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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: IRS Docket No. REG-117631-23 – Comments in Response to Section 45V Credit for Production of Clean Hydrogen; Section 48(a)(15) Election To Treat Clean Hydrogen Production Facilities as Energy Property

The Connecticut Department of Energy and Environmental Protection (CT DEEP) appreciates the opportunity to submit comments to the Department of the Treasury (Treasury) and the Internal Revenue Service (IRS) in response to proposed regulations under Section 45V of the Internal Revenue Code published in the Federal Register (26 CFR Part 1) on December 26, 2023.

Connecticut is a longtime leader in climate action and is aligned with the overall Biden Administration's climate goals. The state is actively pursuing its ambitious mandatory goals for greenhouse gas (GHG) emission reductions of 45% below 2001 levels by 2030[1] and 80% below 2001 levels by 2050[2], as well as a 100% zero-carbon electric sector requirement by 2040[3]. Moreover, Connecticut is committed to advancing and deploying clean hydrogen in an equitable manner. The Connecticut legislature established a nation-leading requirement for hydrogen projects over 2MW to secure community benefit agreements.[4] Currently, CT DEEP is developing a Clean Hydrogen Roadmap which will identify how hydrogen can help the state decarbonize its

[1] Public Act No. 18-82 - An Act Concerning Climate Change Planning and Resiliency.
[2] Public Act No. 08-98 - The Global Warming Solutions Act, Section 22a-200a of the Connecticut General Statutes.
[3] Public Act No. 22-5 - An Act Concerning Climate Change Mitigation.
[4] Public Act 23-156 – An Act Implementing Recommendations of The Hydrogen Task Force.

economy. These regulations will significantly impact what role hydrogen can play in Connecticut's path to decarbonization.

In addition to its nation-leading climate efforts Connecticut is also home to world-leading fuel cell and electrolyzer technologies, and hydrogen-related research, development and innovation. As such, CT DEEP applauds the Biden Administration's efforts in fostering clean hydrogen as a pathway to decarbonize the hardest-to-electrify sectors, including Section 45V of the Internal Revenue Code (Credit for production of clean hydrogen) introduced by the Inflation Reduction Act (IRA). However, CT DEEP is concerned that some key requirements of the proposed §45V regulations (§ 1.45V–4(d)(3)) related to using electricity from certain renewable or zero-emissions sources to produce qualified clean hydrogen will likely produce the opposite effects of those intended, i.e., they will encourage the production of less clean types of hydrogen rather than the cleanest ones in the long run. Further, we are concerned that these requirements may compromise the Biden Administration's Hydrogen Shot goal of bringing clean hydrogen costs down to $1 per kilogram by 2031.

CT DEEP appreciates the opportunity to discuss these elements below.

1) Incrementality requirement

The proposed § 1.45V–4(d)(3) would provide that an Environmental Attribute Certificate (EAC) meets the requirements to be a qualifying EAC if it meets the requirement for incrementality, among others. The proposed § 1.45V–4(d)(3)(i)(A) would provide that an EAC meets the incrementality requirement if the electricity generating facility that produced the unit of electricity to which the EAC relates has a Commercial Operation Date (COD) that is no more than 36 months before the hydrogen production facility for which the EAC is retired was placed in service.

This requirement assumes that all states have no effective binding requirements to limit the use of fossil fuels in electric power generation and the emissions of greenhouse gases, which is not the case. As a participating state of the Regional Greenhouse Gas Initiative (RGGI), Connecticut has a power sector CO2 emissions cap. Given the fixed number of CO2 allowances, if CO2 emissions rise due to electrolytic hydrogen production, they would have to be compensated by an equivalent reduction from some other source. Moreover, the cap-and-invest program makes power generation from fossil fuels more expensive, indirectly incentivizing the

production of renewable energy. Additionally, Connecticut's Renewable Portfolio Standard (RPS) requires electricity providers to offset a specified percentage of the energy they generate or sell by purchasing EACs from renewable sources.[5] The percentage is set to increase over the years, and as mentioned before, the state has a mandatory obligation of 100% zero-carbon electric sector by 2040.

By definition, the RPS or renewable energy requirements based on a percentage of load already provide a mechanism to automatically adjust renewable energy generation for the new clean load. Connecticut and other states with such mechanisms , e.g. such as New York, Rhode Island and Massachusetts, already meet the incrementality criterion; therefore the obligation is unnecessary. However, the requirement could be a barrier to the development of clean electrolytic hydrogen for various reasons.

First, unlike what would occur if incremental production of renewable energy were to occur through the RPS mechanism, the proposed incrementality requirement lays the obligation to adjust the renewable energy generation to the clean electrolytic hydrogen producers. This mechanism will likely lead to higher hydrogen prices since only clean electrolytic hydrogen producers will bear the cost to build out new clean energy generation. Under the RPS mechanism, the cost would be spread out through all ratepayers, contributing to lower clean hydrogen prices. This would have the effect of bifurcating the RPS market into a price for existing renewable generation and a different price for existing generation. This is inconsistent with the foundation of the regional RPS market which does not distinguish between new and existing. In the long run, this is considered to be more economically efficient as the zero carbon generation fleet ages and requires investments to maintain operation. Thus, the incremental requirement for hydrogen, but not for other demand resources, such as economic growth and electrification of the transportation and cooling sectors creates a distorted market.

Requiring incrementality in regions with RPS obligations tied to electric demand also creates an uneven playing field for those states that have an RPS because clean generation in those regions have a robust competitive market for the environmental attributes of clean generation that does not exist in regions that do not have an RPS. A clean energy developer in a region with an RPS can sell the attribute to in the market at a price driven by the RPS while a generator in a

[5] See Renewable Portfolio Standards Overview (ct.gov).

region without an RPS does not have this option. Thus, the attribute of clean generation will likely have a higher price in a region with an RPS than in a region without one.

Second, in practice, the requirement excludes the use of existing clean electricity generators, such as nuclear energy and hydropower, since the facilities were built decades ago, and building new ones is more complex, capital-intensive, and time-consuming than other large-scale power generation plants. Regarding nuclear energy specifically, it is worth noting that it is an excellent power source for hydrogen production, given its high energy density, constant energy supply, and higher cost-effectiveness than renewable sources. The exclusion of such a clean energy source will negatively impact the advancement of clean electrolytic hydrogen, especially in states where nuclear energy represents a large share of electricity generation – such as the case of Connecticut, where nuclear power is responsible for about 37% of the state's electricity. Moreover, the use of nuclear energy from existing and new nuclear plants is explicitly incentivized by the IRA (Section 45U: Zero-emission nuclear power production credit). Setting a clean hydrogen production tax credit regulation that essentially excludes the use of existing nuclear energy generators as a low-carbon source of electricity for hydrogen production is inconsistent with the IRA.

Further, nuclear resources throughout the nation face significant economic pressure as energy prices are pushed lower by low-priced but emitting natural gas generation and/or new, efficient renewable generation coming online driving down wholesale energy prices. Nuclear resources provide significant zero carbon generation and reliability benefits that are not valued in the current markets. The more the markets recognize the value provided by nuclear resources, the less likely we are to see retirements of these valuable resources. It important that the hydrogen tax credit recognizes this risk and need by allowing existing nuclear resources to support green hydrogen.

Although the Treasury and the IRS are considering approaches to incorporate existing clean generators – such as deeming five percent of the hourly generation from minimal-emitting electricity generators placed in service before January 1, 2023, as satisfying the incrementality requirement – CT DEEP believes such approaches should be tailored according to states' policies regarding clean energy and the existence of other particular circumstances (e.g. the risk of existing clean generator retirement). In the case of Connecticut, restriction on the use of nuclear energy for clean electrolytic hydrogen production is unfounded. Given the state's RPS, if nuclear

energy is diverted for the hydrogen production, other sources of renewable energy must come on line for RPS compliance. Additionally, the up to ten-year process to renew the licenses for both of Connecticut's nuclear units will need to begin in the next couple of years or the units will have to retire in 2035 and 2045, respectively. Using nuclear energy for hydrogen production could prevent their retirement.

In sum, CT DEEP believes that the incrementality element may be a reasonable requirement for states that do not have clean electricity requirements based on load percentage and GHG caps. However, the agency also believes that different treatment should be given to states that provide such policy measures. Therefore, CT DEEP respectfully requests that the Treasury and the IRS consider waiving the incrementality requirement for such states. Even if states with an RPS are not waived from the incrementality requirement, CT DEEP requests that nuclear facilities be included within the definition of incrementality given the financial pressure those resources face without market recognition of the zero carbon benefits.

2) Temporal Matching

The proposed § 1.45V–4(d)(3) would provide that an Environmental Attribute Certificate (EAC) meets the requirements to be a qualifying EAC if it meets the requirement for temporal matching, among others. The proposed § 1.45V–4(d)(3)(ii)(A) would provide the general rule that 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. Proposed § 1.45V–4(d)(3)(ii)(B) would provide a transition rule to allow an EAC that represents electricity generated before January 1, 2028 to fall within the general rule provided in proposed § 1.45V–4(d)(3)(ii)(A) 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.

CT DEEP believes hourly matching is the right direction for accounting EACs not only for clean hydrogen production but also in general. However, specifically for clean hydrogen, the transition period proposed is extremely short. Nascent technologies need incentives for an extended period of time to mature. We are seeing this with other technologies that will take us to a cleaner future, such as battery electric vehicles. Section 1.45V–4(d)(3) proposes mature technology requirements for a nascent technology, jeopardizing its potential to mature. The

obligation could produce effects in direct conflict with the intent of the clean hydrogen production tax credits and the Biden Administration's Hydrogen Shot goal of bringing the cost of clean hydrogen down to $1 per kilogram by 2031.

With the hourly-matching requirement starting on January 1, 2028, CT DEEP is concerned that there will be insufficient time to initiate deployment of clean electrolytic hydrogen infrastructure to a degree that technology costs begin to decline, which is crucial to lower clean electrolytic hydrogen production costs without tax incentives. Even with the production tax credit, clean electrolytic hydrogen costs will likely remain high since the hydrogen production under hourly matching will require oversized renewable energy plants and electrolyzers (which will be idle for a certain period), and additional energy storage than it would be necessary under annual matching.

CT DEEP has commissioned a forthcoming draft Clean Hydrogen Roadmap which calculates the levelized cost of hydrogen (LCOH) considering both annual and hourly matching accounting methodologies and the production tax credits. The modeling reveals that clean electrolytic hydrogen production costs would increase by around 185% under hourly matching ($5.04/kg) compared to annual matching ($1.77/kg) in 2027, making clean electrolytic hydrogen non-competitive vis-à-vis less clean types of hydrogen or fossil fuels. Clean electrolytic hydrogen production costs remaining high will deter the demand growth for this type of hydrogen and, consequently, deter additional investment in production. If clean electrolytic hydrogen production cannot mature and be produced at scale, it will never achieve the economies of scale necessary to bring the prices down without incentives in a later phase. As a result, electrolytic hydrogen production will be very limited in the U.S., and certainly not happen in Connecticut and possibly also in other Northeast states.

The IRS' goal in proposing the hourly matching requirement is to encourage the production of one of the cleanest types of hydrogen and promote the transition to a decarbonized economy. Although hourly matching will likely allow the largest GHG emissions reductions, that is only possible if clean electrolytic hydrogen production happens at first place. Imposing the hourly matching requirement in 2028 is too early for such a nascent technology. It will likely produce the opposite result in the long run. It will promote essentially fossil-based hydrogen, since it will be significantly cheaper than clean electrolytic hydrogen, contributing to higher GHG emissions and extending the use of fossil fuels.

The CT Clean Hydrogen Roadmap also shows that importing electrolytic hydrogen from other states is expensive due to transportation costs, limiting the demand. Since the state has limited interest in non-clean electrolytic hydrogen, the virtual absence of in-state clean electrolytic hydrogen production and little import will likely curb the whole hydrogen economy in Connecticut.

From the emissions point of view, it is also important to note that the CT Clean Hydrogen Roadmap calculates the clean electrolytic hydrogen production considering the annual matching tracking system and a hydrogen production lifecycle methodology following the U.S. Department of Energy Clean Hydrogen Production Standard (CHPS) Guidance[6] (well-to-gate). Under the modeling assumptions, it was found that the carbon intensity of clean electrolytic hydrogen production using EACs on an annual basis is lower than 0.45 kilograms of CO2e per kilogram of hydrogen, which falls in the lowest lifecycle GHG emission tier for purposes of § 45V(b)(1), according to § 45V(b)(2). Hence, it is clear that it is possible to produce clean electrolytic hydrogen with minimal CO2 emissions with an annual accounting system for the EACs. That would provide large net emissions abatement without being economically impractical.

The higher electrolytic hydrogen costs due to the proposed annual matching requirement not only will prevent the Hydrogen Shot from achieving its goal, but also will have the opposite effect of those intended related to CO2 emissions. The regulation with the hourly matching requirement significantly favors the production of other less clean types of hydrogen, which are much cheaper than clean electrolytic hydrogen even after the latter receives the highest tax credit amount since the hourly matching acutely raises the costs. This means that the tax credits will help build a strong economic environment for fossil-based hydrogen production and not for clean electrolytic hydrogen. Thus, if the goal of the tax credits is to help push the cleanest types of hydrogen to a scale that is self-sustaining without the tax credits, the regulation must recognize the price implications of its regulations to ensure that the long-run emissions are minimized. That is, we should expect that the cheapest hydrogen to be produces is what the market will develop. If the regulations place an onerous burden on clean electrolytic hydrogen when it is at the infancy of its development, it will never develop into the primary technology. Thus, even if

[6] U.S. Department of Energy Clean Hydrogen Production Standard (CHPS) Guidance.

hourly matching provides for cleaner hydrogen than annual emissions, if the regulations do not support the technology, the cleanest hydrogen will never come to fruition.

CT DEEP acknowledges that in order for Connecticut to achieve net zero emissions, all hydrogen production would eventually need to be supplied with zero-carbon electricity on an hourly basis, which would be in line with Connecticut's 2040 zero-emission electricity sector target. However, as hydrogen, renewable electricity, and electricity storage technologies are still on the pathway to realize cost reductions, CT DEEP believes that annual matching is the best near-term temporality requirement to help hydrogen scale at the pace needed. As the technology matures and clean electrolytic hydrogen is produced at scale, more frequent matching systems, such as monthly or hourly, can be appropriate. Other nascent energy-intensive technologies that source electricity from the grid, such as electric vehicles, behind the meter programs that helped spur the incredible costs reductions for the solar technology, and electrification of the heating sector are not required by the federal government to comply with hourly matching. CT DEEP respectfully requests that the Treasury and the IRS reconsider the temporal matching requirement and provide clean electrolytic hydrogen production with the same treatment given to other energy-intensive technologies.

3) Deliverability

The proposed § 1.45V–4(d)(3) would provide that an Environmental Attribute Certificate (EAC) meets the requirements to be a qualifying EAC if it meets the requirement for temporal matching, among others. Proposed § 1.45V–4(d)(3)(iii) would provide that an EAC meets the deliverability requirements if the electricity represented by the EAC is generated by a source that is in the same region (as defined in proposed § 1.45V–4(d)(2)(vi)) as the relevant hydrogen production facility.

States that have ambitious GHG emission reduction goals, GHG emission caps, and RPS the require renewable energy generation as percentage of the electricity load, such as Connecticut, New York, Rhode Island, and Massachusetts, have already created a market for EACs. Therefore, the prices of those certificates in such regions are higher than in states that do not have such a developed market.

Connecticut's RPS allows EACs from ISO-NE and neighboring Regional Transmission Organizations (RTO). Limiting the use of EACs generated only by sources that are in the same

transmission region of the hydrogen production (in the case of CT, ISO-NE) will further limit the offer of EACs vis-à-vis the increasing demand from the clean electrolytic hydrogen production. The result will be even higher EACs prices, driving clean electrolytic hydrogen production costs up. The deliverability requirement creates imbalances among the states, disadvantaging those that have stricter GHG emission regulations and renewable portfolio standards, but with fewer natural resources to generate renewable energy than other regions.

CT DEEP respectfully requests that Treasury and the IRS reconsider the deliverability requirement by allowing the EACs to be generated by a source that is in the same region and neighboring RTOs as the relevant hydrogen production facility, as long as the power of other RTOs is scheduled in.

CT DEEP appreciates the opportunity to submit comments on the proposed regulations and welcomes further discussion on any of the issues raised herein.

Respectfully submitted,

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