February 26, 2024

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Internal Revenue Service
CC:PA:LPD:PR (REG-117631-23)
Room 5203
P.O. Box 7604, Ben Franklin Station,
Washington, DC 20044

Re: REG-117631-23: Section 45V Credit for Production of Clean Hydrogen, Section 48(a)(15) Election to Treat Hydrogen Production Facilities as Energy Property

Dear Ladies and Gentlemen:

The Fuel Cell and Hydrogen Energy Association ("FCHEA") welcomes the opportunity to submit the following comments in response to the proposed regulations (the "Proposed Regulations") published by the Internal Revenue Service ("IRS") and the U.S. Treasury Department ("Treasury") regarding Internal Revenue Code ("IRC") section 45V, clean hydrogen production credit ("45V Credit"), as enacted under the Inflation Reduction Act ("IRA"), Public Law 117-169, 136 Stat. 1936, 1938, 1939 (August 16, 2022).

Background

FCHEA is the national industry association representing over one hundred leading companies and organizations advancing innovative, clean, safe, and reliable hydrogen energy technologies and solutions. FCHEA's members represent the entire global supply chain of the fuel cell and hydrogen industry including fuel cell and electrolyzer stack and system manufacturers, component suppliers, vehicle manufacturers, aviation companies, hydrogen producers, transporters, fuel distributors, utilities, end-users, salt cavern storage developers, 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.

The Biden Administration has recognized the crucial role hydrogen can play in meeting our nation's decarbonization and economic goals. The importance of such goals has been demonstrated by the inclusion of $9.5 billion in clean hydrogen initiatives enacted under the Infrastructure Investment and Jobs Act ("Bipartisan Infrastructure Law"), Public Law 117-58 (November 1, 2021); the numerous hydrogen related incentives in the IRA; the findings of the *U.S. National Clean Hydrogen Strategy and Roadmap*[1] ("Clean Hydrogen Roadmap"); and the formation of the Hydrogen Shot program, which set a goal of producing clean hydrogen at $1 per kilogram by 2030.

As every game-changing technology (e.g. solar, storage) to date has shown, the ability to scale manufacturing in the United States depends on the market having enough certainty to place purchase

[1] See Energy.gov; U.S. National Clean Hydrogen Strategy Roadmap; https://www.hydrogen.energy.gov/docs/hydrogenprogramlibraries/pdfs/us-national-clean-hydrogen-strategy-roadmap.pdf (accessed January 8, 2024).

orders. If Europe and other countries implement more producer-friendly hydrogen policy regimes, the manufacturing base that would otherwise be located here in the United States will instead move to other markets with more favorable clean hydrogen policies. The Proposed Regulations are not compatible with the policy objectives established by the Biden Administration, Congress, and the U.S. Department of Energy to drive 2030 deep decarbonization, $1 per kilogram of clean hydrogen production, 10 million metric tons per year of clean hydrogen production, 20-25 gigawatt per year of domestic electrolyzer manufacturing capacity, and creation of a large number of good-paying jobs with a multi-billion dollar public investment to seed significantly more private investment in the clean hydrogen industry.

When the 45V Credit was enacted, its impact was felt immediately in terms of positioning the United States as the global leader in clean hydrogen. Since then, and especially following the release of the Proposed Regulations, that is being severely called into question. The IRS and the Treasury need to follow the Congressional intent of this credit to grow a domestic clean hydrogen economy in order to drive broad decarbonization and solidify American technology leadership. Accordingly, FCHEA submits the following comments on the Proposed Regulations:

General Code Section 45V Comments

I. Confirm that there is no monetary threshold required for any capital expenditure paid or incurred with respect to modifications made on an existing facility (i.e., placed in service before January 1, 2023) to produce qualified clean hydrogen, assuming all other requirements are met, for such facility to qualify under Code section 45V(d)(4) and under Prop. Treas. Reg. §§ 1.45V-6(a)(1) and (2).

II. Clarify that "modification of existing facilities" (e.g., acquiring new feedstock and the associated components to process such feedstock or constructing a new facility to produce clean feedstock) means any modification so long as amounts paid or incurred with respect to such modification are properly chargeable to the capital account of the taxpayer.

III. Confirm that a taxpayer with independent, single production lines may be eligible for the 45V Credit and Code section 45Q, credit for carbon oxide sequestration, on the single production lines, respectively, even if such production lines are co-located at a facility.

IV. Clarify the circumstances or the verification process for determining when a taxpayer claim may violate the anti-abuse rule in Prop. Treas. Reg. § 1.45V-2(b).

GREET Model Comments

V. Clarify that taxpayers are permitted to enter the quantity (e.g., all or a portion thereof) of hydrogen produced for which well-to-gate emissions are to be evaluated and used in computing the 45V Credit.

VI. Revise the definition of the "most recent GREET model" for purposes of determining the "lifecycle greenhouse gas emissions" under Code section 45V(c)(1)(B) and Prop. Treas. Reg. §§ 1.45V-1(a)(8)(i) and (ii) to mean the most recent GREET model for the taxable year in which the final investment decision ("FID") is reached and the project commences, and permit the taxpayer to rely upon such model for the full credit period; or, if there is an updated GREET model that best computes the lifecycle GHG emissions rate based on the taxpayer's facts and circumstances, then the taxpayer may have the option to use an updated GREET model during the credit period.

VII. Expand the hydrogen production pathways in 45VH2-GREET 2023 (the "2023 GREET model") to include common technologies and feedstocks used to produce qualified clean hydrogen.

VIII. Revise the 2023 GREET model so that upstream emission rates may be input by the user as "foreground data" rather than including such upstream emission rates as fixed assumptions (i.e., background data).

IX. Allow for all-coproducts with reasonable allocation method alternatives (e.g., energy-based, mass-based, system expansion, economic allocation) to be applied to the GREET Model.

X. Permit a taxpayer to use the provisional emissions rate ("PER") process even if the taxpayer's technology and feedstock are in the "most recent GREET model" if the fixed assumptions do not represent the taxpayer's facts and circumstances and such taxpayer can verify the carbon intensity of bespoke inputs.

XI. For the forthcoming guidance on the PER process, consider including: (i) an established timeline for review and appeals process; (ii) clarify how the PER process accounts for co-products; (iii) permit taxpayers to apply for a PER that may apply to multiple single production lines for similar, co-located production lines; and (iv) confirm a taxpayer may apply for a PER upon completing a FEED study or similar indication of project maturity.

Energy Attribute Certificates and Related Comments

XII. Eliminate the associated requirements on the use of energy attribute certificates ("EACs") (i.e., (1) incrementality, (2) temporal matching, and (3) deliverability (hereinafter referred to as the "three pillars")).

XIII. If the three pillars are not removed, then implement a grandfather rule for certain projects.

XIV. If the three pillars are not removed, then implement a longer transitional period through 2032 for the temporal matching, incremental, and deliverability requirements.

XV. Incorporate a longer transition period for the incremental requirement and an exemption to the incremental requirement for EACs procured from nuclear and hydropower electricity generators. However, if a general exemption is not provided, then FCHEA recommends the government provide multiple options, as presented in the Proposed Regulations, for determining whether an EAC satisfies the incremental requirement.

XVI. Include a safe harbor for EACs purchased from electricity generators located in a jurisdiction with clean energy renewable portfolio, emissions reduction standards, or other similar renewable portfolio standards or policies.

XVII. Clarify that if a specific clean electricity generator(s) is directly connected to a qualified clean hydrogen production facility and the electricity from such generator is used for the production of qualified clean hydrogen, then an EAC is not required.

Renewable Natural Gas ("RNG") Comments

XVIII. Permit taxpayers to use attribute certificates for RNG, fugitive methane, and other similar feedstocks as opposed to applying the "three pillars" requirements as used for EACs procured from clean electricity generators.

XIX. Eliminate the "first productive use concept" for RNG as it unfairly penalizes the RNG industry and discourages the reduction of carbon emissions. If the "first productive use concept" is not eliminated, then FCHEA should implement (1) a grandfather rule and (2) transitional period through 2032.

XX. If the IRS and Treasury determine that an hourly temporal matching requirement is necessary for RNG, then the IRS and Treasury should consider (1) a grandfather period and (2) verify

that the technology and market for such technology is mature for domestic scale-up before requiring compliance with such requirement.

XXI. Eliminate the applicability of the deliverability requirement to RNG as hydrogen production facilities are not typically co-located with RNG production or fugitive methane capture, and renewable fuel is transferred via commercial pipeline.

XXII. Incorporate a book and claim provision for RNG without geographic restrictions. Clarify that the appropriate region for book and claim should be defined as the North American interconnected pipeline grid.

XXIII. Modify the GREET model to be inclusive of a broader range of feedstocks used today for RNG and fugitive methane sources.

XXIV. Apply similar qualification requirements to low-emissions natural gas as implemented for RNG.

Please see below for a detailed summary of each comment.

General Code Section 45V Comments

I. Confirm that there is no monetary threshold required for any capital expenditure paid or incurred with respect to modifications made on an existing facility (i.e., placed in service before January 1, 2023) to produce qualified clean hydrogen, assuming all other requirements are met, for such facility to qualify under Code section 45V(d)(4) and under Prop. Treas. Reg. §§ 1.45V-6(a)(1) and (2).

Under Code section 45V(d)(4), in the case of any facility which: (A) was originally placed in service before January 1, 2023, and, prior to the modification described in subparagraph (B), did not produce qualified clean hydrogen, and (B) after the date such facility was originally placed in service, [such facility] (i) is modified to produce qualified clean hydrogen, and (ii) **amounts paid or incurred with respect to such modification are properly chargeable to the capital account of the taxpayer**, such facility shall be deemed to have been originally placed in service as of the date that the property required to complete the modification described in subparagraph (B) is placed in service (emphasis added).[2]

The Proposed Regulations further provide that an existing facility will not be deemed to have been originally placed in service as of the date the property required to complete the modification is placed in service **unless the modification is made for the purpose of enabling the facility to produce qualified clean hydrogen and the taxpayer pays or incurs an amount with respect to such modification that is properly chargeable to the taxpayer's capital account for the facility** (emphasis added).[3] A modification is made for the purpose of enabling the facility to produce qualified clean hydrogen if the facility could not produce hydrogen with a lifecycle GHG emissions rate that is less than or equal to 4 kilograms of carbon dioxide equivalent ("CO2e") per kilogram hydrogen but for the modification.[4] The Proposed Regulations included the following example of a modification of an existing facility.

[2] Code section 45V(d)(4) and Prop. Treas. Reg. § 1.45V-6(a)(1).
[3] Prop. Treas. Reg. § 1.45V–6(a)(2).
[4] *Id*.

> Facts: Facility X, a hydrogen production facility that was originally placed in service on January 1, 2018, could not produce qualified clean hydrogen as described in section 45V(c)(2). After January 1, 2023, Facility X was modified to produce qualified clean hydrogen, **and all amounts paid or incurred with respect to such modifications were properly chargeable to the taxpayer's capital account** for Facility X. The property required to complete the modification was placed in service on June 1, 2023 (emphasis added).[5]
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> Analysis: Under section 45V(d)(4) and paragraph (a) of this section, because Facility X was originally placed in service before January 1, 2023, **and before the modification could not produce qualified clean hydrogen**, it is deemed to be originally placed in service as of the date the property required to complete the modification is placed in service. Accordingly, for purposes of section 45V(a)(1) and (d)(4), Facility X is deemed to have been originally placed in service on June 1, 2023 (emphasis added).[6]

As demonstrated in the statute and Proposed Regulations, the qualification requirements of Code section 45V(d)(4) and Prop. Treas. Reg. § 1.45V-6(a)(1) are (1) the facility was originally placed in service before January 1, 2023; (2) the facility must be modified to produce "qualified clean hydrogen;" and (3) the amounts paid or incurred by the taxpayer with respect to the modification must be chargeable to the taxpayer's capital account. The statute, the preamble to the Proposed Regulations, and the Proposed Regulations are silent as to whether there is a certain monetary threshold required for any capital expenditure paid or incurred. To encourage taxpayers with nonqualifying hydrogen facilities to bring such facilities into compliance with Code section 45V, FCHEA kindly asks the IRS and the Treasury to clarify that any capital expenditures paid or incurred with respect to the modification, no matter the amount, is sufficient under Code section 45V(d)(4) so long as such amounts paid or incurred are with respect to modifications made for the purpose of enabling the facility to produce qualified clean hydrogen.

II. Clarify that "modification of existing facilities" (e.g., acquiring new feedstock and the associated components to process such feedstock or constructing a new facility to produce clean feedstock) means any modification so long as amounts paid or incurred with respect to such modification are properly chargeable to the capital account of the taxpayer.

As outlined above, a taxpayer may be eligible for the 45V Credit for qualified clean hydrogen produced at a modified hydrogen production facility for the full ten-year credit period beginning on the date the modifications are completed as long as (1) the facility was originally placed in service before January 1, 2023; (2) the facility is modified to produce "qualified clean hydrogen;" and (3) the amounts paid or incurred by the taxpayer with respect to the modification must be chargeable to the taxpayer's capital account for the facility.[7]

The Proposed Regulations clarified that "a modification is made for the purpose of enabling the facility to produce qualified clean hydrogen if the facility could not produce hydrogen with a lifecycle GHG emissions rate that is less than or equal to 4 kilograms of CO2e per kilogram of hydrogen but for the modification. For example**, "if a taxpayer solely pays or incurs capital expenses to modify existing components of a hydrogen production facility that are not necessary for the production of hydrogen with a lifecycle GHG emissions rate that is less than or equal to 4 kilograms of CO2e per kilogram of**

[5] Prop. Treas. Reg. § 1.45V–6(c)(1).
[6] *Id.*
[7] Code section 45V(d)(4) and Prop. Treas. Reg. § 1.45V-6(a)(1).

hydrogen, such modification does not entitle the facility to a new placed in service date (emphasis added)."[8] However, the preamble to the Proposed Regulations included: "Changing fuel inputs to the hydrogen production process, such as switching from conventional natural gas to renewable natural gas, would not qualify as a facility modification for purposes of Prop. Treas. Reg. § 1.45V–6(a)(2)."

As the preamble language was not included in the statutory language or incorporated in the Proposed Regulations, FCHEA respectfully requests that the IRS and the Treasury remove such example from the Preamble because it is inconsistent with the statutory language which provides that "any modification" made for the purpose of enabling the facility to produce qualified clean hydrogen should qualify as a facility modification. Accordingly, the Treasury and the IRS should clarify that the acquisition of new feedstocks necessary to produce qualified clean hydrogen at a previously nonconforming facility may qualify under Code section 45V(d)(4). In addition, FCHEA recommends that the final regulations clarify that placing in service a new biogas facility or similar direct-connection RNG production or fugitive methane facility dedicated to an existing hydrogen production facility would be an eligible modification.

III. Confirm that a taxpayer with independent, single production lines may be eligible for the 45V Credit and Code section 45Q, credit for carbon oxide sequestration, on the single production lines, respectively, even if such production lines are co-located at a facility.

Code section 45V(d)(2) provides that no 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 Code section 45Q for the taxable year or any taxable year.[9] A qualified clean hydrogen production facility means a facility (i) owned by the taxpayer, (ii) which produces qualified clean hydrogen, and (iii) the construction of which begins before January 1, 2033.[10] The Proposed Regulations clarify that the term "facility" means a single production line that is used to produce qualified clean hydrogen. A "single production line" would include all components of property that function interdependently to produce qualified clean hydrogen. Components of property are functionally interdependent if the placing in service of each component is dependent upon the placing in service of each of the other components to produce qualified clean hydrogen.[11] Components of property function interdependently to produce qualified clean hydrogen if the placing in service of each component is dependent upon the placing in service of each of the other components to produce qualified clean hydrogen.[12]

The term "facility" does not include: (i) equipment that is used to condition or transport hydrogen beyond the point of production; or (ii) notwithstanding paragraph (a)(7)(iii) of this section [regarding multipurpose components], electricity production equipment used to power the hydrogen production process, including any carbon capture equipment associated with the electricity production process.[13] Certain exceptions apply to multipurpose components, which mean components that have a purpose in addition to the production of qualified hydrogen may be part of a facility if such components function interdependently with other components to produce qualified clean hydrogen.[14]

[8] Prop. Treas. Reg. § 1.45V-6(a)(2).
[9] Code Section 45V(d)(2).
[10] Code Section 45V(c)(3).
[11] Prop. Treas. Reg. § 1.45V-1(a)(7)(i).
[12] *Id.*
[13] Prop. Treas. Reg. § 1.45V-1(a)(7)(ii).
[14] Prop. Treas. Reg. § 1.45V-1(a)(7)(iii).

The following example in the Proposed Regulations illustrates the definition of facility. "A hydrogen production facility is equipped with carbon capture equipment (as defined in § 1.45Q–2(c)), as distinguished from the carbon capture equipment described in paragraph (a)(7)(ii)(B) of this section. One purpose of this equipment is the capture of carbon oxides. The facility produces hydrogen through a process that results in a lifecycle GHG emissions rate falling within the range specified in section 45V(b)(2)(C). Without the carbon capture equipment, the facility could not produce hydrogen through a process that results in a lifecycle GHG emissions rate falling within the range specified in section 45V(b)(2)(C). **Because the carbon capture equipment is functionally interdependent with other components of property to produce qualified clean hydrogen** within the meaning of paragraph (a)(9)(i) of this section, **the carbon capture equipment is part of the facility** for purposes of section 45V(c)(3) and the regulations in this part under section 45V, along with all other components of property that function interdependently with the carbon capture equipment to produce qualified clean hydrogen.[15]

The Proposed Regulations clarify that a taxpayer is prohibited from claiming both a 45V Credit and Code section 45Q tax credit for the same "facility" (i.e., single production line). However, if a facility included separate production lines for the production of clean hydrogen and production of clean electricity (such as a natural gas plant with CCS), then it is possible for a taxpayer to be eligible for a Code section 45Q tax credit on the clean electricity generation production line and the 45V Credit for the clean hydrogen production at the same location.

Accordingly, FCHEA supports the Proposed Regulations in its designation that two independent single production lines may be eligible for the 45V Credit and Code section 45Q tax credit, respectively, if co-located in a complex, which is a distinct issue from stacking or double counting tax credits for the same single production line. For instance, a facility may need to produce decarbonized electrical power (claiming the Code section 45Q tax credit), and then use that power to run an ATR-based ammonia plant, which claims the 45V Credit. Alternatively, a single site could have a green hydrogen plant, as well as legacy blue hydrogen production with CCS claiming the Code 45Q Credit. This conclusion is aligned with previously submitted FCHEA comments. Therefore, FCHEA respectfully requests that the final regulations confirm that taxpayers with separate, independent production lines may be eligible for both the 45V Credit and Code section 45Q tax credit on a separate production line basis, even if the production lines are co-located in the same industrial complex and are interconnected via utility, power, or other systems.

IV. Clarify the circumstances or the verification process for determining when a taxpayer claim may violate the anti-abuse rule in Prop. Treas. Reg. § 1.45V-2(b).

The 45V Credit provides that the term qualified clean hydrogen means hydrogen that is produced through a process that results in a lifecycle GHG emissions rate of not greater than 4 kilograms of CO2e per kilogram of hydrogen.[16] Such term does not include any hydrogen unless the production and sale or use of such hydrogen is verified by an unrelated party in accordance with, and satisfying the requirements of, § 1.45V–5, and such hydrogen is produced— (A) In the United States (as defined in section 638(1) of the Code) or a United States territory, which, for purposes of section 45V and the regulations in this part under section 45V, has the meaning of the term possession provided in section 638(2) of the Code; (B) In the ordinary course of a trade or business of the taxpayer; and (C) for sale or use.[17]

[15] Prop. Treas. Reg. § 1.45V-1(a)(7)(iv).
[16] Code section 45V(c)(2)(A).
[17] Code section 45V(c)(2)(B) and Prop. Treas. Reg. § 1.45V-1(a)(9).

The Proposed Regulations clarify that the term for sale or use means for the primary purpose of making ready and available for sale or use. Storage of hydrogen following production does not disqualify such hydrogen from being considered produced for sale or use.[18] For purposes of Code section 45V(c)(2)(B)(ii) and the Prop. Treas. Reg § 1.45V–1(a)(13)), a person's verifiable use of the hydrogen can occur within or outside the United States. A verifiable use can be made by the taxpayer or a person other than the taxpayer.[19]

FCHEA kindly requests that the IRS and the Treasury confirm that in order for hydrogen to be "used" it does not need to become a physical part of the resulting product and can be used in the sense of functioning as a blocker or catalyst to produce a product that does not contain hydrogen.

Furthermore, the Proposed Regulations provide that a verifiable use does not include (i) use of hydrogen to generate electricity that is then directly or indirectly used in the production of more hydrogen; or (ii) venting or flaring of hydrogen.[20] The Proposed Regulations provide that such a use is part of an anti-abuse system applied to the 45V Credit. Specifically, the Proposed Regulatory state that, "a determination of whether the production and sale or use of qualified clean hydrogen is inconsistent with the purposes of section 45V and the regulations in this part under section 45V of the Code is based on all facts and circumstances."[21] Therefore, FCHEA asks that the IRS and the Treasury clarify such facts and circumstances that are considered to violate the anti-abuse provision and the process for determining when a taxpayer claim violates the anti-abuse provision.

V. Clarify that taxpayers are permitted to enter the quantity (e.g., all or a portion thereof) of hydrogen produced for which well-to-gate emissions are to be evaluated and used in computing the 45V Credit.

The Proposed Regulations provide that the term "emissions through the point of production (well-to-gate)" means the aggregate lifecycle GHG emissions related to hydrogen produced at a hydrogen production facility during the taxable year through the point of production.[22] It includes emissions associated with feedstock growth, gathering, extraction, processing, and delivery to a hydrogen production facility.[23] It also includes the emissions associated with the hydrogen production process, inclusive of the electricity used by the hydrogen production facility and any capture and sequestration of carbon dioxide generated by the hydrogen production facility.[24]

In summary, the Proposed Regulations would require all clean hydrogen produced at a qualified clean hydrogen production facility to be calculated and verified as part of an annual average within a taxable year, although the verification of the production and sale or use of such hydrogen may occur in a later taxable year. Such a rule that requires aggregation of all hydrogen produced for purposes of determining a lifecycle GHG emission rate during the taxable year is extremely challenging and introduces unnecessary risk to facility owners. This risk will lead to fewer projects reaching FID and higher hydrogen

[18] Prop. Treas. Reg. § 1.45V-1(a)(9)(i)(B).
[19] Prop. Treas. Reg. § 1.45V-5(d)(2).
[20] *Id.*
[21] Prop. Treas. Reg. § 1.45V-2(b)(1).
[22] Prop. Treas. Reg. § 1.45V-1(a)(8)(iii).
[23] *Id.*
[24] *Id.*

prices from those that are built. This is effectively an all-or-nothing approach to calculating annual carbon intensity scores for 45V credit and leaves little room for error to obtain any credit.

FCHEA is extremely concerned about the high level of risk and uncertainty for project developers and project owners created by the Proposed Regulations. In particular, the annual claiming of the 45V credit and the requirement that the lifecycle emissions rate be determined based upon "all hydrogen produced at a qualified clean hydrogen production facility during the taxable year." The inclusion of "aggregate" was a term introduced in the Proposed Regulations and not included in the statutory language.

Under Code section 45V(a), the 45V Credit for any taxable year is an amount equal to the product of the "kilograms of qualified clean hydrogen produced by the taxpayer during such taxable year at qualified clean hydrogen production facility".[25] The statute defined "qualified clean hydrogen" as hydrogen produced through a qualifying "process"—that is, "hydrogen which is produced through a process that results in a lifecycle greenhouse gas emissions rate of not greater than 4 kilograms of CO2e per kilogram of hydrogen."[26] The tiered formula for calculating the tax credit is based on "applicable percentage[s]" tied to "qualified clean hydrogen which is produced through a process that results in" specified levels of emissions rates.[27] Taken together, Code section 45V calls for: (1) identifying the kilograms of hydrogen produced through "a process" with a qualifying emissions rate (i.e., qualified clean hydrogen), and (2) multiplying that quantity by the "applicable amount" that reflects the emissions rate associated with the production of "such hydrogen." The resulting credit amount thus reflects kilograms of qualified clean hydrogen produced at the facility—not "all hydrogen" produced there. The statute recognizes this—defining a "qualified clean hydrogen facility," in relevant part, as simply one "which produces qualified clean hydrogen." Congress did not define it as one that produces only or exclusively qualified clean hydrogen. Congress understood that a "qualified clean hydrogen facility" might produce quantities of qualified clean hydrogen, as well as hydrogen that does not qualify for any tax-credit calculation ("non-qualified hydrogen"). Accordingly, Congress did not intend for the production of non-qualified hydrogen to diminish or preclude a taxpayer's ability to qualify for a 45V Credit.

The support of measuring a certain quantity of hydrogen for which emissions are to be evaluated rather than all the aggregate lifecycle GHG emissions related to hydrogen is supported in the Guidelines to Determine Well-to-Gate GHG Emissions of Hydrogen Production Pathways using 45VH2–GREET (the "GREET Manual"). The GREET manual provides: "Certain parameters within 45VH2-GREET are fixed assumptions (i.e., "background data") and may not be changed by the user…. All other parameters are "foreground data" and must be input by the user.[28] Examples of these parameters include feedstock type and quantity, the type and quantity of energy used for hydrogen production, the properties of feedstock and energy used, the type and quantity of valorized co-products, type and quantity of impurities, **and the quantity of hydrogen produced for which emissions are being evaluated** (emphasis added)."[29] For example, if characterizing well-to-gate GHG emissions of all hydrogen production over the course of a given year, users must input all energy and feedstock consumed in the respective year by the hydrogen production facility being evaluated and all hydrogen produced in that year by the respective facility. On

[25] Code section 45V(a)(1).
[26] Code section 45V(c)(1).
[27] Code section 45V(b)(2).
[28] Guidelines to Determine Well-to-Gate Greenhouse Gas (GHG) Emissions of Hydrogen Production Pathways using 45VH2–GREET (December 2023). .https://www.energy.gov/sites/default/files/2023-12/greet-manual_2023-12-20.pdf.
[29] *Id.*

this basis, the GREET model will calculate the well-to-gate GHG emissions of all hydrogen produced by the facility in that year.[30]

If a facility produces hydrogen in a volume spread evenly across the year, but for half of the year produces hydrogen with the lowest carbon intensity ("CI") and for the remainder of the year produces hydrogen at a carbon intensity ("CI") that is non-qualifying (e.g., greater than 4 kilograms of CO2e per kilogram of hydrogen), then the average lifecycle GHG emissions rate for the aggregate production of hydrogen in the taxable year may cause the CI to drop to a point that no credit is available, whereas allowing a taxpayer to evaluate lifecycle GHG emissions with respect to a certain quantity of hydrogen would result in a 45V Credit for part of the taxable year.

This proposed all-or-nothing procedure in combination with the proposed three pillars approach (discussed in more detail below) introduces challenges in ensuring a qualified hydrogen production facility reaches the full $3 per kilogram applicable amount in each taxable year of the credit period. Despite requiring hourly matching for electricity use, the draft rules require hydrogen facilities to calculate an annualized carbon intensity for all hydrogen produced during year. Compounded with an hourly-matching requirement in 2028 and additionality provisions, projects will struggle to source appropriate power for times of off-peak and be forced to oversize production and curtail operations to only operate during certain hours. This will drive the cost of hydrogen up through increased CapEx and decreased capacity factors. In addition, the constant curtailments and having to turn facilities on and off is also incompatible with safety, energy efficiency, and operational best practices and is significantly detrimental to capital equipment.

If not adequately addressed, this could lead to distortions in the EACs and hydrogen market, undermining efforts towards sustainable energy production. For example, the current liquidity in qualifying EACs is unknown, and there is potential to see dramatic escalation in cost if demand from claimants of tax credits outstrips supply. Therefore, we suggest that the Treasury and IRS provide clear guidelines that ensure clean hydrogen producers are eligible for the PTC in proportion to the EACs they successfully secure, regardless of volume of hydrogen not covered by EACs in a given year.

FCHEA requests that the IRS and the Treasury allow taxpayers to claim the 45V Credit for any duration of clean hydrogen production – not just an annualized average. Particularly in light of the hourly matching requirements for EACs, clean hydrogen producers should be given the ability to bifurcate their clean hydrogen production into qualified and nonqualified quantities for purposes of claiming the 45V Credit. Particularly in light of considering the hourly matching requirements for EACs, clean hydrogen producers should be given the ability to bifurcate their clean hydrogen production into qualified and nonqualified quantities for purposes of claiming the 45V Credit. This position is supported in the Guidelines to Determine Well-to-Gate Greenhouse Gas Emissions of Hydrogen Production Pathways using 45VH2-GREET 2023, as the GREET manual does not require the input of all hydrogen produced annually at a hydrogen production facility as "foreground data" and specifies that taxpayers must input "the quantity of hydrogen produced for which emissions are being evaluated." Therefore, the final regulations should clarify that taxpayers are permitted to enter the quantity of hydrogen produced (e.g., all or a portion thereof) for which well-to-gate emissions are to be evaluated and used in computing the 45V Credit, and not "all hydrogen produced at a hydrogen production facility during the taxable year" as stipulated under Prop. Treas. Reg. Sec. 1.45V-4(a).

[30] *Id.*

GREET Model Comments

VI. Revise the definition of the "most recent GREET model" for purposes of determining the "lifecycle greenhouse gas emissions" under Code section 45V(c)(1)(B) and Prop. Treas. Reg. §§ 1.45V-1(a)(8)(i) and (ii) to mean the most recent GREET model for the taxable year in which the final investment decision ("FID") is reached and the project commences and permit the taxpayer to rely upon such model for the full credit period; or, if there is an updated GREET model that best computes the lifecycle GHG emissions rate based on the taxpayer's facts and circumstances, then the taxpayer may have the option to use an updated GREET model during the credit period.

The term "lifecycle greenhouse gas emissions" shall only include emissions through the point of production (well-to-gate), as determined under the most recent GREET model developed by Argonne National Laboratory, or a successor model (as determined by the Secretary).[31] The Proposed Regulations clarify that the term "most recent GREET model" means the latest version of 45VH2–GREET developed by Argonne National Laboratory that is publicly available on the first day of the taxpayer's taxable year in which the qualified clean hydrogen for which the taxpayer is claiming the 45V Credit was produced.[32]

FCHEA has concerns with the requirement that qualified clean hydrogen producers should rely on an annually updated GREET model. The potential for continuous changes to the GREET model's assumptions each year creates a level of uncertainty that increases project risk and thereby jeopardizes tax equity and project financing. While it is unclear whether changes in the GREET model from year-to-year would be material, the lack of clarity that this question raises creates potential investor risk that can create a barrier for project financing. Accordingly, FCHEA recommends that the GREET model used for purposes of determining the lifecycle GHG emissions for a taxable year should be the most updated model as of the taxable year in which the project reaches FID and allow for clean hydrogen producers to rely on such GREET model for the entire credit period; or alternatively, if there is an updated GREET model that best computes the lifecycle GHG emissions rate based on the taxpayer's facts and circumstances, then the taxpayer may have the option to use an updated GREET model during the credit period. This is consistent with how the California Low Carbon Fuel Standard ("LCFS") applies the GREET model and will provide companies with the clarity needed to forecast returns and make investment decisions.

In addition, with the passage of the 45V Credit and the following implementation regulations being issued, the GREET model is now being incorporated by reference into regulations. Therefore, the legal structures associated with rulemakings and pursuant to the Administrative Procedure Act should apply, including public notice and comment of any potential changes.

VII. Expand the hydrogen production pathways in 45VH2-GREET 2023 (the "2023 GREET model") to include common technologies and feedstocks used to produce qualified clean hydrogen.

The most recent GREET model includes eight hydrogen production pathways, including: (i) steam methane reforming ("SMR") of natural gas with potential carbon capture and sequestration ("CCS"), (ii) autothermal reforming ("ATR") of natural gas with potential CCS, (iii) SMR of landfill gas with potential CCS, (iv) ATR of landfill gas with potential CCS, (v) coal gasification with potential CCS, (vi) biomass gasification

[31] Code section 45V(c)(1)(B).
[32] Prop. Treas. Reg § 1.45V–1(a)(8)(ii).

with potential CCS, (vii) low-temperature water electrolysis using electricity, and (viii) high-temperature water electrolysis using electricity and/or heat from nuclear power plants.[33]

The 2023 GREET Model currently excludes several clean hydrogen production pathways that FCHEA members are pursuing, including but not limited to, methane pyrolysis, high-temperature water electrolysis from non-nuclear sources, tri-generation, geologic hydrogen, cryogenic fractionation in combination with autothermal reforming, and ethanol steam reforming, among others. Accordingly, FCHEA supports expanding the 2023 GREET model to include such pathways. At present, these pathways are left with increased uncertainty in requiring use of a provisional emissions rate ("PER"), which may not be approved, leading to significant barriers to obtaining project financing.

Furthermore, neither the current 2023 GREET model nor the Proposed Regulations allow for the use of renewable biomass feedstocks other than those derived from landfill gas. Similar to what California recognizes already in its LCFS, the IRS and the Treasury should recognize carbon reductions from dairy and swine gas, as well as fugitive methane sources currently in the 2023 GREET Model, as well as swine-based inputs. If the 2023 GREET model does not recognize dairy gas, this would unfairly exclude the dairy industry from being able to utilize fugitive methane and leave emissions reductions on the table. Therefore, FCHEA kindly asks that the final regulations expand the hydrogen production pathways in the 2023 GREET model to include common technologies and feedstocks used to produce qualified clean hydrogen.

VIII. Revise the 2023 GREET model so that upstream emission rates may be input by the user as "foreground data" rather than including such upstream emission rates as fixed assumptions (i.e., background data).

Certain parameters in the GREET model are fixed assumptions (or "background data"). Examples of background data include upstream methane loss rates, emissions associated with power generation from specific generator types, and emissions associated with regional electricity grids. According to the Preamble, the IRS views such background data as parameters for which bespoke inputs from hydrogen producers are unlikely to be independently verifiable with high fidelity, given the current status of verification mechanisms. All other parameters are 'foreground data' and must be input by the user.

By categorizing upstream methane loss rates as "background data," low emissions intensity natural gas will not be recognized as a reduction to the lifecycle GHG emissions rate. Such a result will create a significant risk that many natural gas-based hydrogen production facilities will be unable to qualify for the 45V Credit, as well as create a substantial increase in the cost of the hydrogen production. Effectively, this will make hydrogen production uneconomical compared to hydrocarbon alternatives, and therefore, depending upon other market factors nonviable. Additionally, producers that use a hydrogen production path included in the 2023 GREET model should have the ability to use verifiable and auditable foreground data that differs from the default assumptions (i.e., background data). The inability for a blue hydrogen producer to accurately account for and get credit for the emissions intensity of the natural gas feedstock for the SMR/ATR processes will have a chilling effect on blue hydrogen project development and could result in significant economic impact on American clean hydrogen producers. Such a prohibition amounts to inconsistent and arbitrary treatment of blue versus green hydrogen under the law given the

[33] Preamble of Prop. Treas. Reg. § 1.45V, page 89225; see also Guidelines to Determine Well-to-Gate Greenhouse Gas (GHG) Emissions of Hydrogen Production Pathways using 45VH2–GREET (December 2023). https://www.energy.gov/sites/default/files/2023-12/greet-manual_2023-12-20.pdf.

ability of electrolytic hydrogen producers to purchase EACs to reduce the carbon intensity attributed to their facilities.

There are credible and trusted methane emissions certification standards, including MiQ and Project Canary, that have processes to verify that natural gas has been produced with technologies and processes that minimize methane emissions to rates well below industry averages. These programs provide a certified methane intensity which could be easily incorporated into the 2023 GREET model. Furthermore, hydrogen producers can significantly reduce their upstream methane emissions by sourcing such products, which should also be reflected in the 2023 GREET model.

It is FCHEA's understanding and experience that there are readily available verification mechanisms for different sources of natural gas, including existing federal and state emissions reporting requirements, the most prominent being the EPA's Greenhouse Gas Reporting Program ("GHGRP"). The EPA, and the GHGRP, is the world's premier regulator of GHG emissions and most authoritative source of reliable emissions data. Most natural gas carbon intensity data inputs would be verifiable in the GHGRP under one or more facilities. Therefore, the IRS and the Treasury should permit a taxpayer to input carbon intensity data entered as foreground so long as such data is based on GHG emission data reported to the EPA's GHGRP, thereby making such data deemed sufficiently accurate and verified.

Under the EPA's GHGRP Subpart W, operators of natural gas facilities, from gas production through transmission pipelines, are required to report their emissions to the EPA. This data will also be used as the basis for the methane fee established by IRA. The EPA's rulemaking is currently ongoing, but data will be required from 2024 production onward. This data would provide an important source of credible and verifiable information by which companies can calculate a specific emissions intensity of natural gas feedstock. As noted below, a book and claim system should also be enabled for accounting for the emissions intensity of natural gas.

Without allowing for the ability to identify actual emissions intensity of natural gas, the Proposed Regulations would effectively negate the ability to secure a lower applicable percentage under Code section 45V(b)(2) for projects producing hydrogen from natural gas and reduces the incentive for projects that do move forward to actively minimize upstream methane and CO2 emissions of the consumption of natural gas by the hydrogen production unit. Taxpayers should be incentivized to improve on averages and receive the benefit of project-specific attributes. Project-specific emission rates incentivize companies to optimize design choices, employ state-of-the-art technologies, and form innovative partnerships to reduce emission rates below the national average, all of which support the policy objective of lowering emissions rates countrywide.

The ability of clean hydrogen producers using low carbon intensity natural gas as a feedstock to accurately account for the well-to-gate carbon intensity of natural gas production improves the accuracy of 45V Credit emission accounting and provides incentives to natural gas producers to reduce fugitive methane emissions and natural gas flaring. Therefore, clean hydrogen producers using low carbon intensity natural gas as a feedstock blue hydrogen producers should have the option within the 45VGREET model to input the verified carbon intensity of natural gas feedstock as foreground rather than background data.

As Treasury allows for the use of EACs for green hydrogen production to meet their 45V carbon intensity requirements, blue hydrogen producers should be afforded this same flexibility with low emissions intensity natural gas. Accordingly, the IRS and the Treasury must include the use of certified

lower-carbon intensity natural gas, including renewable natural gas and differentiated natural gas, as a viable pathway for hydrogen producers using natural gas as a feedstock to meet the carbon intensity requirements. As such, we call on the 2023 GREET model to be updated to allow upstream emission rates to be shifted into foreground data.

IX. Allow for all-coproducts with reasonable allocation method alternatives (e.g., energy-based, mass-based, system expansion, economic allocation) to be applied to the GREET Model.

The new 2023 GREET model allocates co-products utilizing a system expansion approach. Instead of allocating emissions between hydrogen and other co-products, system expansion provides a displacement credit equal to the lifecycle emission rate of conventional co-products. This is the approach recommended by ISO 14044:2006. For some production technologies, this approach represents the overall emissions impact of producing multiple co-products from a single process. While the system expansion approach may be best in some circumstances, it is not most accurate in all instances. It is critical for hydrogen producers to be able to demonstrate CI reductions in the way that best represents the value of their process, and providing alternative measures for co-products allows all hydrogen producers to most accurately represent the CI of their technology and encourages co-production synergies.

The exclusive use of the system expansion approach is a concern to many clean hydrogen producers. 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 / system expansion / economic allocation) absent compelling facts that such a method is patently unreasonable or would be abusive. The IRS and the Treasury can consider the framework adopted by the California Air Resources Board (CARB) as a potential solution. CARB allows the choice of physical allocation (e.g., based on energy, mass, etc.) or displacement (e.g., credit for avoided emissions resulting from a co-product). This CARB approach allows flexibility to accommodate different technologies and unique or proprietary applications thereof, providing a more accurate reflection of lifecycle CI for each unique hydrogen production process.

The new 2023 GREET Model also includes a restriction on the amount of steam co-product that reformers can claim based on the quantity of steam that an "optimally designed" reformer is expected to produce based on National Energy Technology Lab modeling. Taxpayers should be encouraged to develop new and improved technologies which may produce more steam than today's optimally designed technologies. Built in restrictions on co-product valorization would discourage such innovation. Treasury states that the intent of this is to avoid incentivizing over-production of hydrogen co-products like steam to artificially reduce the carbon intensity of clean hydrogen produced. Other anti-fraud measures are already in place to prevent production in a manner that is wasteful. FCHEA recommends that 2023 GREET Model and future releases should not have hard limits on co-product valorization.

X. Permit a taxpayer to use the PER process even if the taxpayer's technology and feedstock are in the "most recent GREET model" if the fixed assumptions do not represent the taxpayer's facts and circumstances and such taxpayer can verify the carbon intensity of bespoke inputs.

The Proposed Regulations require that all taxpayers use a pathway and feedstock detailed in the 2023 GREET model to compute their respective lifecycle GHG emissions rate, and only if the relevant lifecycle GHG emissions rate has not been determined under the most recent GREET model, the taxpayer may request a provisional emissions rate.[34] However, without the ability to opt out of a standard pathway, innovators would not be rewarded for the cost and effort of carbon intensity reduction, effectively disincentivizing innovation and investment in low- carbon intensity production; and there is a risk that similar—but unique—processes are lumped into standardized categories, thereby ignoring the value of proprietary processes (e.g., steam reforming of ethanol, which can have a negative carbon intensity with CCS, should not be lumped into a prescribed steam methane reforming category). Mandating that all similar processes be lumped into standardized pathways fails to consider carbon intensity reductions due to process enhancements to a particular producer's technology (e.g., certified low-carbon intensity natural gas or ("RNG") reformation). A taxpayer may not use the PER process if its feedstock and hydrogen production technology are represented in 2023 GREET model, even if the taxpayer disagrees with the underlying assumptions (that is, background data) or calculation approach used by the 2023 GREET model.

FCHEA respectfully requests that the IRS and the Treasury allow clean hydrogen producers to have the option to opt out of the standard pathway and provide for greater flexibility on certified and verified project inputs for their clean hydrogen production facilities. Clean hydrogen producers opting for this route should be able to request a PER. The IRS and the Treasury could streamline the process for granting a PER by establishing criteria for third-party certifications that, if used, would expedite the approval process. As an alternative to seeking a PER, clean hydrogen producers could also have greater flexibility in shifting more options within the 2023 GREET model from background to foreground data that can be configured and verified (as previously discussed).

Furthermore, clean hydrogen producers obtaining a PER should also be able to rely on a PER to calculate the 45V Credit with respect to qualified clean hydrogen produced by the taxpayer at a qualified clean hydrogen production facility beginning with the first taxable year in which a PER determined by the Secretary has been obtained and for any subsequent taxable year during the 10-year period beginning on the date such facility was originally placed-in-service, provided all other requirements of the 45V Credit are met.

XI. For the forthcoming guidance on the PER process, consider including: (i) an established timeline for review and appeals process; (ii) clarify how the PER process accounts for co-products; (iii) permit taxpayers to apply for a PER that may apply to multiple single production lines for similar, co-located production lines; and (iv) confirm a taxpayer may apply for a PER upon completing a FEED study or similar indication of project maturity.

The clean hydrogen production facility investments being considered have long-term economic ramifications. Businesses need to understand whether or not pathways (or a new pathway) would qualify before making major investment decisions. Therefore, the PER process should have a reasonable timeline and appeals process. The IRS and Treasury should confirm that a PER is available and can be determined for a proposed project based on assumptions regarding feedstock and production, i.e., that it is not necessary that project be built or close to being built in order to obtain the PER. This has been an issue for facilities attempting to qualify under Code section 45Q credit, where several taxpayers have been unable to obtain approval of a qualified facility's lifecycle assessments until after the facility is operational.

[34] *Id.*

Clean hydrogen producers need certainty surrounding the process obtaining a PER determination. In particular, FCHEA requests a deadline for DOE's review of PERs, notice to PER applicants as review milestones are met, and the opportunity to supplement PER and appeal PER findings. A structured, efficient PER process will provide clean hydrogen producers with the certainty necessary for successful, timely project development. An expedient approved PER for a pathway or feedstock not included in the 45VH2-GREET modeling should be available to all taxpayers using that qualify to use the PER. A reasonable timeframe for Treasury to respond to a taxpayer that a PER application is complete is 60 days. From that date, a reasonable timeframe for a decision on the PER to be made by Treasury is a subsequent 60 days. An expedient approved PER for a pathway or feedstock not included in the 45VH2-GREET modeling should be available to all taxpayers using that qualify to use the PER. Clean hydrogen producers also need clarity on how to establish a PER based on co-products.

Hydrogen producers should be able to use a single PER for like "facilities," especially if they are part of the same project. A company should not need to submit a separate PER for each clean hydrogen production line if they are using the same production process and equipment. FCHEA requests that Treasury provide clarity on a taxpayer's ability to rely on a PER for multiple "facilities."

Lastly, reiterating points addressed earlier, once a clean hydrogen producer obtains an approved PER, that facility should be able to lock in and rely on that PER for the project lifetime. Should that pathway be added to GREET at a later date, that producer should have the flexibility to opt to switch to the GREET version if they so choose.

Energy Attribute Certificates and Related Comments

XII. Concerns with the Three Pillars Approach for Electricity and EACs

For facilities produce hydrogen using electricity generated from a specific facility or source, the Proposed Regulations impose three pillars that the hydrogen production must meet to obtain EACs and claim the credit: (i) incrementality, (ii) temporal matching, and (iii) deliverability.[35]

The Proposed Regulations include the three pillars' requirements for producers using EACs based on the assumption that these requirements are necessary in order to prevent induced indirect grid emissions on the electric grid. Legal justification for this approach is detailed by the Environmental Protection Agency ("EPA") in a letter released six days before the publication of the Proposed Regulations and is based on the EPA's interpretation of the Clean Air Act.[36] Academic justification for this approach is detailed by the Department of Energy in a White Paper on 45V released in conjunction with the proposed rule.[37]

As discussed in previous comment letters, FCHEA has serious concerns with the three pillars approach that it would significantly raise the cost of clean hydrogen, delay projects, and significantly reduce the scale-up of the domestic clean hydrogen industry. Furthermore, the three pillars are not

[35] Prop. Treas Reg. § 1.45V-4(d)(3).
[36] Environmental Protection Agency, Letter to Honorable Lily Batchelder, Assistant Secretary for Tax Policy, in response to Treasury's request that the EPA provide information related to the definition of lifecycle GHG emissions under the Clean Air Act to support Treasury's interpretation and implementation of Internal Revenue Code Section 45V, December 20, 2023. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://home.treasury.gov/system/files/136/45V-NPRM-EPA-letter.pdf.
[37] U.S. Department of Energy, Assessing Lifecycle Greenhouse Gas Emissions Associated with Electricity Use for the Section 45V Clean Hydrogen Production Tax Credit (December 2023), https://www.energy.gov/articles/clean-hydrogen-production-tax-credit-45v-resources.

included in the statue as written and run counter to Congressional intent. A key colloquy between Senators Carper and Wyden underscored this point:

Mr. CARPER: … Section 13024 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, the Secretary shall recognize and incorporate indirect book accounting factors, also known as a book and claim system, that reduce effective greenhouse gas emissions, which includes, but is not limited to, renewable energy credits, renewable thermal credits, renewable identification numbers, or biogas credits. Is that the chairman's understanding as well?

Mr. WYDEN: Yes.[38]

This colloquy made no mention of artificial restrictions on the use of EACs, and Congress clearly did not intend for the Treasury and the IRS to impose such restrictions. The Congressional intent of Code section 45V is further highlighted in a letter dated November 6, 2023, which eleven members of the United States Senate wrote to Secretary Yellen, Secretary Granholm, and Mr. Podesta to ensure that the Proposed Regulations for the 45V Credit are consistent with their "**intent to provide a robust and flexible incentive that will catalyze and quickly scale a domestic hydrogen economy"** (emphasis added).[39] The Senators expressed hope that the IRS would "**avoid evolving and complex eligibility – such as the overly stringent additionality [i.e., incrementality], deliverability, and time matching [i.e., temporal matching] requirements – that could raise costs, suppress hydrogen production, feedstock and production pathway innovation, and private-sector investment, while discriminating against some regions based on their existing clean energy mixes"** (emphasis added).[40]

The Impact of the Three Pillars on Clean Hydrogen Project Economics

Because so many decarbonization pathways – iron, steel, ammonia, heavy duty transportation - depend upon low-cost, high-volume production of electrolyzers, Congress, the Administration, the Treasury and the IRS should recognize that the proposed "three pillars" will significantly increase the production cost of the lowest carbon-intensity hydrogen. Depending on assumptions, these additional costs could exceed the maximum credit provided by the original legislation ($3 per kilogram of hydrogen, assuming prevailing wage and apprenticeship requirements are met). This would likely increase the delivered cost of "green" hydrogen beyond that of conventional "gray" hydrogen.

The cost implications for the three pillars do not only apply to clean hydrogen production but have significant downstream impacts on hydrogen users. FCHEA's member companies include manufacturers

[38] 168 Cong. Rec. 133, S4165-S4166 (daily ed. Aug. 6, 2022).
[39] United States Senate, Letter Re: Implementation of the Section 45V Clean Hydrogen Production Tax Credit, November 6, 2023.
[40] *Id*.; *see also* Anna Cybulsky, Michael Giovannielo, Tim Schittekatte, and Dharik S. Mallapragada. April 2023. "Producing hydrogen from electricity: how modeling additionality drives the emissions impact of time-matching requirements." Working paper, Massachusetts Institute of Technology Energy Initiative. https://energy.mit.edu/wp-content/uploads/2023/04/MITEI-WP2023-02.pdf.; "Green Hydrogen: What the Inflation Reduction Act Means for Production Economics and Carbon Intensity," Wood Mackenzie, March 14, 2023, https://www.woodmac.com/news/opinion/green-hydrogen-IRA-production-economics/#form.; 1. Analysis of Hourly & Annual GHG Emissions: Accounting for Hydrogen Production, April 2023, https://acore.org/wpcontent/uploads/2023/04/ACORE-and-E3-Analysis-of-Hourly-and-Annual-GHG-Emissions-Accounting-for-HydrogenProduction.pdf.

of light-duty, medium, and heavy-duty fuel cell vehicles, fuel cell users for stationary applications, and a variety of other use cases. Our members in the downstream have raised series concerns that they will be negatively impacted by any policy or regulation that increases the price of delivered hydrogen. The price of hydrogen directly affects the operating cost for their products. As OpEx climbs, the business case for switching to hydrogen becomes more challenging potentially resulting in project cancelation and lost sales.

It is currently challenging to make a business case for switching to hydrogen in most transportation and stationary applications at today's conventional hydrogen price. This is even the case in California with its LCFS program and generous fuel cell vehicle and hydrogen infrastructure incentives. The Proposed Regulations will likely increase the cost of low-carbon intensity hydrogen, further harming the business case in California and making it extremely difficult in the rest of the country.

Without a strong US market for fuel cell products, technology advancements and production volume increases will slow; impacting industry's ability to accelerate cost reductions and on-shore fuel cell stack and system production. The end result will be hydrogen failing to gain a foothold in the United States leaving multiple transportation and stationary applications without a viable way to reduce their carbon intensity.

The IRS and the Treasury should be seeking to incentivize first movers to jumpstart the domestic clean hydrogen economy by stimulating a market that is supportive of, not inhibiting to, the viability of clean hydrogen. However, the delays in issuing the Proposed Regulations have already led to significant market uncertainty and delayed projects that would have otherwise begun construction. We are now also seeing proposed timelines for the Regional Clean Hydrogen Hubs program with timelines of up to 10 or 12 years until their conclusion. The protracted timelines of the hubs will compound challenges created by the Proposed Regulations. The hydrogen economy already faces significant headwinds in competing with incumbent technologies and scaling-up manufacturing capabilities in a competitive global market. The stringent requirements for EACs in the proposed guidance would only add more roadblocks to growth and development of a domestic clean hydrogen industry. If the three pillars are included in the final regulations, the United States could cede technology leadership, manufacturing capacity, and project investment to competitors in Asia, the Middle East, and Europe.

For example, multiple Regional Clean Hydrogen Hubs intend to produce hydrogen through natural gas, nuclear energy, and other renewable energy sources. In preparing for the DOE's funding opportunity announcement ("FOA"), the H2Hubs were encouraged to use the GREET 1 Series (fuel cycle) model for completing their LCA.[41] The DOE stated, it "will use GREET [1 Series] to consistently evaluate the well-to-gate carbon intensity and criteria air pollutant emissions estimated by the applicant for hydrogen production within each H2Hub."[42] The DOE further elaborated that the definition of "well-to-gate" and "lifecycle" are consistent with such terms in Section 45V of the Code. In addition, the FOA provided applicants with guidance on computing their upstream emission sources.[43] For example, "upstream emission sources, such as the generation mix for electricity supply and fugitive emissions for natural gas, can be highly influential on LCA, but often have high uncertainty. If proposed H2Hubs include direct integration with a power generator (e.g., direct connection to renewables) or a PPA, applicants should list

[41] U.S. Department of Energy, Regional Clean Hydrogen Hub Funding Opportunity Announcement (Last Updated: January 26, 2023). https://oced-exchange.energy.gov/FileContent.aspx?FileID=40a1ff87-622d-4ef5-8d7c-89bfe089fd11.
[42] *Id.*
[43] *Id.*

the generator type(s) and respective estimated energy consumption by year. If proposed H2Hubs include integration with the electricity grid, applicants should identify the corresponding Regional Transmission Organization/Independent System Operator, if one exists. DOE will use GREET defaults to estimate the carbon intensity of that region's electricity grid."[44]

The H2Hubs were permitted to use the GREET 1 Series model in computing their respective well-to-gate lifecycle GHG emissions, which includes computing emissions related to the direct connection to renewables or integration with the electricity grid. The FOA did not include the use of EACs and the associated three pillar qualification requirements, as introduced in the Proposed Regulations. The FOA required an applicant to disclose whether it intended to "pursue federal (or state) incentives, such as the 45V Credit, and clearly state the credit value that they are targeting."[45] However, the H2Hubs computation of their LCAs under the GREET 1 Series model and the GREET model mandated under the Proposed Regulations are not analogous and will have different results, with the latter GREET model placing the H2Hubs under an undue burden to comply with the three pillars.

The three pillars are compounding and reinforcing with one another. The interaction of such pillars add even greater overall burden on clean hydrogen producers as follows:

i. The regionality requirement will set the geographic boundaries in which hydrogen producers will be allowed to source "additional" renewable attributes. All EACs would have to be minted within this region (i.e., the Proposed Regulations segregate the United States into 13 regions based on the U.S. Department of Energy's ("DOE") National Transmission Needs Study).[46]
ii. The incrementality requirement (otherwise known as "additionality") sets a limited window in time for sourcing EACs. Currently, this is three years from the commissioning of the facility. If a renewable source was brought online outside of this timeframe, it does not qualify. Existing clean generation assets (i.e., nuclear and hydroelectric) are also currently excluded from this qualification due to the incrementality provisions. Such a result will have a significant impact on the development of Regional Clean Hydrogen Hubs.
iii. Finally, in 2028, the additional power and EACs that are sourced must be minted at an hourly resolution. Effectively, there is no safe harbor transition for hydrogen producers, where project developers will have to plan for hourly compliance in advance to adequately finance these projects. Producers will also have to design their facilities from the start to work with hourly matching, which will delay projects, increase costs, and defeat the purpose of the transition period from annual to hourly.

Currently, hydrogen producers will have to reside in the same DOE Transmission Needs Study region as their associated clean energy generation resources, find eligible renewable power projects commissioned in the last three years within such region, and, beginning in 2028, purchase EACs minted at an hourly resolution from eligible clean energy generators in that region. This will be particularly challenging for regions of the country with minimal new renewable development projects already in the interconnection queue. As a result, projects will inevitably shift towards two or three large authorities

[44] *Id.*
[45] *Id.*
[46] DOE, National Transmission Needs Study, Oct. 2023, available at https://www.energy.gov/sites/default/files/2023-10/National_Transmission_Needs_Study_2023.pdf.

(i.e., ERCOT, SPP). And as there is no EAC market available to purchase hourly EACs, the hydrogen producers will be forced to create and prop up a brand new hourly EAC market. Developing an hourly EAC market will take years to be commercially available and there is no certainty that one will be developed by the proposed 2028 deadline. The IRS and the Treasury have effectively subdivided the markets for EACs in such fine segments that it will exacerbate concerns with liquidity and price spikes. Regions with renewable power either entering into service or planned in the near future will attract hydrogen production (albeit less than if the three pillars were not included), whereas other regions will lack investment. The consequence is a failure to create a national network of hydrogen hubs as intended in the IIJA and instead create a regional system of winners and losers.

Electricity that can be delivered across regions will be instrumental for development of electrolyzer projects around the country, especially Regional Clean Hydrogen Hubs, some of which are already located across multiple regions. As drafted, the draft guidance limits the ability of some regions that lack renewable resources to have a technologically or commercially viable path to connect in renewables. For example, a clean hydrogen production unit in the Delta region (MISO South) would be limited to sourcing EACs from only solar projects due to the region's lack of wind resources. When an hourly matching requirement is implemented, this hydrogen producer would no longer be eligible for the credit due to the inability to source EACs around the clock. This clean hydrogen production unit should also be allowed to utilize EACs sourced from wind projects in the Midwest region (MISO North), as the transmission infrastructure enabling delivery to the Delta region already exists. Similarly, RECs generated in the Plains region should be usable in the Delta region provided that transmission capacity can be shown to exist to move the power into the region, regardless of whether the power actually flows that way. If there is not a more flexible option, this will reduce the ability to achieve the credit parameters, particularly with the temporal matching requirements, undermining the ability and incentives to decarbonize.

More flexibility in project design could be gained if the proposed regions were used, but with the additional allowance for projects to span adjacent regions (cross one regional boundary.) This would allow projects like renewable generation in Nevada feeding an electrolyzer in California, for example, without adding excessive grid congestion.

FCHEA supports allowance for interregional EACs and purchase of EACs from regions outside of the United States. The taxpayer should be able to use interregional EACs if they can demonstrate that the underlying electricity could have been delivered to the hydrogen producer. Interregional EACs should be accepted if the hydrogen producer can illustrate how generation sources from different regions can tie into the hydrogen producer's regional grid. This can be accomplished through contracting with generation sources that are transmitting electricity through long-distance high-voltage direct-current (HVDC) transmission lines or contractual structures (i.e. wheeling services agreements) that secure transmission rights from generation point to point of consumption. Furthermore, FCHEA supports a broader level of regions that should be used of the NERC regions, again with ability to purchase EACs from adjacent regions.

Implementation of the three pillars has the potential to seriously delay and dampen the deployment of clean hydrogen production, specifically the scaleup of electrolytic based hydrogen. Such stringent rules, imposed from the outset before the industry has an opportunity to emerge, will effectively kneecap the industry all together. There is significant risk that green hydrogen development will take place outside of the United States and will significantly set back the United States's clean energy leadership, which has been the Biden Administration's objective. Furthermore, this could impede the ability of the United States to decarbonize hard-to-abate industries, potentially threatening national climate ambitions.

While the GREET model is important to verify the carbon intensity of the produced hydrogen, the required level of detail and project maturity to assure compliance with the EACs' three pillars and the 45V Credit qualification requirements is too high of a barrier for new projects to get off the ground or to build the business case for new projects. Given the complexity in project development, this would require understanding every detail of the 45V Credit qualification requirements before potentially securing financing or determining if the project is viable. This is a non-starter and is bound to negatively impact the development and deployment of new hydrogen projects. A similar scenario is presented as FCHEA stated in its Section 48 ITC comments: "in order to receive financing for a project seeking to obtain an ITC, taxpayers would be required to determine their eligibility for the ITC well in advance, before developing the hydrogen storage property. This is because investors will not fund these types of investments without a tax opinion from reputable tax counsel concluding at a high degree of certainty that the property qualifies for the ITC. This would require that offtakers and customer agreements be negotiated and concluded at the very outset of the development of hydrogen storage projects, which is unrealistic in most cases."

The three pillars will cause clean hydrogen production facilities to struggle to source appropriate power for off-peak production and such facilities will be forced to oversize production, as a result. Hydrogen production facilities will not only be uneconomic operating at a 30% capacity factor, but curtailing operations to follow load will be significantly detrimental to capital equipment on-site and contrary to safety, energy efficiency and operational best practices. This will drive up the cost of hydrogen and will begin pricing out consumers. This will be particularly true for hard-to-abate industries where a lower levelized cost of hydrogen is needed.

Overall, the three pillars will prevent large-scale, clean hydrogen adoption and will prevent broader carbon abatement. If industries are unwilling or unable to adopt hydrogen, hard-to-abate industries will not be able to decarbonize. Ultimately, this will prevent emissions from being reduced.

The entire foundation for the IRS and the Treasury's adoption of the three pillars is built on a speculative theory of "induced grid emissions" that is unsupported by the evidence and does not remotely justify the blunt instrument of an across-the-board incrementality mandate, much less all three pillars together. The IRS and the Treasury should not adopt the three pillars in the final regulations for a simple, threshold reason: Doing so would exceed the limited authority that Congress delegated to the Secretary of the Treasury under Code section 45V. If adopted, the proposed rules would effectively rewrite—rather than permissibly implement—the statute. Like other administrative agencies, Treasury has "no power to act unless and until Congress confers power upon it."[47] Here, Congress authorized Treasury to "issue regulations or other guidance to carry out the purposes of [Code section 45V], including regulations or other guidance for determining lifecycle greenhouse gas emissions."[48] The Treasury Secretary's authority, however, is limited by the statutory text and structure, and it can only be used "to carry out the purposes of" Code section 45V.[49]

The Three Pillars Exceeds the Treasury's Rulemaking Authority

The limited grant of rulemaking authority under Code section 45V does not authorize the Secretary to introduce new eligibility criteria for clean hydrogen production tax credits—especially where,

[47] *Mozilla Corp. v. FCC*, 940 F.3d 1, 74 (D.C. Cir. 2019) (citation omitted).

[48] Code section 45V(f); *see also id.* Code section 45V(e)(5).

[49] Code section 45V(f).

as here, doing so would contravene the detailed statutory scheme Congress created and undermine its central objective to incentivize large-scale clean hydrogen production. Because Congress has provided highly specific eligibility criteria, the Secretary cannot introduce entirely new substantive requirements.[50] And Congress plainly has not authorized the Secretary to introduce criteria that thwart the fundamental objectives of the statutory scheme by unduly limiting the ability of producers of electrolytic hydrogen to qualify for the credits at issue.[51]

The bottom line is that the 45V Credit should be focused on producing qualified clean hydrogen and not backdoor creation of renewable energy industries by tying these two independent industries together under the 45V Credit. The IRA included a range of other tax provisions to drive support and development of new renewables and nuclear power. Therefore, the adoption of the three pillars will contravene the text and structure of the statutory language in Code section 45V and run counter to its purpose.

In conclusion, FCHEA continues to oppose restrictions on the use of EACs by electrolytic hydrogen producers to meet 45V carbon intensity thresholds. We acknowledge the risk identified by the Department of Energy that additional load associated with new electrolytic hydrogen production will lead to induced GHG emissions unless EACs used by producers have attributes that meet the incremental generation, geographic matching, and temporal matching restrictions. However, the scope and scale of potential induced emissions remains unproven while the potential impact of the restrictions is a very real and immediate threat to electrolytic hydrogen production, especially as the nascent clean hydrogen economy in the United States begins to scale.

XIII. If the three pillars are not removed, then implement a grandfather rule for certain projects.

Should Treasury move forward with the three pillars approach, FCHEA offers the following input on the various aspects of these pillars and policy preferences of our membership and the industry.

Grandfather Rule for Projects that Begin Construction before January 1, 2033

The IRS and the Treasury should implement a grandfather rule for first mover facilities to encourage early development and adoption of this technology. As currently drafted, hydrogen production facilities that already have begun construction, or will begin construction soon, are not exempt from the three pillars. This is significantly impactful to the industry's first movers and places the current investments at risk. Therefore, FCHEA requests that the IRS and the Treasury consider a grandfather rule that exempts projects that begin construction before January 1, 2033, from the incrementality and regionality requirements and grandfathers such projects into to annual matching for the full credit period.

Since the IRA's passage in August 2022, domestic clean hydrogen producers have made millions of dollars of investments in production projects based on the reasonable understanding (given Code section 45V's explicit adoption of GREET) that they would qualify for the 45V Credit without the artificial limitations of the three pillars that are nowhere in the statutory text or GREET. These early projects are vital to the trajectory of the domestic clean hydrogen economy, to U.S. clean energy leadership, and to domestic job creation. Relatedly, project financing demands predictability and uniformity of requirements

[50] *See, e.g.*, *Ethyl Corp. v. EPA*, 51 F.3d 1053, 1058–60 (D.C. Cir. 1995) (holding agency "acted contrary to the plain language of" the statue when it based its decision on criteria not included in the statute).

[51] Code section 45V(f).

of a facilities ten-year credit period. The proposed three pillars are unprecedented, and as a result, have created uncertainty for project financing. For example, the lack of certainty around the viability of a liquid hourly EAC market by 2028 will stop all hydrogen generation projects in their tracks.

Concerns about the economic feasibility of clean hydrogen projects previously understood to be eligible for the 45V Credit (based on the language of Code section 45V and the existing GREET model at the time the IRA was enacted) has substantially delayed the deployment of clean hydrogen projects – including proposed projects for winning applicants under the DOE's Regional Clean Hydrogen Hub program. This is particularly damaging when dampening investor appetite to back "first-mover" projects that are vital to the future viability of the clean hydrogen economy, to U.S. clean energy leadership, and to domestic job creation.

A grandfather rule, however, would incentivize first movers to move quickly without adding undue financial uncertainty on the level of the credit that a project will get, in addition to saddling hydrogen deployment with new renewable power generation – which we know will cause delays due to interconnection queues and permitting. This strategy drives earlier build out of the electrolyzer manufacturing plants which are needed to drive down electrolyzer cost and provide Regional Hydrogen Hub capacity, which is a key goal of the legislation in the first place.

FCHEA believes that grandfathering annual matching for the life of the 45V Credit for early mover projects is critical to drive early scale for the industry. Without grandfathering, projects will be forced to assume hourly matching at project COD as the matching requirement plays a significant role in the rightsizing of both the quantity of renewables necessary to serve the electrolyzer and the electrolyzer itself. These assumptions represent significant capital costs and would be necessary decisions for any project looking to secure tax equity financing. The effective requirement to utilize hourly matching at project COD will increase capital costs of early mover projects in such a way as to stunt early scaling of the nascent hydrogen industry.

Furthermore, electrolyzers would have to be overbuilt to maintain electrolyzer utilization and renewable generation over-procured. Additionally, the systems needed for hourly EAC tracking will not be in place and reasonably tested for early mover projects. Any decision to move towards a more granular approach to temporality should be taken only after a thorough evaluation of the state of the hydrogen market, the uptake of renewables and an assessment of the maturity of the technologies available to ensure information and data is being provided in a reliable manner. The lack of readiness of the market infrastructure for hourly matching and costs associated with hourly matching are expected to be enormous, particularly for projects that have to have continuous flow of green hydrogen (like PtL/PtX companies) and for whom high levels of hourly electricity procurement is required (e.g., 90% of electrolyzer operation time). A switch from annual to monthly temporal correlation would be more suitable, as part of a more gradual approach. A recent study indicates only a 10% cost difference between annual and monthly matching. Monthly matching gives extra granularity whilst also providing sufficient flexibility for market actors to source electricity from the grid for hydrogen production when renewable prices are low and sell electricity to the grid when prices are high.

FCHEA respectfully recommends that early mover projects be permitted to have grandfathered annual matching for the life of the 45V Credit. Grid-connected projects that begin construction before January 1, 2033, should be permitted to retain annual matching for the full credit period and be exempt from incrementality and regionality requirements. This timing would allow all first movers, as well as the Administration supported DOE Regional Clean Hydrogen Hubs, to qualify for the 45V Credit, providing

critical support for scale-up of this nascent market and enablement of broader decarbonization across the economy.

Grandfather Rule for Projects that Begin Construction Prior to the Publication of the Final Regulations in the Federal Register.

As an alternate solution, FCHEA, at a minimum, requests a grandfather rule for hydrogen production facilities that began construction prior to the date the final regulations are published in the in the Federal Register so that such facilities shall only need to comply with annual temporal matching for the full credit period.

XIV. If the three pillars are not removed, then implement a longer transitional period through 2032 for the temporal matching, incremental, and deliverability requirements.

An EAC satisfies the temporal matching requirement if the electricity represented by the EAC is generated in the same hour that the taxpayer's hydrogen production facility uses electricity to produce hydrogen.[52] The Proposed Regulations provide a transition rule to allow an EAC that represents electricity generated before January 1, 2028 to satisfy the temporal matching requirements if the electricity represented by the EAC is generated in the same calendar year that the taxpayer's hydrogen production facility uses electricity to produce hydrogen.[53]

Hourly-matching industry standards, processes, and full functionality within tracking systems does not currently exist. Without a grandfathering or "beginning of construction" cutoff as highlighted above, this would effectively eliminate any safe harbor window as projects will need to plan for a transition to hourly-matching for project economics and financing. There is no hourly REC market and simply imposing hourly matching on one industry will not create a market. In addition to the years needed to update REC tracking systems to enable hourly matching, it will also take substantially longer thereafter to develop a liquid market for these instruments. Furthermore, without requiring all accounts within tracking systems to have hourly tracking functionality, very few will voluntarily opt to use hourly-matched EACs, thus considerably limiting supply and driving a premium.

Imposing an hourly matched EAC market would also make it extremely difficult for green hydrogen producers to procure electricity in a competitive market, since other industries/consumers that also procure large quantities of electricity are not required to do matching of any kind.

For low temperature electrolysis projects, initial GREET modeling suggests that the amount of acceptable grid mix power for consumption, when zero-carbon power supported by qualified EACs is not available, is extremely low at roughly one to two percent of all power consumption. With the all-or-nothing annual approach for the 45V Credit as discussed earlier, this leaves a very small margin of error for all low temperature electrolysis projects. This one to two percent margin will make many projects infeasible and increase risk for others, ultimately leading to fewer projects coming to fruition and higher hydrogen prices from those that do. Facilities would need to be operated on a minute-to-minute basis because even one minute per hour operating unmatched to renewable could cause a facility to miss the $3/kg tier. FCHEA understands that the revenue grade metering data used for settlement and the creation of EACs or RECs is generally captured in 15-minute increments. With this increment level in mind, it would

[52] Prop. Treas. Reg. § 1.45V-4(d)(3)(ii)(A).
[53] *Id.*

be nearly impossible to hourly match renewable generation with hydrogen production with less than a one to two percent margin for error. Even in a situation where renewable generation is co-located with hydrogen production, this margin for error is unacceptable. Furthermore, it is not certain that current electrolyzer technologies will be capable of hourly matching with renewables. A recent article on hydrogeninsight.com outlines this point, stating "Electrolyzers have not fully demonstrated that they are compatible with intermittent renewables." Unfortunately, the Proposed Regulations, as drafted, could eliminate all electrolysis hydrogen facilities from reaching the $3 per kilogram 45V Credit amount.

The proposed temporal matching approach in the rule, set to commence in 2028, is not compatible with the practical realities of renewable energy and battery storage development, including the lack of hourly-tracking systems. A more feasible strategy would be a phased implementation, allowing emerging sectors, like hydrogen, to adapt gradually. This could include: Access to low-cost or government-backed securities for hydrogen enterprises in renewable energy procurement; Incentives for developing EAC tracking systems, tied to deadlines for demonstrating technological readiness; and, Extending the mandatory implementation date to no earlier than 2032, incorporating milestones for technological advancement and renewable energy integration, and providing a longer adaptation period for smaller hydrogen producers.

Another core issue lies in the unpredictability of EAC availability, especially from renewable sources such as solar and wind. Despite proactive efforts to over procure EACs, there's a substantial risk that the EACs available for any given hour within each region will fall short of expectations. This raises critical concerns for instances where only a portion of the EAC load requirement for a particular hour is met.

Hourly matching should be considered only after systems are ready to produce the necessary data at scale. Additionally, there must be sufficient battery storage to ensure hourly matching does not unduly limit hydrogen production.

Furthermore, use of technology such as batteries to convert to hourly matching increases the cost of the power substantially to become non-economic even with the 45V credit, and curtailing production also makes any projects non-economic unless coupled with other carbon related incentives (e.g., in California). Renewable capacity need time to grow further and achieve excess capacity. Additional time is needed to develop hourly matching systems and infrastructure, which is already required for grid purposes. Given the unpredictability in hourly energy production, a more gradual approach aligns better with industry capabilities and environmental goals.

Electricity grid regions with high renewable energy content will not see significant benefit, if any, from time matching requirements on overall GHG emissions, and will suffer cost penalties. A recent study from MIT shows that for grids with 60% or higher renewable content, GHG emissions can remain below the Tier 2 threshold or even negative, regardless of annual or time matching constraints.[54]

Therefore, the IRS and the Treasury should extend the date for implementation of the hourly matching requirement back until calendar year 2033. There should not be a requirement for hourly tracking without an hourly REC tracking product broadly available on the market. A product with hourly REC tracking would need to be available in the next 12 months in order to procure a PPA or EAC product

[54] Nature Energy, The Influence of Additionality and Time-Matching Requirements on the Emissions from Grid-Connected Hydrogen Production, (January 8, 2024). https://doi.org/10.1038/s41560-023-01435-0.

with hourly tracking capability starting January 1, 2028. The final guidance should allow hydrogen projects with start of construction or placed in service dates before 2033 to be grandfathered and exempt from this requirement. This recommendation acknowledges the intermittent nature of predominant renewable sources, like solar and wind, necessitating over-procurement for consistent energy matching.

Furthermore, the IRS and the Treasury should only apply an hourly matching requirement in 2033 if the hourly EAC market is appropriately developed and commercially available at a reasonable rate for clean hydrogen production. To verify this market development, the Department of Energy should conduct a study to ensure the market is viable for clean hydrogen producers. The IRS and the Treasury could also provide for a good faith exemption for clean hydrogen projects that operate where no such market is available.

If, however, the IRS and the Treasury insists on implementing temporal matching earlier than 2032, a gradual transition phase of going from annual to quarterly/monthly could be initiated, however, given the issued described above related to an hourly market the transition to hourly should still occur no earlier than 2032 and only if a market for hourly EACs is sufficiently developed.

In conclusion, the only way that a three-pillars approach would be feasible is with a delayed implementation timeline. Temporal matching requirements in particular cannot be put in place before a market for hourly matched EACs is well-established and available nationally. Implementation of the three pillars should be pushed back as far as possible to allow for initial market development, and establishment of a clean hydrogen production market.

XV. Incorporate a longer transition period for the incremental requirement and an exemption to the incremental requirement for EACs procured from nuclear, hydropower, and renewable electricity generators. However, if a general exemption is not provided, then FCHEA recommends the government provide multiple options, as presented in the Proposed Regulations, for determining whether an EAC satisfies the incremental requirement.

The incrementality requirement would require qualifying EACs to represent incremental source electricity, such as electricity from an electricity generating facility that has a recent commercial operations date ("COD") or uprate no more than 36 months before the hydrogen production facility for which the EAC is retired was placed in service.[55]

Developing a renewable project can take six years or longer and the current expected time to progress through the interconnection queue is roughly five years. In addition, a new project may have to go through a bid process, which can take approximately one year, and if transmission needs to be upgraded, that is another one-year delay. These long delays will be significant in preventing clean hydrogen production facility development due to the need to coordinate timing and scheduling with new clean energy facilities as part of an incrementality requirement. Development of Regional Clean Hydrogen Hubs is also at significant risk due to these potential years long delays. Therefore, the final regulations should include a transitional period for compliance with the incremental requirement until 2033. In addition, the IRS and the Treasury should allow clean hydrogen production facilities placed in service or

[55] Prop. Treas. Reg. § 1.45V-4(d)(3)(i)

who have start of construction dates before 2033 to be grandfathered and exempt from the incrementality requirement.

Further, it will be necessary to make certain existing clean energy generators eligible beyond the 36 months. Nuclear energy and hydropower are critical sources of base-load, low-emission electricity which dominate the grid mix in several regions of the United States. An incrementality requirement would preclude any use of these power generators and significantly dampen clean hydrogen production capacity and growth. Given the strong importance of clean baseload power to driving a large-scale clean hydrogen economy, the IRS and the Treasury should apply an across-the-board exemption from the incrementality requirement for nuclear and hydropower.

Likewise, because of long development timelines, economic efficiency, and the public policy good of retaining operating renewables as part of an "all hands on deck" approach to decreasing carbon emissions and meeting the Administration's goals, certain renewable energy generators should be exempted from the 36-month limitation.

Should the IRS and the Treasury not apply an exemption for nuclear, hydropower, and renewable energy from the incrementality provisions, FCHEA offers the following comments and policy preferences:

The Proposed Regulations should offer several alternative approaches for consideration on how incrementality could apply to existing clean hydrogen producers, such as nuclear, hydropower, and renewables. The IRS and the Treasury offer these alternatives based on the assumption that they would lead to minimal risk of significant induced grid emissions if adopted in the final rule. Inclusion of nuclear and hydroelectric resources is essential to ensuring that hydrogen facilities have access to clean baseload power necessary to achieve economic utilization rates/capacity factors. Incrementality must meaningfully include hydroelectric and nuclear resources, and at a minimum be pushed out several years (as currently permitted under the temporal matching requirement, and as the EU has done in the delegated acts). Also, inclusion of certain renewable energy resources that fall outside the 36-month cutoff will be essential to providing hydrogen facilities with access to renewable energy that is actually available.

In the context of the Proposed Regulations offering various approaches for existing clean hydrogen producers like nuclear, hydropower, and renewables, it is crucial that the final regulations avoid placing excessive burdens on the taxpayers. Clean energy sources, particularly nuclear power, are essential for maintaining a reliable and sustainable energy grid. Therefore, we respectfully suggest that if the IRS and Treasury were to consider only one alternative approach, then the formulaic approach is preferred. However, it is FCHEA's position that the full suite of options to meet the incrementality requirement must be included in the final regulation.

Regarding the formulaic approach, FCHEA believes the percentage should be based on anticipated levels of curtailment on or around 2030 and should be set at a level of at least ten percent of all existing clean power generators. This allowance of at least ten percent should also be set at a fleet level as opposed to individual facility sites. The proposed five percent value is far too conservative and should be increased as several regions of the country experience curtailment rates in excess of five percent. For example, the curtailment of wind power in 2022 was 9.2% in the Southwest Power Pool ("SPP"). We recognize that as renewable penetration increases, curtailment will also increase. As such, the national allowance should be higher than the proposed five percent.

As many nuclear facilities are nearing the end of their initial licensing periods, the process of relicensing becomes critical. The associated costs for relicensing nuclear plants are substantial, often ranging from hundreds of millions to billions of dollars. This process also requires years of planning. Relicensing alone should be considered sufficient to satisfy any incrementality requirements. It is important to ensure that hydrogen producers, who are key commercial partners in this phase, have a streamlined process.

In the Proposed Regulations, the IRS and the Treasury inquire about the use of existing minimal-emitting generation "in locations where grid electricity is 100 percent generated by minimal-emitting generators or where increases in load do not increase grid emissions, for example, due to State policy capping total GHG emissions such that new load must be met with minimal-emitting generators." FCHEA requests that hydrogen generation facilities located in jurisdictions with greenhouse gas emissions caps, clean power mandates, or renewable portfolio standards (or similar policies) should be deemed to be compliant with any proposed incrementality framework. This would recognize the significant efforts already underway at states to proactively pursue renewable deployment and grid decarbonization.

Furthermore, clean hydrogen producers must have the option to submit data demonstrating zero or minimal induced grid emissions in any given case (or category of cases) through modelling or other evidence. Given the tremendous uncertainty and nascency of Treasury's proposed framework, it is imperative to provide flexibility to avoid unintended consequences of stifling hydrogen generation project development.

In addition, FCHEA recommends that the IRS and the Treasury consider implementing the following alternatives in relation to the Avoided Retirement Approach. Specifically, a clean hydrogen production facility should be deemed to satisfy the incrementality requirement if its generation source is from an existing facility that meets any of the following criteria:

i. Any existing clean power generator can assess retirement risk by evaluating the economic viability of the electricity generating facilities ("EGF"). We propose an evaluation and review of the EGF's historical financial performance, and if in two out of the three calendar years prior to hydrogen FID the EGF's revenues did not cover its costs then the EGF retirement risk exists. The EGF's revenues should include the EGF's settlement with the ISO, the EGF's settlement with its PPA counterparties, and the receipt from the sales of renewable energy certificates ("RECs"). Tax benefits such as PTCs that the EGF has sold to tax equity investors for financing purposes should not be included in the EGF revenues, because the cash flows of the tax benefits will go to investors, not the EGF. Costs to be included in the assessment should include operating and maintenance costs, finance costs, lease costs, and all other costs that are essential for the EGF operations. Third-party verifier's shall review the EGF's financial performance and shall certify that EGF's retirement risk existed at the time of the hydrogen FID.

ii. For nuclear power facilities, we offer the following alternative approaches that should be adopted:
    a. Any nuclear facility eligible for a state program enacted to prevent closures of nuclear power plants. Examples of such programs include two pieces of legislation in Illinois - the Future Energy Jobs Bill enacted in December 2016 that provided for the procurement of zero-emission credits ("ZECs") from zero emission facilities and the 2021 Climate and Equitable Jobs Act which implemented a carbon mitigation credit ("CMC") program. A clean energy facility should automatically meet the "avoided

retirements" test if it has received or is eligible to receive support under a state program designed to prevent nuclear power plant closures. Retirement of that facility has been avoided and its output is incremental for the duration of its operating license.

b. Any nuclear facility that was eligible for the Code section 45U, zero-emission nuclear power production credit, for at least three of the past six years. The 45U credit aims to prevent premature closure of existing nuclear facilities by providing, beyond a certain threshold, a credit that is gradually reduced as power prices rise above a $25 per megawatt hour index. The credit is thus based on market conditions and is focused on merchant facilities that are at risk due to market volatility. Tying eligibility for the 45V Credit to 45U on a year-to-year basis creates too much uncertainty for nuclear hydrogen producers given the significant up-front investment required for a hydrogen facility. However, providing a snapshot of market volatility for six years prior to hydrogen facility operation gives potential nuclear hydrogen producers a mix of data and projections that allows for some certainty in deciding whether to make an investment into developing and constructing a hydrogen facility. This test would be applied as of the date a supply agreement for electricity used to power hydrogen production is executed, and deliveries under that supply agreement would be incremental for the full term of the agreement and any extension thereof, up to the contract quantity.

XVI. Include a safe harbor for EACs purchased from electricity generators located in a jurisdiction with clean energy renewable portfolio, emissions reduction standards, or other similar renewable portfolio standards or policies.

The Treasury's "induced grid emissions" theory for the Proposed Regulations is even more tenuous for hydrogen generation projects in states with policies driving grid decarbonization and greenhouse gas emissions reductions. Even if there were any basis to the theory in limited situations and regions, it clearly has no application in regions subject to state decarbonization rules and standards. As a result, hydrogen generation facilities sited in locations with greenhouse gas emissions caps or renewable portfolio standards (or similar policies) should be deemed to be compliant with any proposed incrementality framework. Several state stakeholders have supported this position.[56] For example, the State of California (through Go-Biz and ARCHES) explained in its August 23, 2023 letter to Treasury:

> "The argument for requiring additionality [i.e., incrementality], in the context of a state with an RPS and carbon neutral requirement, sets up an "either-or" at the project level when we need "both-and" at the system level to enable deep system wide decarbonization. For context, in California, to provide 100% clean electricity our state will need to build 148,000 MW of clean energy resources by 2045 – increasing our already robust clean electricity capacity by 400% over the next two decades. We believe these targets are achievable, but if hydrogen projects require additionality above and beyond our 100% RPS requirements, it will be impossible to interconnect

[56] New York State Energy Research and Development Authority, Response to Request for Comments on Credits for Clean Hydrogen and Clean Fuel Production: Northeast Regional Clean Hydrogen Hub States, August 3, 2023; see also, California Alliance for Renewable Clean Hydrogen Energy Systems, RE: Notice 2022-58 – Response to Request for Comments on Credits for Clean Hydrogen (H2) and Clean Fuel Production, August 23, 2023; see also, State of Washington Department of Commerce, Re: Notice 2022-58 Request for Comments on Credits for Clean Hydrogen and Clean Fuel Production, July 14, 2023.

them in a timely and cost-effect manner without disrupting our carefully calibrated energy system."[57]

Similarly, a consortium of states in the northeast, led by the New York State Energy & Research Development Authority, explained:

> "[We] do not support a strict requirement of "Additionality". As an initial point, in states with renewable portfolio standards (RPS) based on a percentage of load, by definition if an electrolyzer load is added to that grid, new renewables must be built to cover the percentage of obligation in place. An RPS enables the clean electricity sector to automatically adjust its renewables requirements for new clean load without putting this obligation onto the new electrolyzer load. Under current RPS implementation policies, no RPS requires additionality tied to individual heat pumps installed, electric vehicles connected to the grid, lithium-ion energy storage, nor any other decarbonization solution being deployed at scale to meet local, state or national climate and energy goals. It is unclear why a different approach should be applied to hydrogen." [58]

The State of Washington also provided a compelling justification that incrementality is unwarranted—at least on an undifferentiated, nationwide basis:

> "The suggested additionality restrictions are not only unnecessary in a statutory clean energy state such as Washington, they would also complicate the development of electrolytic hydrogen production in such states. An additionality requirement would prevent the use of electricity from existing hydroelectric, wind, solar, or nuclear generating facilities even if those facilities are most suitable to serve a particular hydrogen production facility and even if state law ensures this use would not result in any increase in GHG emissions. . . Proponents of the additionality restriction argue that, if existing generating resources are shifted to hydrogen production, utilities will increase electric generation at existing fossil fuel power plants. There may be a reasonable concern in states without clean electricity and GHG cap laws, and if this occurred it would greatly reduce the climate benefits that Congress anticipated in enacting the § 45V PTC. However, that scenario is not credible in Washington and other states with clean electricity or GHG emission laws. Washington's clean electricity law would prevent utilities from back-filling their generating portfolio with fossil fuel generation. These factors are acknowledged in the analysis cited by advocates for the strict additionality requirement. ***We believe that any additionality-based restriction of the § 45V tax credit should distinguish between states with these laws and states with no safeguards on increased generation from fossil fuel plants.***[59]

The Proposed Regulations inquire about the use of existing minimal-emitting generation in locations where grid electricity is 100 percent generated by minimal-emitting generators or where increases in load do not increase grid emissions, for example, due to State policy capping total GHG emissions such that new load must be met with minimal-emitting generators. FCHEA respectfully suggests that, in addition to GHG emissions caps, clean energy deployment targets (such as renewable portfolio

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

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

[59] State of Washington Department of Commerce, Re: Notice 2022-58 Request for Comments on Credits for Clean Hydrogen and Clean Fuel Production, July 14, 2023.

standards) are equally relevant. The NYSERDA website for New York State's Clean Energy Standard (CES) provides a compelling narrative about the degree to which state-policy is addressing grid emissions:

> New York's Clean Energy Standard (CES) is designed to fight climate change, reduce harmful air pollution, and ensure a diverse and reliable low-carbon energy supply. Following its adoption in 2016, the CES was expanded in 2020 to meet the requirements of the Climate Act Link opens in new window, which sets goals for achieving 70% renewably sourced electricity by 2030 and a zero-emission electric grid by 2040. By focusing on low-carbon energy sources, such as solar, wind, and hydropower, the CES will bring investment, economic development, and jobs to New York State. The CES features two mechanisms – the renewable energy standard (RES) and zero-emissions credit (ZEC) requirement – that require every load serving entity to procure renewable energy certificates (RECs) and ZECs.[60]

It would create an inequitable result if the IRS and Treasury were to impose incrementality requirements in states that are proactively addressing grid decarbonization. Therefore, FCHEA respectfully requests that the IRS and the Treasury consider a safe harbor for EACs purchased by facilities located in jurisdictions with renewable portfolio standards, clean power mandates, or other similar policies whereby such facilities would be exempt from the three pillars.

XVII. Clarify that if a specific clean electricity generator(s) is directly connected to a qualified clean hydrogen production facility and the electricity from such generator is used for the production of qualified clean hydrogen, then an EAC is not required.

Prop. Treas. Reg. § 1.45V–4(d)(1) provides that for purposes of Code section 45V, if a taxpayer determines a lifecycle GHG emissions rate for hydrogen produced at a hydrogen production facility using the most recent GREET model or a PER, then the taxpayer may reflect in the GREET model or include in a PER such hydrogen production facility's use of electricity as being from a specific electricity generating facility rather than the being from the regional electricity grid only if the taxpayer acquires and retires a qualifying EAC for each unit of electricity that the taxpayer claims from such source. For example, one megawatt-hour of electricity used to produce hydrogen would need to be matched with one megawatt-hour of qualifying EACs. Further, Prop. Treas. Reg. § 1.45V–4(d)(1) provides that to satisfy this requirement, a taxpayer's acquisition and retirement of qualifying EACs must also be recorded in a qualified EAC registry or accounting system so that the acquisition and retirement of such EACs may be verified by a qualified verifier. The double counting of EACs and their underlying attributes would undermine the integrity of lifecycle GHG emissions rate determinations that incorporate EACs. Thus, Prop. Treas. Reg. § 1.45V–4(d)(1) provides that certain requirements must be met regardless of whether the electricity generating facility giving rise to the qualifying EAC is grid connected, directly connected, or co-located with the hydrogen production facility (that is, regardless of whether the underlying source of the qualifying EAC physically supplies electricity through a direct connection to the hydrogen production facility).

FCHEA believes that EACs are the most appropriate and easiest to execute mechanism for tracking matching and supports the ability of clean hydrogen producers to use EACs to meet the carbon intensity requirements of the 45V credit. However, the three-pillar restrictions for EACs should only apply to clean hydrogen production facilities that purchase EACs and associated power from a clean electricity

[60] New York State Energy Research and Development Authority, *New York State Clean Energy Standard, The Most Comprehensive and Ambitious Clean Energy Goal in the State's History*, accessed February 19, 2024. https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Standard.

generating facility. In the instance where a clean hydrogen production facility owns directly-connected wind or solar facilities that provide the power for the clean hydrogen facility and is not purchasing the power for delivery through grid connections, then the three pillars requirements would not apply.

Therefore, FCHEA requests that the IRS and the Treasury affirm that the three pillars' requirements would only apply to "purchased" EACs in the final regulations. Furthermore, FCHEA kindly asks for clarification and examples of the circumstances in which the restrictions on the use of EACs would not apply, such as situations in which electricity required to support electrolyzer operation is delivered by directly connected renewable generation resources.

Renewable Natural Gas ("RNG") Comments

XVIII. Permit taxpayers to use attribute certificates for RNG, fugitive methane, and other similar feedstocks as opposed to applying the "three pillars" requirements as used for EACs procured from clean electricity generators.

The IRS and the Treasury state they intend to apply conditions that are logically consistent with, but not identical to, the incrementality, temporal matching, and deliverability requirements for electricity derived EACs. However, the concern regarding induced emissions driving the incrementality, temporal matching, and deliverability requirements for EACs does not directly apply to the use of RNG certificates. The use of RNG to produce qualified clean hydrogen would simply induce more demand and production of RNG, which can be generated much faster than building additional renewable energy capacity. Furthermore, there is no evidence to indicate that the use of RNG certificates would compromise the environmental integrity of the 45V Credits, and therefore require restricted use.

As stated earlier regarding electricity and EACs, the IRS and the Treasury should not add unnecessary and onerous requirements for the 45V Credit that are outside the boundaries of the law. Taxpayers should be able to use attribute certificates for RNG, fugitive methane, and among other similar feedstocks. Consistent with the legislative intent of Code section 45V, taxpayers should be able to use a wide variety of market-based mechanisms to access clean power and RNG in supporting the desired outcome of reducing GHG emissions. Furthermore, imposing incrementality, temporality, and regionality restrictions on RNG sources disincentivizes use of relatively expensive RNG and fugitive methane in favor of fossil natural gas because of its lower cost and administrative burden. The unintended result of extending the three pillars to RNG would be to increase GHG emissions and decrease the feasibility of methane abatement through low-carbon RNG gas production. Therefore, FCHEA kindly asks the IRS and Treasury to consider permitting taxpayers to use attribute certificates for RNG, fugitive methane and other similar feedstocks as opposed to applying the "three pillars" requirements as used for EACs procured from clean electricity generators.

XIX. Eliminate the "first productive use concept" for RNG as it unfairly penalizes the RNG industry and discourages the reduction of carbon emissions. If the "first productive use concept" is not eliminated, then FCHEA should implement (1) a grandfather rule and (2) transitional period through December 31, 2032.

The Proposed Regulations also seeks comment on how application of a "first productive use" requirement could be applied to methane-abated gas sources, including RNG. The proposed rule defines

first productive use as the time when a producer of that RNG first begins using or selling it for productive use in the same taxable year as (or after) the relevant hydrogen production facility was placed in service.

We recognize that there is concern regarding market disruption of hydrogen production's use of RNG and fugitive methane. However, it is impractical and unrealistic to have two newly constructed facilities – a new RNG facility and a new hydrogen production facility – to come online during the same taxable year. These projects are almost always owned by separate entities, are different scales of projects with different timelines, and while close collaboration may take place, relying on a separate project while constructing a hydrogen facility causes extreme uncertainty and cost increases, each of which pose obstacles for financing new hydrogen projects.

The first productive use requirement would essentially eliminate the ability to use any RNG facilities that exist today (since they all current sell or use their RNG), whereas the electricity additionality requirement at least allows use of power from facilities less than 36 months old.

Without the ability to sell RNG into the marketplace while waiting for a hydrogen production facility to come online, RNG producers will be unwilling to enter into future offtake agreements. Additionally, if an RNG producer waits to construct a facility in anticipation of future hydrogen production offtake, an opportunity to reduce methane emissions will be missed. The proposed first productive use requirement would amount to a freeze of future offtake agreements and will result in additional emissions.

To decarbonize gas-based hydrogen production at scale, complementing other decarbonization solutions such as CCS, hydrogen producers must be allowed to aggregate low-carbon gas resources in sufficient quantities (which in some cases will involve up to a dozen individual RNG and fugitive methane sources), while optimizing placement of their assets for efficiency of hydrogen production and distribution. Placing the restrictions suggested by Treasury on First Productive Use, requiring matching of low-carbon gas feedstock to hydrogen production on a timeframe that is more frequent than monthly, or limiting the region that RNG or fugitive methane may be sourced from would be prohibitive to the leveraging of methane abatement in hydrogen production.

SMR and ATR deployment in many cases – especially when coupled with CCS – will benefit from scale and vicinity of hydrogen demand (this is also very appropriately reflected in DOE's Regional Hydrogen Hub program). Accordingly, a single major SMR/ATR facility will need to aggregate several (as many as a dozen) RNG facilities to match their gaseous feedstock needs. The challenges associated with successfully timing start of production, at the necessary volumes, of multiple low-carbon gas facilities within the calendar year of the hydrogen plant's online date are hard to overstate. Hydrogen producers need more flexibility to robustly structure their gas procurement mix.

The "first productive use" concept limits RNG pathways by creating a de facto strict additionality requirement that is even more onerous than that suggested for electricity and EACs. Treasury should eliminate or clarify "first productive use" in a way that leaves open the possibility for various pathways to produce RNG. Flexibility needs to be provided to RNG producers to sell RNG for hydrogen production independently from when an RNG plant has entered into production.

The first productive use requirement, especially if coupled with a limitation on eligible waste sources is overly restrictive and will preclude decarbonization of gas-to-hydrogen, as well as methane

abatement at scale. We strongly oppose this measure in the form it was proposed. In case some form of the incrementality provision is maintained by the IRS and the Treasury in the final program, we suggest following guidelines to ensure that Treasury's goals of creating a framework for low-carbon gasses that is "logically consistent" with the requirements pertinent to renewable electricity, while being appropriately tailored to the fundamental differences between RNG and electricity production and distribution. However, if a first productive use requirement is instituted, then low-carbon gas should also qualify as first productive use if it is additional methane abatement, even if it is conditioned at a pre-existing facility. In other words, any gas from newly constructed capture infrastructure for fugitive methane, a newly covered lagoon, newly constructed digester, or newly contracted feedstock source for RNG production should count as first productive use, since these are all individual investment decisions that lead to incremental methane abatement.

Should the IRS and the Treasury choose to still proceed with this requirement despite the range of issues detailed above, FCHEA offers the following preferences to the IRS and the Treasury to mitigate some of the adverse impacts to the production or RNG. We encourage that this requirement only be implemented in a similar timeline as an incrementality provision for electricity and EACs. As stated earlier we believe that incrementality should also be delayed until at least December 31, 2032. Should Treasury apply grandfathering provisions similar to those suggested by FCHEA for electricity and EACs, those grandfathering allowances should also be applied to clean hydrogen production facilities using RNG.

XX. If the IRS and Treasury determine that an hourly temporal matching requirement is necessary for RNG, then the IRS and Treasury should consider (1) a grandfather period and (2) verify that the technology and market for such technology is mature for domestic scale-up before requiring compliance of such requirement.

Temporal regulations for RNG would add tremendous costs and project timeline delays. The IRS and the Treasury should review how current markets are managed. RNG production does not change with day-to-day, much less hour-to-hour variations in demand, and so do not face the same intermittency issues as wind and solar. Therefore, there is not a rationale to require time-matching.

For RNG and fugitive methane, temporal matching on a basis that is more frequent than monthly is prohibitive. RNG producers are bound to the injection pipelines and utilities' measurement and metering requirements (in some cases pipeline injection meters must be owned and read by the utility or pipeline operator, not the project). While metering may be continuous and automated, finalization and reconciliation of pipeline injection volumes occur on a monthly-basis.

The characteristics of RNG production are not identical to those of renewable electricity production. For example, RNG can be produced for 24 hours in a day, every day and does not face the intermittency challenges of some renewable energy resources that underly the IRS and the Treasury's temporal matching restrictions for EACs. Accordingly, the IRS and the Treasury should not assume that restrictions on the use of EACs by electrolytic hydrogen producers should be directly applicable to the use of RNG certificates. Should the IRS and the Treasury determine than a temporal matching requirement is necessary, then we encourage the IRS and the Treasury to consider a transitional period similar to the timeline provided for procured EACs from clean electricity generation facilities to ensure equity across production pathways. Additionally, should the IRS and the Treasury apply grandfathering provisions similar to those suggested by FCHEA for electricity and EACs, then such grandfathering allowances should also be applied to clean hydrogen production facilities using RNG.

If the IRS and the Treasury require a temporal matching requirement, then such requirement should only if such a market is validated as appropriately developed and commercially available at a reasonable rate for clean hydrogen production. To verify this market development, the DOE should conduct a study to ensure the market is viable for clean hydrogen producers. The IRS and the Treasury could also provide for a good faith exemption for clean hydrogen projects that operate where no such market is available.

XXI. Eliminate the applicability of the deliverability requirement to RNG as hydrogen production facilities are not typically co-located with RNG production or fugitive methane capture, and renewable fuel is transferred via commercial pipeline.

Deliverability requirements would restrict new production sites and potentially create an unworkable rule for taxpayers. Currently, hydrogen production is not typically co-located with RNG production or fugitive methane capture, and new deliverability requirements would needlessly limit access to customers and offtake partners that stand to benefit from reducing their emissions from the use of lower-cost, clean hydrogen. Furthermore, the GREET model does not recognize regional restrictions at this time so placing such restrictions on RNG certificates before the government decides on regional methane emission rates is arbitrary and not justified. While there may currently be regional differences in leak rates, recent methane regulations will drive all production to equivalent rates, and that is especially true for new production subject to the EPA methane NSPS.

The IRS and the Treasury should seek to avoid the significant costs and emissions associated with hydrogen liquefaction and transportation. Additionally, RNG is inserted into the gas grid, which is connected nationally, where it is indistinguishable from other natural gas molecules. The RNG pipeline system is significantly different from the electric grid. Pipelines are fully integrated across the country. Furthermore, the RNG system is endowed with significant physical storage capacity, both through dedicated storage infrastructure as well as line packing – these infrastructure elements work in tandem to ensure robustness and deliverability against the seasonal and variable RNG demand throughout the country. Accordingly, it is "logically consistent" with EAC provisions to treat the entire U.S. pipeline system as a single region for book and claim eligibility. In addition, the appropriate region for book and claim should be defined as the North American interconnected pipeline grid. Therefore, the IRS and the Treasury should leverage the California LCFS requirement for "plausible deliverability" for purposes of determining "deliverability" under the final regulations.

XXII. Incorporate a book and claim provision for RNG without geographic restrictions. Clarify that the appropriate region for book and claim should be defined as the North American interconnected pipeline grid.

The Proposed Regulations sought comments on whether or how a book and claim system could be applied to hydrogen producers using RNG. Such a system is an established market that already works within regulatory frameworks, such as LCFS and the DOE's RFS program. Accordingly, the IRS and the Treasury should look at the precedents set by these frameworks and leverage the historical learnings that have already occurred when developing additional guidance on the 45V Credit regarding RNG.

Delivery of RNG and fugitive methane through a book and claim system is essential to the widespread utilization of low/negative CI RNG over fossil natural gas. Lowering the cost of transmission by utilizing existing infrastructure with book and claim is the optimal way to leverage existing resources, expand adoption of non-fossil natural gas and keep transportation costs on par with fossil natural gas.

Furthermore, the electronic tracking systems that satisfy the IRS and Treasury's requirements exist in abundance under current programs (e.g. RINs, LCFS credits). The most suited and currently available system for the 45V Credit is M-RETS' Renewable Thermal Certificates program, which should be approved by the IRS and the Treasury for 45V Credit compliance purposes.

Verification of facilities (prior to commencement of delivery) is a related, but different challenge from tracking and should be done through leveraging CARB-accredited LCFS verifiers and RFS QAP auditors, who have deep experience in auditing such facilities. Engineering review and verification requirements from the LCFS and RFS programs could be easily transposed into the 45V Credit.

Therefore, the IRS and the Treasury should institute a book and claim provision for RNG without geographic restrictions. The current proposed rule only supports landfill gas physically connected to the production facility. Expanding the rule to include landfill and dairy other waste that is geographically dispersed will help unlock the production and use of RNG and fugitive methane from waste products that would otherwise vent methane into the atmosphere. This can be accomplished if the IRS and the Treasury establishes a book and claim system like as is currently used by the LCFS program.

XXIII. Modify the GREET model to be inclusive of a broader range of feedstocks used today for RNG and fugitive methane sources.

Limiting sources of methane to those identified as of a certain date disincentivizes further investigation and development of RNG sources or fugitive methane capture. Likewise, it would create an administrative burden on the hydrogen producer to demonstrate that its methane source existed before the effective date. It also eliminates from consideration RNG produced as a co-product by a new production facility, thereby disincentivizing the production of low-carbon RNG. Accordingly, the IRS and the Treasury should ensure that a wider range of feedstocks are included in the rule, particularly those with a negative carbon intensity, such as dairy, poultry, and swine-based feedstocks, as well as fugitive methane sources. In conclusion, any limitations on sources of waste are unimplementable, unjustified, and would arbitrarily constrain low-carbon gas development.

XXIV. Apply similar qualification requirements to low-emissions natural gas as implemented for RNG.

FCHEA respectfully requests that the IRS and the Treasury do not apply the three pillars' requirements to low-emissions natural gas, as there are similar concerns with low-emissions natural gas as outlined above for RNG. However, if the IRS and the Treasury determine that the three pillars are necessary, then FCHEA asks that the IRS and the Treasury apply similar qualification requirements to low-emissions natural gas that is used as a feedstock for the production of clean hydrogen as is implemented in the final rules for RNG.

Conclusion

FCHEA has collaborated with policymakers and regulators on hydrogen-focused tax policies incentives for over three decades and welcomes the opportunity to continue such collaboration with the IRS and Treasury on the issues and solutions outlined herein. Please contact me at (202-355-9463) with any questions or comments.

Thank you for your consideration,

Frank Wolak
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