CALIFORNIA HYDROGEN BUSINESS COUNCIL

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VIA ELECTRONIC FILING (www.regulations.gov) (REG-117631-23)

The Department of the Treasury
CC:PA:LPD:PR (REG–117631–23)
Room 5203
Internal Revenue Service
P.O. Box 7604, Ben Franklin Station
Washington, DC 20044

RE: Section 45V Credit for Production of Clean Hydrogen, Notice of Proposed Rulemaking, 88 Fed. Reg. 89,220 (Dec. 26, 2023)

The California Hydrogen Business Council (CHBC) respectfully submits comments on the proposed rulemaking relating to the credit for production of clean hydrogen (clean hydrogen production credit) and the energy credit, as established and amended by the Inflation Reduction Act of 2022.

Background

The CHBC is the largest and longest established hydrogen trade association in the United States with over 130 members across the hydrogen value chain. California has the ambitious goal to achieve carbon neutrality by 2045 and has the most stringent air emission standards in the country. Hydrogen has been identified by the California Air Resources Board as a necessary decarbonization pathway.[1] California has a long history of using hydrogen for decarbonization and air quality across the early markets of power generation and light-duty transportation sectors, and is expanding use in transit and heavy-duty fleets, power plants, and maritime and rail sectors. In recognition of the key role of hydrogen, renewable hydrogen is an eligible resource in the California Renewable Portfolio Standard (RPS) and is included in the California Low-Carbon Fuel Standard (LCFS).

The CHBC herein submits comments on topics related to the eligibility of hydrogen for the clean hydrogen production credit if there is a purchase of renewable power or RECs (referred to as an "energy attribute credit" or "EAC") and if renewable natural gas (RNG) feedstocks are used to produce hydrogen. We also comment on the impact of the proposed rulemaking on the California Regional Clean Hydrogen Hub selected for award by the U.S. Department of Energy (DOE), known as the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES).

As an overarching matter, regional markets that have binding RPS requirements and/or binding carbon caps already have provisions in place to address the concerns that purport to be addressed by what some parties have referred to as the "Three Pillars". The combination of program requirements for eligibility, and already well-established regional energy markets ensure that real GHG reductions and expansion of renewable supply will occur. Overlaying prescriptive "corrections" in these regions adds unnecessary constraints that will increase the cost of achieving deep decarbonization.

[11] 2022 Scoping Plan Documents | California Air Resources Board

Executive Summary of CHBC Comments

DOE ARCHES Hydrogen Hub Impact Comments

1. To retroactively impose rules on hydrogen — rules that were not in place when California and the ARCHES team applied for DOE hydrogen hub program funding — would materially impact projects. Importantly, it would also have the unintended consequence of delaying action to decarbonize communities and improve air quality by prolonging the use of fossil fuels in industrial sectors that are hard to define and in transportation sectors where the performance of hydrogen-powered fuel cell electric trucks, buses and vehicles is required. Therefore, the proposed rulemaking potentially jeopardizes California's ability to realize the full value of the award.

Temporal Matching Comments

2. The CHBC recommends a waiver of the requirement for hourly matching in states and regions that already have a compliance mechanism in place to ensure production of decarbonized hydrogen. California should thus receive a waiver from hourly matching provided if can demonstrate that such a restriction is unnecessary to demonstrate attainment of the carbon intensity requirement in the statute.

3. Rather than aggregating all hydrogen produced during a taxable year, the final rules must rely on only qualified clean hydrogen.

4. Any resource that is eligible under any tier for RPS compliance should be eligible as renewable power for purposes of tax credit eligibility.

Geographic Matching/Deliverability/Regionality

5. The CHBC recommends that the guidance adopt the same market boundaries as the existing tradeable REC markets. In the western region, the market boundary should mirror the WECC.

Induced Emission Comments

6. Treasury should not attribute any induced emissions to power procured by electrolyzer owners receiving 45V credits. Should the guidance take the step of overlaying such a requirement, it should not be enacted until such time as those emissions can be properly calculated with temporal and spatial resolution consistent with other parts of the regulation.

7. The final guidance should allow producers to include a quantified assessment of induced emissions in pathway carbon intensity calculations with no specific requirement on facility vintage for procured power.

Incrementality Comments

8. The final rules must include a carve-out for facilities located in jurisdictions with clean energy, renewable portfolio standards, or declining emissions caps.

Grandfathering Comments

9. Treasury should exempt clean hydrogen projects that begin construction prior to 2033 from incrementality, hourly temporal matching, and deliverability requirements. First mover facilities should be encouraged to complete construction as soon as possible and fulfill their investment commitments.

Renewable Natural Gas Comments

10. Ensure that a wider range of feedstocks are included in the rule.

11. Allow new and existing RNG facilities to shift to hydrogen production at any time to support deep decarbonization.

12. Hourly temporal matching should not be applied to RNG. The appropriate region for book and claim should be defined as the North American interconnected pipeline grid.

13. Treasury should institute a book and claim provision for RNG and other low-emissions and certified natural gas without geographic restrictions.

I. Impact of 45v Proposed Rulemaking on ARCHES Hydrogen Hub

In October 2023, the DOE announced the selection of seven regional hydrogen hubs, including the California regional hydrogen hub, the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) as a renewable hydrogen hub. During the proposal phase, the hubs were required to select projects that would receive program funding through technical and financial due diligence. The ARCHES hub is currently in contract negotiations with DOE for the award for $1.25B award – an award that was made under a specific circumstance based on the legislative intent of Section 45v in the Bipartisan Infrastructure Act.

All the end-user projects included in ARCHES, including bus fleets, heavy-duty freight trucks, port cargo handling equipment, and distributed fuel cell and central gas turbine power generation, depend upon receiving the $3/kg production tax credit to enable projects to proceed.
Additionally, the total cost of ownership (TCO) of the bus fleets, heavy duty freight trucks, and port cargo handling equipment will not support the adoption of hydrogen and fuel cell technology without the lower cost hydrogen that will be enabled by the $3/kg production tax credit.

The State of California represents hydrogen demand across power and transportation sectors. These sectors are epitomized in the ARCHES objective to meet the demand in these centers with renewable hydrogen. These demand centers are also located within communities that can immediately benefit from improved air quality and green job growth. Forty percent of projected benefits are anticipated to go to disadvantaged communities. The 100% renewable and clean hydrogen production proposed in ARCHES (renewable and hydro-electric powered electrolysis and biogas and waste biomass production with carbon capture and sequestration) is that which was assessed by current standard tools for regulatory compliance (e.g., the California GREET model of Argonne National Laboratory) to achieve very low carbon intensity (< 0.45 kg CO_2/kg H_2) that should qualify for the $3/kg production tax credit. The use of this prevailing carbon intensity calculation regime was a foundation of project

selection for the ARCHES proposal. Bank financing of many projects included in ARCHES will not proceed without certainty that these projects will qualify for the $3/kg production tax credit.

To retroactively impose rules on hydrogen — rules that were not in place when California and the ARCHES team applied for DOE hydrogen hub program funding — would materially impact projects. Importantly, it would also have the unintended consequence of delaying action to decarbonize communities and improve air quality by prolonging the use of fossil fuels in industrial sectors that are hard to define and in transportation sectors where the performance of hydrogen-powered fuel cell electric trucks, buses and vehicles is required. Therefore, the proposed rulemaking potentially jeopardizes California's ability to realize the full value of the award.

The intention of the regional hydrogen hubs is also to create a connective infrastructure of hubs across regions.[2] The new market boundaries that would be imposed by the proposed regionality rule would stifle the connection of the hubs and further dilute the investments, for example between California and the Pacific Northwest renewable hubs.

II. Temporal Matching

The heart of the argument that hourly matching is needed to ensure accurate calculation of carbon emissions is technically incorrect. While it is true that failure to properly account for consequential emissions when renewable power credits are generated at one time, and retired at another time can lead to inaccurate GHG accounting, hourly matching (as opposed to hourly emissions tracking) is only one way among many to address this and is the costliest way. Hourly matching within a single balancing area without transmission constraints ensures that there will be no consequential emissions from renewable power production and use, but there are more flexible ways to address the issue. For example, consequential emissions can be offset by the retirement of additional EACs.[3]

In markets that have binding RPS and/or carbon regulation, temporal matching in the form of storage and firm renewable resources will evolve through market forces. Overlay mandates will interfere with optimal market-based resource additions and dispatch.

Changing policy to track temporal matching must take into account what is possible today with tracking systems. As the tracking system for the Western Electricity Coordinating Council (WECC) that includes California, WREGIS does not currently have an hourly tracking systems, there will continue to be uncertainty in timing of hourly matching implementation until many questions are answered. These questions include:

- who will possess the data required to track hourly;
- how difficult or easy will it be to put this required data into a tracking systems;
- how do we validate the information for regulatory compliance

Tracking systems will take time to develop and system development cannot commence until final regulations are in place. It may not be technically feasible to implement hourly time stamped EACs as soon as 2028. Hourly matching also departs from the annual matching required of EACs used in the California Renewable Portfolio Standard program today, and provisions for the use of EACs in the

[2] U.S. Department of Energy, What are Regional Clean Hydrogen Hubs? | Department of Energy

[3] Clean Energy Institute at University of California Irvine, comments submitted to Treasury on Section 45v February 26, 2024.

California LCFS program.[4] Although some entities are working on developing EACs that feature an hourly time stamp, current tracking systems do not have such a feature. When coupled with geographic and additionality conditions, regional systems such as WREGIS would need multiple different products to track compliance. System design cannot begin until final regulations are in place, and until the regional tracking systems determine how they will recover costs for system design and implementation. Further information is needed before the earliest practical implementation date of the final regulations can be determined, including the time for robust piloting and validation prior to widescale roll-out of a multi-billion-dollar financial instrument tracking system.

The requirement of hourly matching necessarily increases hydrogen production cost. Arguing otherwise implies that energy storage is free, that firm renewable resources are no more costly than wind and solar power, or that electrolyzer capacity can be increased without cost. All these claims are false. Hourly matching increases the cost of hydrogen production and delivery, as the cost of storage is not free, and energy storage or increased electrolyzer capacity would be required to comply with the hourly matching requirement on a grid that is already subject to greenhouse gas provisions and RPS compliance to meet the most stringent decarbonization targets in the country. This will impact the cost competitiveness of producing green hydrogen and will negate the positive impacts of the $3/kg subsidy. When the hydrogen industry collectively advised lawmakers that $3/kg was an appropriate level of incentive for renewable electrolytic hydrogen to be cost-competitive, it was with the explicit understanding that the use of unbundled EACs would be permitted. Had the provision of the proposed guidance been envisioned, the necessary subsidy would have been significantly increased.

The argument in favor of hourly matching is that time shifting of renewable power production and use by creating renewable energy credits at times of high renewable production and retiring them at times of low or no renewable production increases grid emissions. This is possible but, as shown by ACORE and E3[5], based on the marginal hourly emissions in most locations, such emissions are near zero in most locations. In California, natural gas is the marginal dispatchable resource in all hours for the vast majority of hours in the year. Over-generation of solar power by a producer during the day reduces gas-fired power and consumption of the same amount of power at night creates emissions in the same amount. The entire transaction is zero power. In this case, requiring simultaneity of supply and demand has only one effect, increasing cost. A recent study by MIT published in the journal Nature showed that the most stringent carbon intensity thresholds required for the 45V incentive could easily be achieved in grids with RPS requirements as high as 60% or more with no need for hourly matching.[6]

Moreover, in markets with 100% carbon free energy standards, consequential emissions due to changes in grid dispatch cannot occur. By mandate, the grid dispatch must meet the mandated renewable power or carbon constraint irrespective of what voluntary procurement transactions occur. As a consequence, the percentage of carbon free power on the grid in the evening will continue to increase through expanded supply of electricity storage (to store renewable energy) and/or renewable generation. Clean hydrogen is absolutely essential to complete this transition as well as the transition to a zero-carbon transportation sector. Increasing the cost of renewable hydrogen will likely result in a delay in expanding the supply of firm renewable resources, which is against the interests of those promoting carbon free energy and transportation sectors.

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[4] California Air Resources Board, Low Carbon Fuel Standard regulation at LCFS Regulation | California Air Resources Board

[5] A. Olson, G. Gangelhoff, A. Fratto, H. Felicien, and K. Walter, "Analysis of Hourly & Annual GHG Emissions Accounting for Hydrogen Production," Energy & Environmental Economics, April, 2023, [Online]. Available: www.ethree.com

[6] Giovanniello, M.A., Cybulsky, A.N., Schittekatte, T. *et al.* The influence of additionality and time-matching requirements on the emissions from grid-connected hydrogen production. *Nat Energy* **9**, 197–207 (2024). https://doi.org/10.1038/s41560-023-01435-0 (Related open source working paper available at: https://energy.mit.edu/wp-content/uploads/2023/04/MITEI-WP-2023-02.pdf

In markets that have binding RPS and/or carbon regulation, temporal matching in the form of storage and firm renewable resources will evolve through market forces. Overlay mandates will interfere with optimal market-based resource additions and dispatch.

Rather Than Aggregating All Hydrogen Produced During a Taxable Year, the Final Rules Must Rely On Only Qualified Clean Hydrogen.

Qualified clean hydrogen production facilities must be allowed to claim the Section 45V credit for any amount of qualified clean hydrogen produced via any process that makes the hydrogen eligible for the credit within a given year. The proposed rules in their current form contravene the plain text of Section 45V because they would require a taxpayer to lump together all hydrogen produced via different processes (e.g., hydrogen produced using solar energy and hydrogen produced using wind energy or energy from the electric grid) in a given year. In addition to being inconsistent with the statutory text, the proposed rule would create perverse incentives that run counter to Section 45V's objectives of incentivizing and rapidly scaling up hydrogen production, especially if combined with the proposed requirement of hourly temporal matching.

The CHBC recommends a waiver of the requirement for hourly matching in states and regions that already have a compliance mechanism in place to ensure production of decarbonized hydrogen. California should thus receive a waiver from hourly matching provided if can demonstrate that such a restriction is unnecessary to demonstrate attainment of the carbon intensity requirement in the statute.

III. Geographic Matching/Deliverability/Regionality

Power procured from any resource within the same NERC interconnection region should be eligible for use by a facility generating 45V credits. Large energy market areas with regional transmission/transport capability are cost optimal. They allow production to occur at locations of least cost and to deliver energy to demand centers over the transmission network. In the case of California, efforts to regionalize of transmission planning in the WECC have been under way for several years for precisely this reason.[7] The market efficiency of broad market areas has been fully proven in existing energy markets (power, natural gas, and liquid fuels). Energy market mechanisms, such as congestion pricing, and integrated resource planning are the tools that ensure adequate electric system delivery capacity. There is no basis for placing any unique burden on electrolyzers.

The proposed rulemaking proposes — without justification — adopting the modeling zones used in the National Transmission Needs Study (DOE Needs Study). That study contains no finding that restricting power-purchase transaction to within its modeling zones would avoid or reduce consequential greenhouse gas emissions. The study does contain, in the sponsor feedback section, a recommendation that the DOE analyze the value of regional transmission planning over broader market areas.

The draft guidance limits 45V power transactions to a part of California. The California RPS program has regulations in place regarding renewable power transactions within the WECC using EACs certified and tracked through the WREGIS system. Those same protocols should be used for 45V eligibility for

[7] https://blog.ucsusa.org/vivian-yang/what-does-western-grid-regionalization-mean-for-california/

California renewable electrolytic hydrogen production to ensure reliable electricity that meets stringent decarbonization standards. Under the proposed guidance a significant set of California RPS eligible resources that would normally flow into California would not be eligible supply would be ineligible for 45V qualification. **Any resource that is eligible under any tier for RPS compliance should be eligible as renewable power for purposes of tax credit eligibility.**[8]

The CHBC recommends that the guidance adopt the same market boundaries as the existing tradeable REC markets. In the western region, the market boundary should mirror the WECC. This existing framework is based on years of comprehensive policy analysis. California has a framework that functions as it should, with agencies who work on a regional basis with protections in place on resource shuffling.

California projects are being developed and seeking financing as we speak. Restricting power sourcing to part of the state will render an unknown number of planned projects unfinanceable.
The proposed boundary, which does not include the entire state and stops short of the northern border of California, would restrict California projects from sourcing wind or solar power from within the WECC region outside of California. This will increase the cost of producing hydrogen in California with absolutely zero environmental benefit.

IV. Incrementality and Induced Emissions

As written, the guidance document proposes a power procurement restriction. The guidance should instead defer rulemaking on the issue of induced grid emissions until there is adequate information and analysis to support including induced emissions in a pathway carbon intensity calculation (as EPA did in RFS2). It is technically incorrect to state that mandating a use case for which induced emissions are known is equivalent to addressing induced emissions in pathway carbon intensity calculations.

Treasury should not attribute any induced emissions to power procured by electrolyzer owners receiving 45V credits until such time as those emissions can be properly calculated with temporal and spatial resolution consistent with other parts of the regulation. The same is true of the inclusion in pathway carbon intensity of consequential emissions related to dispatch of existing resources. This should be deferred until such time as tools are in place to calculate such emissions under common assumptions.[9] At a minimum, **the final guidance should allow producers to include a quantified assessment of induced emissions in pathway carbon intensity calculations with no specific requirement on facility vintage for procured power.**

The final rules must include a carve-out for facilities located in jurisdictions with clean energy, renewable portfolio, or declining emissions caps. The theory of "induced grid emissions" introduced for hydrogen generation projects in the proposed rules cannot be defended in a state with grid decarbonization policies to reduce greenhouse gas emissions. While perhaps the theory could apply in very limited situations and regions, there is no application in regions with state decarbonization standards and compliance mechanisms. Hydrogen generation facilities should thus be compliant with any incrementality framework where there are existing RPS or other compliance mechanisms. Other

[8] See market boundaries discussion in "Environmental Attribute Credits – Analysis of Program Design Features and Impacts" at https://www.apep.uci.edu/PDF_White_Papers/Environmental_Attribute_Credits_Analysis_of_Program_Design_Features_and_Impacts_091523.pdf

[9] Clean Energy Institute at University of California Irvine, comments submitted to Treasury on Section 45v February 26, 2024.

state-level stakeholders in this rulemaking support this position.[10] The State of California (through the Governor's Office of Business and Economic Development and the ARCHES California hydrogen hub) described 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 them in a timely and cost-effect manner without disrupting our carefully calibrated energy system.[11]

Another consortium of state level hydrogen stakeholders located in the Northeastern U.S., led by the New York State Energy & Research Development Authority, also elucidated that:

> [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.[12]

And from the Pacific Northwest, the State of Washington has also explained why incrementality is unnecessary and not justified for country wide application:

> 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 backfilling

[10] Appendix A.
[11] *Id.*
[12] Appendix A.

> 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.[13]

The proposed rulemaking seeks information on 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."[14] The CHBC recommends that in addition to GHG emissions caps, clean energy deployment targets (such as renewable portfolio 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.[15]

California's Cap-and-Trade is an enforceable, binding, and declining cap on greenhouse gas emissions. California's RPS is an enforceable binding compliance obligation. Neither RPS or Cap-and-Trade obligations change if electric load increases due to new demand like electrolytic hydrogen production. RPS annual compliance obligations are assumed into Electric Distribution Utility (EDU) load forecasts that inform Cap-and-Trade allocations. EDUs in their Integrated Resource Plans (IRP) balance their obligations with RPS with their obligations to reduce emissions under cap-and-trade. This balance in renewable procurement with capped declining carbon emissions and the cost of carbon inform modeling that dictates what generation resources are procured.[16]

Enacting incrementality requirements in states that are proactively addressing grid decarbonization would be unnecessary and restrict achievement of decarbonization targets, and far exceeds Congressional intent. The proposal would also support hydrogen developments in jurisdictions that are most thoughtfully pursuing renewable deployment, grid decarbonization, and climate change. **An exemption should therefore be granted for facilities located in jurisdictions with renewable portfolio standards, clean power mandates, or other similar policies.**

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[13] *Id.*

[14] NPRM at 37.

[15] https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Standard

[16] Pub. Util. Code section 454.52 and 9621

V. Grandfathering

To further the overarching goals of Section 45V, Treasury should ***exempt clean hydrogen projects that begin construction prior to 2033 from incrementality, hourly temporal matching, and deliverability requirements.*** First mover facilities should be encouraged to complete construction as soon as possible and fulfill their investment commitments. The certainty provided in the 45v statutory text and the current published version of the GREET model at the time the IRA was enacted should be reflected in the rulemaking. This is critical to maintain project viability and financial investments.

To account for this need for predictability and certainty, ***any application of the three pillars (together or individually) should be limited by a "beginning of construction" standard***—specifically, a "qualified clean hydrogen production facility" should be subject to the same Treasury requirements for the entirety its ten-year Section 45V credit. Based on the language of Code Section 45V and the existing GREET model, project developers and investors planned for and/or began construction of hydrogen projects. Millions of dollars were committed to hydrogen production projects. The delays in this rulemaking, and the uncertainty created by not following statutory intent, have delayed and jeopardized these projects, risking domestic business and jobs, as well as progress on nationwide decarbonization. First-movers should be encouraged to build the clean energy sector in the U.S.; the proposed rulemaking discourages these investments.

Grandfathering such projects through a rule that does not subject qualified projects to the concepts of the three pillars (a concept not envisioned in the statute) will support U.S. jobs and the clean hydrogen economy.

VI. Renewable Natural Gas and Fugitive Sources of Methane

Treasury should **ensure that a wider range of feedstocks are included in the rule,** particularly those with a negative carbon intensity, such as dairy, organic waste, poultry, and swine-based feedstocks. The hydrogen production pathways in the 45VH2-GREET 2023 model should also include 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 other pathways. We should not limit the capture of methane from any RNG production source, as it advances the country's ability to reduce short-lived climate pollutants that help our ability to curb and prevent climate change. RNG should not be held to a higher standard as, like electricity, RNG as a feedstock for hydrogen production provides a pathway for carbon negative hydrogen.

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. We should not be adding unnecessary roadblocks to meet the fueling demands of the hydrogen industry. Treasury should eliminate "first productive use" altogether to leave open the possibility for various pathways to produce RNG. Treasury can ensure market certainty by **allowing new and existing RNG facilities to shift to hydrogen production at any time to support emission reduction.** Failure to ensure that new and existing production RNG facilities can switch at any time toward supporting the country's zero emission goals may result in those facilities shutting down their operations for economic reasons and venting otherwise captured methane for productive use into the atmosphere.

Hourly temporal matching is incongruous with the way pipeline fuels systems and markets operate, and Treasury should avoid any such requirements. Market mechanisms for securing transmission and storage of RNG over the natural gas system are already in place.

Moreover, there is no ability for the RNG market to provide more volume granularity than monthly due to the natural gas industry's existing practices (i.e. pipeline operators issue reconciled injection statements monthly), therefore a more restrictive option is entirely unfeasible. The concept of hourly matching in the electricity industry derives, in part, from the instantaneous natural of electricity transmission. By contrast, natural gas moves at about 10-20 MPH when it is injected in a pipeline. As a result, natural gas is stored in the pipeline as linepack, or stored in natural gas facilities, and the time at which it produced and/or injected in a pipeline has nothing to do with the time at which it is consumed. **Hourly temporal matching should not be applied to RNG.**

The appropriate region for book and claim should be defined as the North American interconnected pipeline grid. The California Low Carbon Fuel Standard (LCFS) requirement for "plausible deliverability" should be used here.

Treasury should institute a book and claim provision for RNG and other low-emissions and certified natural gas without geographic restrictions. The current proposed rule only supports landfill gas physically connected to the production facility, thereby limiting the ability to capture short-lived climate pollutants. Expanding the rule to include landfill, dairy waste, organic waste, sanitation facilities, forest waste, and other biogas/biomass sources that is geographically dispersed will help unlock the production and use of RNG from waste products that would otherwise vent methane into the atmosphere. This can be accomplished if Treasury establishes a book and claim system like that currently used by the California LCFS program. Society's ability to capture short-lived climate pollutants (which includes methane) is key to preventing climate change. We should not be limiting our ability to capture these sources in any way and regulations like the federal Renewable Fuel Standard and state-run low carbon fuel standards have demonstrated a cost-effective means to generate such actions. 45V should be designed to help accelerate RNG production facilities of all types to help prevent further climate impact.

APPENDIX A

NEW YORK STATE | NYSERDA

KATHY HOCHUL
Governor

RICHARD L. KAUFFMAN
Chair

DOREEN M. HARRIS
President and CEO

August 3, 2023

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

Re: Notice 2022-58

Response to Request for Comments on
Credits for Clean Hydrogen and Clean Fuel Production:
Northeast Regional Clean Hydrogen Hub States

We, the undersigned Northeast state representatives, appreciate the opportunity to submit these comments in response to Notice 2022-58. We write with great enthusiasm for all the work that this administration has achieved in support of our mutual climate and energy goals. In particular, we write to express how important we believe that the support provided by this administration to the development of a robust clean hydrogen industry continues to be for our collective goals. We are applicants to the U.S. Department of Energy's Regional Clean Hydrogen Hubs program and otherwise have strong interest in other hydrogen offerings provided by this administration. It is regarding the hydrogen production tax credit that we write you today.

Like any nascent industry, the clean hydrogen industry will need many years and a variety of strong mechanisms to catalyze its potential to decarbonize hard to electrify sectors of the economy. The clean hydrogen industry, like others, must go through a multi-year process of building trust with counterparts, including investors, insurers, consumers, transporters, host communities, and others. It must take incremental risks to grow when its policy and economic paths are not yet defined. And it must continue to develop a constituency that embraces its value to decarbonization, resilience, air pollution mitigation, and other positive attributes (benefits). These processes take time. For a new industry to compete successfully against incumbent technologies such as coal and natural gas it must be supported, much like the country has supported other sources of energy, with tax credits, favorable market rates, initiatives to reduce soft costs, and so many other mechanisms.

Just as solar and wind has grown in their respective shares of the national energy market and have been supported for decades to meet the nation's growing needs for clean resources, the market is ready to take the next steps with clean hydrogen. State policies, like renewable portfolio standards and net metering with annual matching requirements, have resulted in once unthinkable growth in renewable technologies. This success in policy support for renewable energy should serve as the template for clean hydrogen. Clean hydrogen could play a pivotal role in the decarbonization of hard to decarbonize sectors in the United States. There is also an opportunity for our states, and the nation, to capture and maintain the lead in the hydrogen industry and reap the related jobs, economic growth, and pollution mitigation benefits alongside those of decarbonization.

The Inflation Reduction Act, including the Act's creation of the hydrogen production tax credit (45V), has the promise to significantly advance the decarbonization of the economy. If, however, proper policy is not implemented, that promise is unlikely to be fully achieved. The undersigned have concerns with attaching overly burdensome obligations, known as "Additionality," "Time Matching," and "Geographic Matching" to the hydrogen production tax credit provisions. The undersigned respectfully raise the following suggestions regarding these draft requirements of the new tax benefit.

Additionality

Although we share the concern that rapid additions of electrolyzers could potentially lead to greater emissions because of the increase in electricity demand, 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.

One of the purposes of the tax credits is to accelerate the growth of a scaled clean hydrogen industry. We do not see a strict "Additionality" obligation as consistent with achieving that goal in the long run as it could stifle the development of clean hydrogen and ultimately block the progress in hard to decarbonize sectors. Clean hydrogen is a nascent technology, and the policies to advance it must recognize the market barriers it faces coming to scale. Many existing clean resources in need of new markets and many projects in our states are at various stages of development and they are excited to play a role in clean hydrogen development. For the success of our power markets and decarbonization goals, a broad interpretation of "Additionality" would be critical to our success.

Geographic Matching / Deliverability

One of the goals for further development of the clean hydrogen industry as expressed by the Department of Energy, notably in its regional clean hydrogen hub solicitation, is to develop a nationwide industry for the fuel. We share this goal. Only a national industry is likely to be able to adequately create a flexible, reliable, cost-effective market that can meet the needs of so many hard-to-electrify sectors and be capable of matching the scale and scope of its potential customers.

The greater the obligation to match the location of the renewable power generation resource with the hydrogen production asset, the less likely it will be that either can reduce its respective costs and take advantage of the unique resources that each needs to be successful. Some proposals call for electrolyzers to be physically attached to the renewable power generator that it would use to produce hydrogen. In this instance, instead of both renewable developer and hydrogen developer selecting site characteristics that improve their ability to provide a low-cost energy resource, whether electron or molecule, they may both be forced to choose suboptimal areas and resources to ensure their physical connectivity, leading to higher energy prices and substantially fewer feasible projects. Renewables siting has long been, and continues to be, a challenge for the industry. Adding the renewable siting challenges to those of siting new hydrogen projects will compound costs, delays, and potentially lead to an increased risk of failed projects. Any increase in project failures or downsizing of projects will mean a sacrifice of good paying jobs and clean energy production. In other cases, costs may be higher and outputs suboptimal for long-term industry growth and affordability. Further, co-location has the potential to lead to suboptimal solutions, such as prioritizing the generation, which may prevent locating the hydrogen production in the best location for offtake, resulting in higher need for expensive and emission intensive transportation of hydrogen to the end use.

To ensure the tax credits help reduce production costs and ensure maximum supply to consumers, hydrogen producers must be able to guarantee certain quantities of production. If hydrogen production must have a physical interconnection with an intermittent renewable asset, then it will only produce hydrogen when that specific renewable asset produces power. While wind and solar forecasting are improving, wind and solar remain intermittent resources that do not produce uniform amounts of electricity over a given period. Electrolyzers are better operated continuously, rather than intermittently. By requiring a physical connection to a renewable asset, the inherent supply risk from intermittent resources would be added unnecessarily to electrolyzer projects at a time when the industry needs to reduce risks.

Time Matching

Time Matching is an important part of how many RPS programs have been developed, mostly using annual matching, which is the industry standard. We are not aware of a tracking system in North America that has the ability to fully implement hourly tracking for all renewable sources. Many RPS programs and behind the meter programs were instituted for much the same reason as the hydrogen production tax credit - to support the scale up of new industries that could not otherwise compete on their own. These programs have been highly successful. Requiring hourly matching would significantly

impact the economics of clean hydrogen projects. A preliminary look at work being performed on hydrogen for Connecticut indicates that hourly matching would approximately double the cost of clean hydrogen as compared to annual matching. Hydrogen would benefit from the same support pathway provided to other clean energy sectors.

We appreciate this opportunity provide these comments and express our continuing support of this important initiative.

Respectfully Yours,

Doreen Harris
President & CEO, New York State Energy Research and Development Authority

Elizabeth Mahony, Commissioner
Massachusetts Department of Energy Resources

Dan Burgess
Director, Governor's Energy Office Maine

Katie Dykes
Commissioner, Connecticut Department of Energy & Environmental Protection

Chris Kearns
Acting Commissioner, RI Office of Energy Resources

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

July 14, 2023

Re: Notice 2022-58 Request for Comments on Credits for Clean Hydrogen and Clean Fuel Production

The Washington State Department of Commerce appreciates the work that the US Internal Revenue Service is conducting to determine the best guidelines for the forthcoming § 45V clean hydrogen production tax credit (PTC). We are grateful for the consideration both of the critical need to contribute to reducing the cost of clean hydrogen, and to the need to consider the lifecycle greenhouse gas (GHG) impacts of hydrogen production and focus incentives on hydrogen produced with the lowest GHG emissions.

The Washington State Department of Commerce submitted comments to the US IRS in December 2022 regarding the § 45V PTC in repose to an RFI. These comments were largely focused on complementarity with the Clean Fuel Standard in Washington State to ensure that they ways in which hydrogen producers generate and account for the lifecycle GHG impacts of hydrogen production are aligned.

Since these comments were submitted, there have been increasing discussions about the "three pillars" of hydrogen production via electrolysis, which is the production method of the greatest focus in Washington state. We have determined that additional clarification will be helpful regarding these policies and would like to submit additional comments at this time.

Additionality in states with clean electricity laws and binding greenhouse gas limits
Our agency agrees that it is extremely important that the PTC rules avoid the unintended consequence of incentivizing the production of electrolytic hydrogen in a way that causes increased emissions of GHGs. The discussions and analysis around the "three pillars" of additionality, deliverability, and hourly matching have provided a valuable context in which to identify the circumstances in which the tax credit could lead to an inadvertent increase in emissions.

However, the advocates for three pillars consistently assume, explicitly or implicitly, a single national policy landscape with no effective requirement to limit use of fossil fuels in electric power generation and no binding limit on the emissions of greenhouse gases. While this assumption may be accurate with respect to many jurisdictions, it fails to reflect important differences in law among states. The case for an additionality requirement is unfounded in Washington state because of its statutory 100% clean electricity standard and its statutory GHG cap-and-invest regulation.

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.

Washington's clean electricity law, the Clean Energy Transformation Act (Chapter 19.405 RCW) requires that electricity consumed in Washington be greenhouse gas neutral by 2030. This law applies to electricity used in Washington to produce hydrogen, including electricity imported from other states. Further protection exists in the Washington cap-and-invest law (the Climate Commitment Act, Chapter 70A.65 RCW), which applies to electricity generation and imports of electricity. With the number of GHG allowances fixed under that law, any increase in emissions from electricity would require a reduction in emissions from some other source in Washington. Moreover, the cost of purchasing allowances under this program makes fossil fuel power generation more expensive than renewable generation, especially with the increased federal tax credits for renewable energy generation. The combined impact of these regulations and market incentives for renewables provide a high degree of confidence that hydrogen used in Washington State will be made using renewable power.

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.** Making this kind of distinction will help ensure states such as Washington which already have strong regulations on the books can get to work producing green hydrogen at a low cost and with very low carbon footprint quickly, and could serve to motivate other states interested in hydrogen production to consider passing similar policies. This can support additionality goals and renewable electricity production broadly across the country, for all sectors of the economy including but not limited to hydrogen. This approach would be similar to the European Commission's Delegated Regulation which also distinguishes approaches additionality differently for zones with grids dominantly served by renewable electricity.

Thank you for your consideration of these comments so that we can ensure this valuable tax credit achieves its goals to help drive private sector investments in clean hydrogen production to reduce costs, while ensuring the associated GHGs are low, with the appropriate differentiations made to respond to local regulatory context.

Please feel free to reach out with any questions regarding this topic. We appreciate the opportunity to provide additional comments on this important issue.

Sincerely,

Michael Furze
Assistant Director, Energy Division
Washington State Department of Commerce

August 23, 2023

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

Re: Notice 2022-58-- Response to Request for Comments on Credits for Clean Hydrogen (H2) and Clean Fuel Production

Thank you for the opportunity to submit comments in response to **Notice 2022-58.** We are deeply appreciative of this Administration's prioritization and commitment to a clean energy future and efforts to ensure states have the resources needed to deploy effective programs and strategies. We enthusiastically support the Administration's Regional Clean Hydrogen Hubs program–or H2Hubs–that will catalyze the development of domestic carbon-free energy and fuels across America. These hubs will accelerate the decarbonization of hard-to-reach sectors, improve our energy security, establish good-paying green jobs, and help communities benefit from clean energy investments.

California has long been a leader in cleaning the air and fighting against climate change. The state has committed to a clean, renewable future with ambitious goals that the state plans to meet through a number of initiatives aimed at achieving carbon neutrality by 2045. Renewable clean hydrogen must be an integral part of California's clean energy portfolio to achieve that goal. To organize and accelerate the hydrogen market, California launched the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES), a public private partnership founded by the Governor's Office of Business and Economic Development (GO-Biz), the University of California Office of the President, The State Building and Construction Trades Council, and Renewables 100 Policy Institute. ARCHES is tasked with establishing a hydrogen ecosystem that drives down the cost of renewable hydrogen, while increasing renewable energy penetration and achieving our net zero and carbon goals on an accelerated schedule.

Based on California's extensive experience to successfully bring clean technologies to market, we know that success hinges on getting market signals right, enabling a level playing field among low- and zero-carbon technologies and working from the perspective of operating a multi-level, multi-sectoral energy system, not just individual projects.

Therefore, launching "new" technologies requires thoughtful collaboration and discussion on all levels to ensure a positive outcome. A viable and successful demand-side support mechanism for clean hydrogen and ultimately a regional and national network of H2 hubs requires a comprehensive, systems-level policy framework that ensures three objectives: 1) timely and consistent clean H2 production; 2) competitive pricing; and 3) suitable point of delivery. To achieve these three objectives, policy mechanisms must provide Transparency, Long-term objectives, and Consistency (TLC) throughout all phases of design and implementation. These are necessary to ensure clear, long term demand-side support resulting in steady offtake and corresponding H2 price reductions, which are stated objectives for the U.S Department of Energy (DOE) Hydrogen programs.

We write today in support of the new § 45V clean hydrogen production credit as it is central to our efforts to decarbonize California and key to our national goals for H2. But most importantly, we write to urge that policies and regulations ensure a level playing field for hydrogen to other energy technologies. **It is critical that pathways for market liftoff not single out and overburden one technology or resource with onerous geographic, time matching, and "additionality" requirements.**

Strict geographic and deliverability requirements will stifle the system.

- Requiring an obligation to match the location of the renewable power generation resource to the hydrogen production asset will add additional costs in many cases and inhibit placing renewable energy generation and hydrogen production in the best locations.

Time Matching needs to align with similarly situated technologies.

- Like other renewable portfolio standards, hydrogen should be allowed to use annual matching—the industry standard—vs. hourly tracking. In addition, such requirements should be carefully calibrated to have similar applicability for like technologies/or resources, such as batteries (stationary and mobile), pumped hydro, or compressed air, etc.

Additionality should not be required for jurisdictions with Renewable Portfolio Standards and clear commitments to decarbonize all sectors of the economy.

- Current implementation policies for renewable portfolio standards do not require additionality be tied to electric vehicles connected to the grid, battery energy storage, or any other decarbonization solution being deployed to meet climate and energy goals. Hydrogen should not have to follow a different approach. Requiring additionality for hydrogen alone would significantly impact the technology's ability to reach its full potential and prevent California (and the U.S.) from building a system that can be optimized to decarbonize all sectors of the economy.

The argument for requiring additionality, 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 them in a timely and cost-effect manner without disrupting our carefully calibrated energy system.

In other words, additionality, time matching and geographic co-location requirements for H2 would not allow California to optimize its system to accelerate deep decarbonization in all sectors. Similar to electrifying other sectors like transportation, buildings, and industry, which we account for, hydrogen is already part of our comprehensive energy system planning process. Taking hydrogen outside of this process–with additional burdensome requirements–will have an unnecessary negative impact system wide.

As we work to increase support for hydrogen among consumers and motivate the market towards investment and inspire manufacturers to build hydrogen production facilities, the hydrogen ecosystem should not be unfairly burdened by its own set of unique rules and regulations. Instead, policies should be structured so that hydrogen follows similar requirements as other similarly situated technologies. This will attract private investment and amplify any incentives put forth by the government at all levels.

Thank you for the opportunity to share our thoughts. ARCHES is fully committed to accelerating California's transition to a carbon-free economy, and we look forward to working together to implement a clean hydrogen future for our country.

Sincerely,

Angelina Galiteva

CEO, ARCHES; Founder and Board Chair, Renewables100 Policy Institute

Tyson Eckerle

Senior Advisor for Clean Infrastructure and Mobility, California Gov's Office of Business & Economic Development (GO-Biz)

Scott Brandt

COO, ARCHES; Associate Vice President for Research & Innovation, University of California Office of the President

Chris Hannan

President, State Building and Construction Trades Council of California (SBCTC)