under § 45V(c)(3), a Qualified Clean Hydrogen Production Facility is a facility owned by the taxpayer, which produces qualified clean hydrogen, and commences construction before January 1, 2033. Thus, while FCHEA believes it is clear that Prevailing Wage and Apprenticeship requirements do not apply to carbon capture equipment located at such a facility if section 45Q credits are not claimed on the captured qualified carbon oxide from such facility —in order to avoid any ambiguity or uncertainty, Treasury should issue guidance making clear that those requirements do not apply.

Section 45V(e)(4) provides that rules similar to those under IRC § 45(b)(8) shall apply for purposes of 45Q. Section 45(b)(8) provides that Apprenticeship requirements apply with respect to the construction of any qualified facility. Although Treasury provided additional guidance on November 30, 2022, for Prevailing Wage and Apprenticeship requirements, FCHEA believes that any of the extension the requirements to apply to the construction of carbon capture equipment placed in service at a new or existing Qualified Clean Hydrogen Production Facility would be beyond the scope of the requirements

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FCHEA is appreciative of the opportunity to provide these comments on the Section 45V Clean Hydrogen Production Credit. The association and its members are dedicated to supporting the Administration however necessary to ensure that the Inflation Reduction Act guidance on hydrogen tax incentives accurately reflects the scientific and business realities of the hydrogen sector. Please feel free to contact FCHEA CEO Frank Wolak at [FWolak@FCHEA.org](mailto:FWolak@FCHEA.org) with any comments or questions you may have regarding this submission or any other hydrogen related issue.

Sincerely,



Frank Wolak  
President & CEO  
Fuel Cell and Hydrogen Energy Association

## Appendix

### FCHEA Comments on DOE's Initial Proposed Clean Hydrogen Production Standard (CHPS)

November 14, 2022

VIA E-mail: [cleanh2standard@ee.doe.gov](mailto:cleanh2standard@ee.doe.gov)

U.S. Department of Energy  
James V. Forrestal Building  
1000 Independence Avenue Southwest  
Washington, D.C. 20585

**Re: Comments on DOE's Initial Proposed Clean Hydrogen Production Standard (CHPS)**

The Fuel Cell and Hydrogen Energy Association (FCHEA) appreciates the opportunity to provide these comments to the U.S. Department of Energy (DOE) in support of the Clean Hydrogen Production Standard (CHPS).<sup>5</sup>

FCHEA is the leading hydrogen energy association in the United States representing over eighty-five companies and organizations advancing innovative, clean, safe, and reliable hydrogen energy technologies and solutions for over thirty years. FCHEA's members represent the entire global supply chain of the hydrogen and fuel cell industry, including hydrogen producers, fuel cell and electrolyzer stack and system manufacturers, equipment and service suppliers, vehicle manufacturers, aviation companies, fuel distributors, utilities, transporters, end-users, and more.

FCHEA is a longtime advocate of hydrogen, its potential uses, and its contribution to a clean energy future. For years, FCHEA has provided advice, guidance, and served as a resource for the DOE, Department of Transportation (DOT), Department of the Treasury (Treasury), federal policymakers, and other industry leaders. FCHEA appreciates DOE's commitment to developing a Clean Hydrogen Production Standard and looks forward to being a resource to DOE throughout the development process. FCHEA offers these comments leveraging its leadership, mentorship, and expertise within the hydrogen industry.

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<sup>5</sup> 87 Fed. Reg. 58,776 (Sep. 28, 2022).

## I. FCHEA supports DOE's proposal that the Clean Hydrogen Production Standard establish an initial target for lifecycle greenhouse gas emissions of 4.0 kgCO<sub>2</sub>e/kgH<sub>2</sub>.

DOE's CHPS proposal to establish an initial target for lifecycle greenhouse gas emissions of 4.0 kgCO<sub>2</sub>e/kgH<sub>2</sub> is both an appropriate target (4.0 kgCO<sub>2</sub>e/kgH<sub>2</sub>) and approach (lifecycle analysis) to mitigate emissions across the hydrogen production value chain.

The target and the approach combined create a standard that can accommodate a variety of hydrogen production processes and energy sources—renewables, biomass, nuclear, and traditional fossil fuels—while still encouraging emission reductions and investment. Striking this balance is critical for the growth and evolution of hydrogen technology and industry as a whole. A standard that is perceived as too aggressive could foreclose investment and slow the advancement of technology, whereas a standard that is perceived as business-as-usual will not provide the appropriate distinction for processes that achieve greater emissions reductions to warrant increased investment. By providing a lifecycle approach from which to meet the standard, DOE will allow a variety of production pathways the flexibility to meet the standard and will open the door to innovation and investment in clean energy technologies such as advanced electrolyzer systems and carbon capture technologies. This flexibility is particularly important as new production pathways are being established and existing production pathways are evolving.

DOE's proposed initial standard is consistent with the Bipartisan Infrastructure Law's (BIL) statutory obligation to develop a clean hydrogen production standard.<sup>6</sup> The BIL sets a series of requirements that a clean hydrogen standard (1) support clean hydrogen production from a variety of diverse pathways; (2) target 2.0 kgCO<sub>2</sub>e/kgH<sub>2</sub> at the point of hydrogen production, and (3) take into account technological and economic feasibility. Within the BIL, each of these requirements is equally important; one cannot be prioritized at the expense of another. With the initial CHPS, DOE has created a standard that appropriately balances and aligns these requirements.

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<sup>6</sup> Infrastructure Investment and Jobs Act of 2021, also known as the Bipartisan Infrastructure Law (BIL), Section 40315.

## II. FCHEA supports DOE aligning CHPS with Section 13204 of the Inflation Reduction Act (IRA), IRC sec. 45V production tax credit for “qualified clean hydrogen.”

Within the last year, the U.S. Congress has taken two significant actions to accelerate development of clean hydrogen to support the clean energy transition. First, in November 2021, the Bipartisan Infrastructure Law was signed into law, directing \$9.5 billion dollars to DOE to support clean hydrogen development. Included in the BIL is the requirement that DOE develop a clean hydrogen standard, which DOE published a proposal for on September 22, 2022, and which is the subject of these comments. The second significant action was the enactment of the Inflation Reduction Act, which among other things, created a Clean Hydrogen Production Credit.

Together, these actions have the potential to accelerate the deployment of clean hydrogen to support the clean energy transition. To fully realize the potential of these programs, it is critical that synergies exist across the programs that create alignment and harmonization. The calculation of the lifecycle greenhouse gas emission rate is key to this synergy. Otherwise, the same hydrogen may have different life cycle emissions under each program and may be considered “clean” under one program but not the other. This type of disparate treatment and uncertainty would have a significant chilling effect on investment, financing, and development of clean hydrogen production and the entire hydrogen value chain.

DOE recognizes the importance of this synergy and has proposed an initial standard under the BIL that “aligns with Section 13204 of the Inflation Reduction Act.”<sup>7</sup> FCHEA appreciates and supports DOE creating a standard that aligns with both programs and encourages DOE to ensure that this alignment is maintained in subsequent versions of a standard.

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<sup>7</sup> 87 Fed. Reg. 58,776 (Sep. 28, 2022), pp. 2.

### III. The lifecycle boundary of CHPS is appropriately limited to “well-to-gate,” *i.e.*, to include upstream emissions associated with hydrogen production through the point of hydrogen production, as well as downstream emissions associated with the transport and sequestration of CO<sub>2</sub>.

The Draft Guidance suggests a proposal to implement the provisions of Section 43015 of the BIL by adopting a CHPS that “supports diverse feedstocks and allows for consideration of technological and economic feasibility of achieving overall emissions reductions by establishing a lifecycle greenhouse gas emissions target for clean hydrogen production.”<sup>8</sup> FCHEA supports DOE’s proposal to limit the lifecycle boundary as a “well-to-gate” emissions analysis. As DOE has proposed, a “well-to-gate” emissions boundary analysis should include upstream emissions associated with hydrogen production through the point of hydrogen production, as well as downstream emissions associated with the transport and sequestration of CO<sub>2</sub>. In order to provide certainty to stakeholders as they consider the requirements of the Infrastructure Investment and Jobs Act of 2021, in any final standard DOE should maintain a “well-to-gate” emissions analysis that provides appropriate flexibility to this diverse group in order to achieve the lifecycle targets within this boundary.

Establishing a “well-to-gate” emissions boundary analysis conforms with existing DOE work performed at the National Laboratories, the definition of “lifecycle greenhouse gas emissions” in Section 13204 of the Inflation Reduction Act, and international best practices. While flexibility within this framework is critical, DOE should provide further clarity that any frameworks or protocols used to inform the lifecycle boundary would be limited to the boundary described above and would not include downstream emissions associated with the distribution, storage, or consumption of hydrogen. FCHEA agrees with DOE’s description of the system boundary described in footnote 11.<sup>9</sup> FCHEA believes that rather than providing this critical guidance in a footnote, DOE should clearly assert its position as part of the main text of the guidance itself. Furthermore, DOE should provide stakeholders with a clear list of hydrogen value chain elements hydrogen value chain elements not included within the well-to-gate boundary for the sake of transparency and clarity. DOE should also be clear that the lifecycle target excludes purity hydrogen pipelines, storage, and distribution methods downstream of the point of hydrogen production.

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<sup>8</sup> 87 Fed. Reg. 58,776 (Sep. 28, 2022), pp. 2.

<sup>9</sup> 87 Fed. Reg. 58,776 (Sep. 28, 2022), pp. 5.

And finally with respect to footnote 11, FCHEA notes that the first sentence could be misinterpreted to suggest that any hydrogen transportation, storage and/or distribution occurring downstream of the hydrogen point of production but upstream of the hydrogen's end-use point should be included in the lifecycle analysis; FCHEA therefore suggests revising the first sentence of footnote 11 as follows:

*In the CHPS, the lifecycle target corresponds to a system boundary that terminates (a) with respect to hydrogen, at the point of hydrogen production and does not include other post-hydrogen production, and (b) with respect to any CO<sub>2</sub> emissions captured at the point of production or upstream, at the point at which the CO<sub>2</sub> is sequestered.*

In Figure 1 of the draft guidance document, DOE depicts the proposed emissions sources for the lifecycle target. To complement the revision to footnote 11, FCHEA supports augmenting Figure 1 of the draft guidance document by including a clear list hydrogen value chain elements and related emission sources of emissions sources within the boundary depicted that would provide stakeholders with maximum flexibility with regard to diverse emission sources and production processes. Moreover, given the diverse methods of hydrogen production, DOE should provide additional examples of lifecycle system boundaries to better represent the current state of the industry. For example, for production facilities that use produced feedstocks, such as bio-propane, DOE should be explicit in its guidance that for the purpose of a lifecycle emissions assessment these feedstocks will be treated similarly to extracted feedstocks (such as fossil natural gas).

In establishing the upstream boundary, FCHEA notes that there are a variety of existing pathways and feedstocks for producing hydrogen production and new pathways and feedstocks are continuously being explored. FCHEA believes that the CHPS should allow hydrogen producers to demonstrate the upstream lifecycle boundary appropriate for their pathway or feedstock. Doing so will sustain technological neutrality with regard to production pathways and feedstocks. For example, where hydrogen is produced from a waste gas, the CHPS should recognize that the collection of the waste gas represents the extraction of the feedstock. The upstream boundary should not extend beyond the collection of waste gas to include the extraction and delivery of the original feedstock. These activities occur irrespective of hydrogen production. Adopting this approach in the CHPS will encourage investment, grow the hydrogen market, and reduce greenhouse gas emissions – fulfilling DOE's mission of establishing a robust clean hydrogen production standard.

Congress agrees that the lifecycle analysis of hydrogen production should include upstream emissions through the point of production. Limiting factors in section 13204 of the Inflation Reduction Act make it clear that "lifecycle greenhouse gas emissions shall only include emissions through the point of production (well-to-gate), as determined under the most recent Greenhouse gases, Regulated Emissions, and Energy use in

Transportation model (commonly referred to as the ‘GREET model’).”<sup>10</sup> As noted above, aligning DOE’s CHPS with the lifecycle greenhouse gas emissions definition in the Inflation Reduction Act will provide greater clarity and certainty to stakeholders as they navigate the parallel processes and allow for these programs to encourage the greatest amount of investment.

The GREET “fuel-cycle” model is the best representation of “well-to-gate” emissions analysis for hydrogen that is familiar and trusted by stakeholders. In setting the lifecycle emissions boundary for CHPS, it would not be appropriate for DOE to utilize the “vehicle cycle” model, which incorporates the lifecycle emissions of automobiles, from raw materials mining to vehicle disposal. (Given the manner that hydrogen is produced, the “vehicle cycle” model would not provide the most accurate understanding of the lifecycle emissions for hydrogen.) For the purposes of establishing the CHPS, DOE should provide further clarity to stakeholders on the definition of “well-to-gate” system boundary and that use of the GREET “fuel cycle” model is the most appropriate for analyzing lifecycle emissions.

As DOE asserts in the draft guidance, various international best practices have adopted a “well-to-gate” lifecycle emissions boundary. According to the International Partnership for Hydrogen in the Economy’s (IPHE) Hydrogen Production Analysis Task Force (H<sub>2</sub>PA TF), current guidance covers a “well-to-gate” boundary.<sup>11</sup> Within this analysis, IPHE refers to emissions within this boundary as scope 1, scope 2, and partial scope 3 emissions.<sup>12</sup> DOE also asserts that a European entity known as CertifHy follows similar “well-to-gate” and “well-to-wheel” boundary analyses.<sup>13</sup> Further information regarding the methodologies for lifecycle emissions with regard to CertifHy should be provided to stakeholders in order to better understand key information such as the scope of boundary analysis, emissions sources, etc.

While on their face these international best practices appear to align with the DOE suggested “well-to-gate” boundary put forward in the draft guidance, further clarity should be provided with regard to what extent partial scope 3 emissions and “well-to-wheel” boundary methodologies factor into the boundaries established in the CHPS. For example, the IPHE working paper defines “Partial Scope 3 emissions” considered to include “associated impacts from the raw material acquisition phase, raw material transportation phase, hydrogen production and manufacture.” As stated, such a definition could include emissions associated with production and manufacture of solar panels, wind turbines and natural gas compressors, i.e., emissions outside the scope of Figure 1. Whereas it may be appropriate to consider downstream scope 3 emissions only

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<sup>10</sup> Inflation Reduction Act Section 45(V)(1)(B).

<sup>11</sup> International Partnership for Hydrogen in the Economy’s Hydrogen Production Analysis Task Force, “[Methodology for Determining the Greenhouse Gas Emissions Associated with the Production of Hydrogen](#),” Version 1 (October 2021).

<sup>12</sup> *Id.*

<sup>13</sup> <https://www.certifhy.eu/>

with regard to instances of transport and sequestration of CO<sub>2</sub>, the inclusion of the international best practices in the draft guidance creates confusion over the extent that downstream emissions are included in the proposed CHPS. FCHEA believes that DOE should speak definitively in the CHPS guidance document with regard to the extent of downstream scope 3 emissions and affirm that the downstream lifecycle emissions boundary extends only to this extent in the above referenced scenario. FCHEA's members are increasingly spending significant development capital in pursuit of projects that would seek to export clean hydrogen produced in the USA to European and East Asian nations in the form of methanol or ammonia. FCHEA applauds DOE's efforts to integrate with global hydrogen markets to ultimately enable a cross-border standardized, recognized and easily-administered certification process, and believes the best way to enable such an international certification process to flourish is by providing exceptionally clear guidance complete with a multitude of examples based on actual project designs rather than by referencing "well-to-gate" or "well-to-wheel" and hoping that nothing gets lost in the shorthand or in translation.

To the extent that DOE is considering including Scope 3 emissions, DOE should appropriately limit the inclusion of scope 3 emissions associated to upstream activities of hydrogen production and clearly delineate that the Scope 3 emissions boundary is limited to what is calculated in the GREET model.

#### IV. The CHPS Should Allow the Use of Market-Based Mechanisms in Determining Lifecycle Emissions

DOE is seeking feedback on whether "renewable energy credits, power purchase agreements, or other market structures be allowable in characterizing the intensity of electricity emissions for hydrogen production."<sup>14</sup> As explained below, allowing these market-based mechanisms to align low- or zero-carbon energy sources with hydrogen production infrastructure is critical to the efficient and accelerated development of hydrogen production infrastructure—goals of both the Biden Administration and Congress. Moreover, it is Congress' intent that DOE allow for such market-based mechanisms.

FCHEA encourages DOE to allow for the use of a wide variety of these market-based mechanisms, including, but not limited to, renewable energy credits (RECs), power purchase agreements (PPAs), book-

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<sup>14</sup> 87 Fed. Reg. 58,776 (Sep. 28, 2022), pp. 8.



and-claim, the ability to treat energy commodities on an accounting basis, renewable thermal credits, renewable identification numbers, certified natural gas certificates, and biogas credits. RECs and similar certificates (Zero Emission Credits for nuclear and hydrogen etc.) enable tracking of zero-carbon power generation and prevents double counting of carbon reduction. For the purposes of these comments, FCHEA generally uses the term market-based mechanisms to refer to these approaches.

As a threshold matter, FCHEA supports the applicability of these market-based mechanisms to demonstrate the emissions for all types of feedstocks and energy supplies that may be used for hydrogen production—electricity, natural gas, biogas, renewable natural gas, certified low-methane intensity natural gas, etc. In its request for comment, DOE describes these market-based mechanisms as being used to characterize the intensity of “electricity emissions.” However, these market-based mechanisms can be used for all types of energy supplies, not just electricity. For instance, in the GREET 2022 technical report on Hydrogen Life Cycle Analysis, Argonne National Laboratories “[n]ote[s] that, in the US, upgraded LFG [landfill gas] is often virtually traded in lieu of NG [natural gas] use.”<sup>15</sup> Limiting the use of these market-based mechanisms to electricity would inappropriately favor one production pathway over another and would stifle investment in a broad range of production pathways. It would be inconsistent with the BIL, which requires DOE to develop a CHPS that supports clean hydrogen production from a variety of sources. There is no justification for DOE to limit the use of the market-based mechanisms to hydrogen production pathways that use electricity.

If DOE were not to enable these mechanisms, the potential for negative consequences may arise. In particular, hydrogen production would either need to be collocated, perhaps even “behind the meter” of feedstock producers. Alternatively, an entirely independent supply of low-cost feedstocks would be needed, precluding any shared common carriers (natural gas pipelines, electricity grids, etc). In either case, this is extremely costly, requires non-deal operation (due to limited availability of feedstocks at any given moment) and will significantly and unnecessarily add to the cost and GHG footprint of these systems due to redundant investments and collection costs. This would severely limit the effectiveness of the program, reducing potential investments by orders of magnitude. Further, it is important to ensure that all types of hydrogen production have the ability to use market-based instruments to meet the CHPS. This includes the use of high quality certified low-carbon natural gas certificates for hydrogen producers that use natural gas as a feedstock.

Although DOE is developing the CHPS as directed by the BIL, as DOE notes, its proposed CHPS “uses the same lifecycle analysis system boundary as the IRA” and “create[es] alignment between the two statutory provisions.” The only way for there to be alignment between the two statutory provisions is if the

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<sup>15</sup> Amgad Elogwainy et al., “Hydrogen Life-Cycle Analysis in Support of Clean Hydrogen Production” October 2022. <https://greet.es.anl.gov/files/hydrogenreport2022>

inputs to the lifecycle analysis also are the same. And for the Clean Hydrogen Tax Credit, Congress has spoken directly on this matter.

During the Senate floor debate on the Inflation Reduction Act, Senator Ron Wyden, Chairman of the Senate Finance Committee, and Senator Tom Carper, Chairman of the Senate Environment and Public Works Committee, conducted a colloquy on this exact point. The relevant exchange is as follows:

Mr. Carper: Section 13204 of title I of the Inflation Reduction Act of 2022 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 Greenhouse gases, Regulated Emissions, and Energy use in Technologies—GREET—model. It is also my understanding of the intent of section 13204, is that in determining “lifecycle greenhouse gas emissions” for this section, Inflation Reduction Act of 2022, renewable thermal credits, renewable identification numbers, or biogas credits. Is that the chairman’s understanding as well?

Mr. Wyden: Yes<sup>16</sup>

From this exchange it is clear that it is Congress’ intention that DOE ensure that these types of market-based mechanisms be allowed to support implementation of the Clean Hydrogen Tax Credit. The only way for there to be alignment between the two statutory programs is for DOE to allow for these market-based mechanisms to be used in the lifecycle analysis for both programs.

Allowing for market-based mechanisms is aligned with the Biden Administration’s clean energy goals and the goals of both the IRA and the BIL—the largest ever federal investments in clean energy. IRA provides tax credits for clean energy technologies based on their emissions reductions through a “tech neutral” framework.<sup>17</sup> A requirement for co-location of renewables next to hydrogen production facilities would contradict this framework, as it would provide a comparative advantage in qualifying for credits to facilities sited near wind, solar, or hydropower, instead of rewarding facilities for emissions reductions.

In June 2021, DOE launched its first Energy Earthshot—the Hydrogen Shot—which seeks to reduce

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<sup>16</sup> Congress.gov. “H.R. 5376 – 117th Congress (2021-2022): Inflation Reduction Act of 2022” August 6, 2022. <https://www.congress.gov/congressional-record/volume-168/issue-133/senate-section/article/S4165-3?q=%7B%22search%22%3A%5B%22%5C%22HONORING+THE+DEDICATION+OF+THE+BALL+FAMILY%5C%22%22%2C%22%5C%22HONORING%22%2C%22THE%22%2C%22DEDICATION%22%2C%22OF%22%2C%22THE%22%2C%22BALL%22%2C%22FAMILY%5C%22%22%5D%7D&s=3&r=2>

<sup>17</sup> Inflation Reduction Act Section 13204.

the cost of clean hydrogen by 80% to \$1 per 1 kilogram in 1 decade (“1 1 1”).<sup>18</sup> Accelerating the clean hydrogen economy is driven by a multitude of factors working in tandem, including, but not limited to, increased investment and build out of hydrogen production, increased demand by end users of hydrogen, and a declining trend in costs associated with maturing technology, scale, and other factors. To align with the DOE’s Hydrogen Shot goals, DOE programs must encourage these factors across the board. Allowing for the use of market-based mechanisms to capture the reduced emissions associated with low carbon intensity or zero-emission energy sources aligns with these goals by both reducing costs and encouraging clean hydrogen production. It allows investment in hydrogen production the flexibility to contract for cost-effective lower carbon intensive or zero-emission energy sources, thereby reducing the cost of clean hydrogen and accelerating its deployment.

Allowing these market-based mechanisms also supports President Biden’s broader climate goals of reducing emissions economy-wide to net-zero by 2050.<sup>19</sup> By allowing hydrogen production to capture the reduced emissions associated with low- or zero-emission energy sources within the hydrogen production lifecycle, DOE would further the President’s goal by creating and expanding demand for low- and zero-emission energy sources and thereby accelerating the deployment of these resources in furtherance of the President’s goal: “The more consumers who buy RECs, the more renewable electricity the market will create to meet that aggregate demand.”<sup>20</sup>

In enacting the IRA, Congress allocated \$270 billion of the total \$369 billion investment in clean energy to be delivered through tax incentives administered by the Treasury.<sup>21</sup> Senator Joe Manchin (D-WV), one of the chief architects of the Inflation Reduction Act, stated when he released the bill that “This legislation ensures that the market will take the lead, rather than aspirational political agendas or unrealistic goals, in the energy transition that has been ongoing in our country.”<sup>22</sup> It is clear that Congress desired to push the nation towards a clean energy economy through primarily market-oriented solutions, so it would run counter to congressional intent to prevent industries from lowering their emissions portfolio by requiring low carbon intensity or zero-emission energy sources be co-located with hydrogen production.

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<sup>18</sup> <https://www.energy.gov/eere/fuelcells/hydrogen-shot>

<sup>19</sup> The White House, “FACT SHEET: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies,” April 22, 2021, <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies>

<sup>20</sup> Center for Resource Solutions, “How Renewable Energy Certificates Make a Difference,” March 7, 2016, <https://resource-solutions.org/wp-content/uploads/2016/03/How-RECs-Make-a-Difference.pdf>.

<sup>21</sup> Department of the Treasury, “Briefing on Inflation Reduction Act Climate and Clean Energy Tax Incentive Implementation Process,” October 6, 2022.

<sup>22</sup> Office of Senator Joe Manchin, “MANCHIN SUPPORTS INFLATION REDUCTION ACT OF 2022,” July 27, 2022, <https://www.manchin.senate.gov/newsroom/press-releases/manchin-supports-inflation-reduction-act-of-2022>.

Preventing the use of market-based mechanisms of low carbon intensity or zero-emission energy sources would be contrary to the goals of the Administration and Congress, and slow broader progress on both job creation and decarbonization. It is inefficient and costly to require that low carbon intensity or zero-emission energy sources be co-located with hydrogen production for the reduced emissions to be considered in the lifecycle analysis. The location of hydrogen production often is driven by hydrogen demand as well as other siting, permitting, and operating considerations. An appropriate location for hydrogen production is not always aligned with the availability of low carbon intensity or zero-emission energy sources or the most cost- or resource-efficient location of such low-carbon intensity or zero-emission energy sources. Allowing the use of market-based mechanisms that allow hydrogen producers to contract for the low carbon intensity or zero-emission environmental benefits overcomes these logistical constraints and inefficiencies. Limiting the use of market-based mechanisms would stifle the growth of the nascent hydrogen economy, particularly in geographic areas that have insufficient access to clean energy sources and would limit federal incentives for hydrogen production to parts of the country with an abundance of clean energy.

The use of these market-based mechanisms is well-established. According to a 2015 report from the Center for Resource Solutions, 36 states “recognize that RECs can be used to track and transact renewable electricity on the grid” and 35 states “recognize the supremacy of RECs to demonstrate compliance of regulated entities with state laws requiring provision of renewable electricity to grid customers, such as Renewable Portfolio Standards (RPSs), or participation in voluntary state programs for provision of renewable electricity to grid customers.”<sup>23</sup> Further, FERC “has also recognized that ‘environmental attributes’ can be traded separately and are not necessarily bound to or conveyed with the ‘energy or capacity.’”<sup>24</sup> Standards for certifying low-carbon intensity natural gas continue to develop and evolve. DOE should include the use of certified lower carbon intensity natural gas certificates as a viable pathway for hydrogen producers using natural gas a feedstock to meet the carbon intensity requirements of the CHPS. Without that option, such producers will be at a competitive disadvantage compared to other hydrogen producers, clearly violating the intent of the BIF and the CHPS.

Market-based mechanisms for validating clean energy credits would be most effective if calculated on an annual basis without geographic limitations or requirements to match time of generation with time of use.<sup>25</sup> This streamlined system would make it easier for both industry and government to ensure compliance

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<sup>23</sup> Center for Resource Solutions, “The Legal Basis for Renewable Energy Certificates,” June 17, 2015, <http://resourcesolutions.org/wp-content/uploads/2015/07/The-Legal-Basis-for-RECs.pdf>

<sup>24</sup> Center for Resource Solutions, “The Legal Basis for Renewable Energy Certificates,” June 17, 2015, <http://resourcesolutions.org/wp-content/uploads/2015/07/The-Legal-Basis-for-RECs.pdf>

<sup>25</sup> FCHEA recognizes that as technologies and markets develop these requirements might be appropriate. However, at this time, when technologies are in their early stages of growth, flexibility is needed. FCHEA notes that taking a financial investment decision on a significant capital project requires predictable revenues over the useful life of the asset, or at least over the term of the financing. Therefore, to the extent DOE decides to impose any conditions – such

with the proposed standard by requiring one determination of compliance, rather than requiring near-continuous monitoring of activity across the industry. This annual true-up would also ease the administrative burden on hydrogen producers and ensure their investments are directed towards industrial operations rather than hiring staff for the sole mission of ensuring real-time compliance. Additionally, placing geographic requirements on these market-based mechanisms would impede the growth of the clean hydrogen industry in areas that do not have readily abundant clean energy supplies. If a hydrogen production facility has purchased RECs, lower carbon intensive natural gas, or participated in a power purchase agreement to facilitate the expansion of clean energy, it should be rewarded even if that clean energy development is in another part of the country, as it is still accomplishing the core mission of the legislation.

## **V. It would be inappropriate for DOE to consider any indirect climate warming impact in the CHPS.**

DOE notes that atmospheric modeling simulations have estimated hydrogen’s indirect climate warming impact.<sup>26</sup> To the extent that DOE is considering incorporating this impact to its initial CHPS, FCHEA suggests that it would be inappropriate to do so for several reasons.

The CHPS is intended to measure, among other things, the carbon intensity of hydrogen production pathways. Notably, the release of hydrogen into the atmosphere would occur downstream from the point of hydrogen production and therefore falls outside the lifecycle boundary that DOE has proposed. Moreover, any indirect climate warming associated with released hydrogen would be the same regardless of the production pathway and the carbon intensity of the hydrogen. As such, there is no reason to include this type of calculation within the standard because it would be the same across the board.

At this point, the science relating the indirect impact hydrogen could have on climate warming is preliminary and any quantification would be accompanied with significant uncertainty. This fact is confirmed by DOE’s request for comment on the topic which recognizes that estimating methods are still in development. For these reasons, as DOE continues to consider this impact, DOE should not incorporate it into the CHPS.

## **VI. The CHPS should account for regional differentiation in natural gas production.**

DOE is seeking comment on whether to incorporate estimates of regional fugitive emission rates from

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as a requirement that renewable energy generation be located within the same Regional Transmission Organization, or that time of generation and time of use be matched on a narrower interval than annually – FCHEA would suggest to DOE that grandfathering should be clearly addressed. If left unaddressed, capital projects will not be built for lack of certainty regarding revenues after the future imposition of such requirements.

<sup>26</sup> 87 Fed. Reg. 58,776 (Sep. 28, 2022), pp. 7.

natural gas recovery and delivery. FCHEA notes that there is considerable regional differentiation in the emissions profiles of natural gas production across the U.S. based on a number of factors, including different technologies in use. Wherever possible, the CHPS should account for this regional differentiation where a developer can confirm the source of its natural gas.

## VII. The CHPS should allow for flexibility in greenhouse gas allocation for hydrogen and hydrogen co-products.

DOE is seeking comment on how greenhouse gas emissions should be allocated to co-products from the hydrogen production process, noting systems such as “system expansion, energy-based approach, [and] mass-based approach.”<sup>27</sup> DOE should develop a process whereby hydrogen producers can petition the agency, describing and justifying use of an approach that supports their unique process. As an example, steam is an important co-product in many hydrogen production facilities, and the use of steam often displaces carbon dioxide emissions that would have otherwise occurred from, for example, operating a natural gas fired boiler. In this case, a displacement allocation method would be most appropriate. Mass-based allocation is another common method of greenhouse gas allocation among co-products that should be included. FCHEA suggests that DOE provide additional clarity with regard to the appropriate method of allocation for both coproducts and byproducts within the lifecycle assessment.

## VIII. The CHPS should be implemented in a way that provides flexibility to and certainty to hydrogen production investments.

In order to provide further clarity and certainty to hydrogen production facilities, DOE should offer additional guidance regarding the finality of the lifecycle analysis performed by a facility and which iteration of the GREET model was used in its calculation. Because the GREET model adjusts emissions from various items, sometimes on a yearly basis, stakeholders often utilize internal benchmarks to meet an updated standard and enter into contractual agreements for feedstocks based on that benchmarking. These calculations are then used to determine qualifications for the production tax credit. Based on this standard business practice, once a hydrogen facility determines its levels of emissions, the lifecycle assessment and the GREET model used for that facility should be “locked-in” for the future of that facility. Any future iterations of the GREET model developed after that period should only apply to projects that commence after the effective date for the updated model. DOE should provide additional guidance with regards to the ability to “lock in” the lifecycle assessment using a GREET model at the time of the design finalization and hold that position for the duration

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<sup>27</sup> 87 Fed. Reg. 58,776 (Sep. 28, 2022), pp. 8.

of the 10-year period of the production tax credit. This will bring certainty to hydrogen plant developers and financiers and provide the needed impetus to establish clean hydrogen production in the United States.

Furthermore, the CHPS should allow for (but not require) individualized use of emissions estimates. There are many different methods to produce hydrogen and all of them will have different emissions based on the detailed configuration of the plant. For hydrogen production site emissions and CO<sub>2</sub> sequestration, individualized emission estimates are preferable. Adopting this methodology will encourage private investment and innovation to continuously reduce the GHG emissions of hydrogen production pathways.

Additionally, as emerging technologies (radiolysis, photolysis, pyrolysis, catalysis, redox reactions, geologic hydrogen, biochemical reactions, etc.) continually develop, GREET should provide the opportunity to add or create new pathways supporting those technologies. If not, despite the many benefits of GREET, the tool will inhibit the development of those new technologies.

## IX. Conclusion

FCHEA appreciates the opportunity to provide this feedback to DOE and continue our history of supporting the hydrogen industry. Please feel free to contact FCHEA CEO Frank Wolak at [FWolak@FCHEA.org](mailto:FWolak@FCHEA.org) with any comments or questions you may have regarding this submission or any other hydrogen related issue.

Sincerely,



Frank Wolak  
President & CEO  
Fuel Cell and Hydrogen Energy Association