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SUBMITTED ELECTRONICALLY

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 | Notice of Proposed Rulemaking for the Clean Hydrogen Production Credit (Section 45V)

On behalf of Antora Energy, I am pleased to submit comments to the Department of the Treasury (Treasury) and the Internal Revenue Service (IRS) in response to their Notice of Proposed Rulemaking (NPRM) for the Clean Hydrogen Production Credit, Section 45V (REG–117631-23).

The enclosed comments provide relevant examples from Antora Energy's experience as a long duration energy storage company structuring innovative clean electricity procurement contracts in power markets. Antora Energy welcomes the opportunity to respond to the Treasury and IRS' inquiry regarding the incrementality requirement for clean electricity generation, as accurately accounting for the full economic value of clean power generation assets will be critical to accelerating the decarbonization of the grid while ensuring ongoing reliability and resilience.

Antora Energy agrees with the Treasury and IRS' assertion that there are certain circumstances during which the use of existing clean electricity generation for green hydrogen production would result in zero or minimal induced grid emissions. As such, Antora Energy respectfully recommends that the Treasury and IRS consider the types of transactions detailed below as satisfying the incrementality requirements of the proposed 45V rule and other related tax incentive programs.

We appreciate the opportunity to respond and thank you for your time and consideration.

Sincerely,

Jordan Kearns
VP of Project Development
Antora Energy

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Background on Antora Energy

Based in Sunnyvale, CA, Antora Energy manufactures thermal battery modules that convert low-cost, intermittent renewable electricity into reliable, on-demand zero-emissions industrial heat and power. This technology provides a cost-effective solution to decarbonize a wide range of commercial and industrial processes by using zero-emissions electricity when it's inexpensive and abundant to heat blocks of carbon, storing that thermal energy for hours or days, and then discarching it as heat or power, whichever form is more useful to the customer.

The company has received funding from the U.S. Department of Energy's Advanced Research Projects Agency-Energy and Industrial Efficiency and Decarbonization Office; the National Science Foundation; and the California Energy Commission. Antora is also backed by leading investors including Decarbonization Partners, Breakthrough Energy Ventures, Lowercarbon Capital, Emerson Collective, Shell Ventures, and BHP Ventures. When deployed at scale, Antora Energy's products will eliminate gigatons of emissions while strengthening the U.S. manufacturing sector.

Incrementality

The NPRM for clean hydrogen production establishes guardrails commonly referred to as the "three pillars" – incrementality, deliverability, and time matching. Collectively, these guardrails seek to ensure that the significant growth in electrical load for green hydrogen production does not inadvertently induce additional grid emissions.

The incrementality requirement is intended to reduce the risk of existing clean electricity that is already deployed to useful purposes from being diverted to hydrogen production, inducing significant emissions elsewhere on the grid as an indirect consequence. Critically though, the Treasury and IRS acknowledge that there are certain circumstances during which the diversion of existing clean electricity generation is unlikely to result in significant induced emissions, including periods during which this electricity is otherwise curtailed. The Explanation of Provisions states

> "Purchasing EACs [energy attribute certificates] from existing minimal-emitting electricity generators under these conditions would have limited or no induced grid emissions as these are times during which increased load would tend to be met by the otherwise curtailed minimal-emitting electricity generators rather than inducing increased generation from emitting electricity generators, and so is unlikely to significantly increase induced grid emissions."

Zero-to-negative electricity prices are a reliable indicator of these conditions. While negative pricing often indicates situations where clean power is subject to curtailment, negative pricing can also indicate other scenarios where the addition of load would not induce new emissions intensive generation. Zero or negative nodal power prices (LMP) indicate that the marginal generating resource has no fuel costs – that is to say, it is a zero-emissions resource. If a renewable generator is the

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marginal resource, the addition of new load at that node would *not* lead to additional induced grid emissions. This is intuitive as a negative price indicates the market is oversupplied with electricity relative to useful demand (i.e. a positive willingness to pay). Such negatively priced power commonly induces loads simply to safely manage and absorb this generation, such as large load banks which dissipate this energy as heat to the atmosphere without useful purpose. Because these dissipation loads do not have a positive willingness to pay, the addition of new, useful load would simply supplant the dissipation load without inducing new emissions intensive generation.

Consistent with Treasury and IRS' finding that diversion of renewable generation in certain circumstances would not induce new emissions, we respectfully urge the Treasury and IRS to recognize the following about existing clean generation assets as they finalize rules regarding incrementality:

1. The untapped emissions reduction potential of these assets is large;
2. Expanding the use of existing assets is more economically efficient than building new assets;
3. Taxpayers have already subsidized existing assets, and requiring them to subsidize new assets in instances where existing assets could be used without inducing grid emissions would be an unnecessary use of taxpayer funding.

While the formulaic approach outlined in V.C.2.a.iii of the Explanation of Provisions would establish an allotment of qualifying EACs based on 5-10% of hourly generation from existing clean energy assets, Antora's experience indicates that this approach could lead to significant power market inefficiencies and fail to utilize large quantities of curtailed power from certain assets. For example, certain wind farms in ERCOT, SPP, and MISO curtail upwards of 30% of nameplate capacity and over 50% of generation can occur when prices are negative; this formulaic approach, while potentially minimizing administrative burdens at a national level, would therefore significantly undervalue the potential of these resources to contribute to low-carbon solutions such as clean hydrogen production. Incentivizing new customers to contract offtake agreements with power providers of highly curtailed assets like these would not only enable industry to realize the full potential of these assets, but also help electric utilities lower their net operating costs by enabling them to sell energy that would otherwise be wasted.

Therefore, Antora Energy recommends any incrementality rules included by the Treasury and IRS allow a zero-carbon generating resource currently exposed to frequent curtailment or negative pricing to qualify a demonstrable portion of their generation as incremental for the purposes of 45V, similar to the approach outlined in V.C.2.a.ii. Our experience indicates that this approach not only supports a more efficient resource allocation of grid assets, but is also administrable in practice based on facility-specific evidence.

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The portion of electricity from an existing resource considered incremental could, for example, be calculated based on a three-year historic baseline; this measure could be imputed using a historic "backcast" of negatively priced or curtailed power, as the addition of new load from hydrogen production would impact forward power pricing and consume the energy that would have been curtailed, precluding its direct measurement. This backcast can be performed by analyzing the quantity of power produced when the relevant nodal wholesale electricity prices were negative. Curtailment likewise can be imputed from generator operating procedures and a comparison of wind or solar farm generation potential to actual generation. This method of calculating curtailment is widely accepted and used in the market to allocate the costs of curtailment between parties, resulting in hundreds of millions of dollars of payments annually.

In summation, the Treasury and IRS should seek to encourage these sorts of procurement agreements under federal tax incentives like 45V by providing a means or method to recognize curtailed electricity as incremental. This provision would align with Congress' intent to facilitate meaningful net emissions reductions and with the Treasury and IRS' resulting interpretation of § 211(o)(1)(H) of the Clean Air Act. Moreover, it would ensure efficient use of existing resources, lowering the costs of the "three pillars" framework for producers and of operation for electricity generators by maximizing the value of today's infrastructure and energy assets. Regarding the exact method, the Treasury and IRS should credit curtailed and negatively-priced power in a way that is reflective of the specific project conditions, based on wind and/or solar farm provided data and market data or other evidence similar to the methods described above.