

May 24, 2023

The Honorable Janet Yellen
Secretary
U.S. Department of the Treasury
1500 Pennsylvania Avenue, N.W.
Washington, DC 20220

The Honorable Jennifer Granholm
Secretary
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, DC 20585

The Honorable John Podesta
Senior Advisor to the President for Clean Energy
Innovation and Implementation
The White House
1600 Pennsylvania Avenue, N.W.
Washington, DC 20220

Re: Hydrogen PTC (45V) implementation – Carbon matching offers a more cost-effective and scalable alternative to local hourly energy matching and prevents the increased emissions that would result from annual energy matching

Dear Secretary Yellen, Secretary Granholm, and Mr. Podesta,

As you are aware, significant debate has arisen in recent months over the best methodology for determining lifecycle greenhouse gas emissions of hydrogen production when calculating the applicable amount of the 45V tax credit (“45V PTC”). The dominant discourse has focused on **local hourly energy matching** as the only solution to the increased emissions that would result from **annual energy matching**. We write today for two reasons: (i) if local hourly energy matching is adopted as part of 45V PTC implementation, to highlight the critical importance of defining “local” in such a way that avoids increasing carbon emissions, and (ii) to advocate for **carbon matching** as a more cost-effective and scalable alternative compliance pathway that also solves the problem that local hourly energy matching addresses.

Critics of annual energy matching correctly assert that, if implemented, annual energy matching will significantly increase carbon emissions due to the variable emissions intensity of electricity in time and space. This challenge mirrors the central issue in the current Greenhouse Gas Protocol carbon accounting debate where, under current GHG guidance which aligns closely with the annual energy matching methodology, it is already established that actual emissions may be understated by up to 50%.¹ As such, we do not believe annual energy matching should be allowed for 45V PTC compliance beyond a minimum phase-in period.

However, it is critical to acknowledge that local hourly energy matching may also materially increase carbon emissions if “local” is not defined with sufficient granularity. This is due to the frequent and often significant disparity in the carbon emissions impact of energy consumption and generation at different locations, including within the same electric grid or balancing authority. This disparity is caused by

¹ Wall Street Journal, [Carbon Accounting Changes Could Lift Corporate Greenhouse-Gas Emissions](#), May 18, 2023.

transmission constraints, and is increasingly common and increasingly severe in areas with high renewable energy penetration.² As such, if local hourly energy matching is adopted as part of 45V PTC implementation, it is critical that the geographic scope of “local” is defined sufficiently tightly to avoid the increase in emissions that would be caused by transmission constraints.³

To the extent that the Department of the Treasury is concerned that the added cost and geographic restrictions of local hourly energy matching will limit the long-term scalability of green hydrogen, an attractive solution would be to allow carbon matching as an alternative compliance strategy.

Although carbon matching has received less attention in the 45V PTC debate than either energy matching methodology (i.e., annual and hourly), it is far from novel. Carbon matching mirrors the way in which the financial operations of most US wholesale electricity markets have worked for well over a decade, where revenues and costs are calculated using location-specific marginal prices.

Carbon matching solves the same problem as local hourly energy matching – which is to avoid the increased emissions that result from annual energy matching – but it does so in a way that is much more geographically flexible, cost-effective, and scalable.⁴ While local hourly energy matching can ensure that hydrogen projects are carbon neutral, there is a significant risk that developers will not fully utilize the tax credit given the geographic restrictions and financial cost of local, hourly energy matching compliance.

Today, estimated marginal emissions rates are available across the entire country from nonprofit and industry sources. Furthermore, PJM, the largest US electrical grid, has already begun publishing locational marginal emissions and the bipartisan 2021 Infrastructure Bill tasked the US Energy Information Administration to make marginal emissions data widely available for balancing authorities and pricing nodes throughout the country.^{5,6}

The undersigned entities are committed to supporting the development of a robust green hydrogen production industry while ensuring consistent reduction of carbon emissions. In order to achieve these goals, we believe it is vital that: (i) annual energy matching is prohibited as a strategy for complying with the 45V PTC beyond a minimum phase-in period, (ii) local hourly energy matching must incorporate geographic boundaries that are defined sufficiently tightly, so as to account for transmission constraints

² For example, two similar solar projects located within the same grid and zone in Texas, but separated by just 40 miles, can realize a 2x difference in carbon impact as a result of local transmission constraints. See Oates, D.L. and Spees, K., [Locational Marginal Emissions, a Force Multiplier for Carbon Impact](#) (May 2021).

³ Ricks, Wilson, Xu, Qingyu, & Jenkins, Jesse D., [Minimizing emissions from grid-based hydrogen production in the United States](#), Environmental Research Letters (“We find that allowing resource procurement over large geographic areas can lead to significant consequential emissions from hydrogen production even when a 100% Hourly Matching requirement would otherwise ensure low consequential impact, as the introduction of transmission constraints prevents physical delivery of procured clean electricity” and “the real grid is not divided neatly into well-connected zones with perfect internal deliverability, and transmission bottlenecks of varying severity exist at all spatial scales.”)(Jan. 6, 2023).

⁴ He, H., Derenchuk, A., Rudkevich, A., and Tabors, R., [Paths to Carbon Neutrality: A Comparison of Strategies for Tackling Corporate Scope II Emissions](#) (April 2023)

⁵ PJM encompasses Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia.

⁶ See 42 U.S.C. § 18772(a)(2)(B) (requiring the Energy Information Administration to establish an online database that includes, where available, the estimated marginal greenhouse gas emissions per megawatt hour of electricity generated).

within balancing authorities, and (iii) carbon matching should be allowed as an alternative 45V PTC compliance option.

The future of the U.S. green hydrogen industry and the carbon legacy of that industry hang in the balance of this decision. We greatly appreciate your consideration and applaud the Administration's tenacious efforts to combat the climate crisis.

Sincerely,

Clean Incentive

Enocor

Institute for Policy Integrity at New York University School of Law

Longroad Energy

REsurety, Inc.

Tabors Caramanis Rudkevich, Inc.

TimberRock

WattTime

Cc: The Honorable Michael Regan
Administrator
U.S. Environmental Protection Agency

The Honorable Lily Batchelder
Assistant Secretary for Tax Policy
U.S. Department of the Treasury

The Honorable Ali Zaidi
Assistant to the President and National
Climate Advisor
The White House

Mr. David Crane
Director
Office of Clean Energy Demonstrations
U.S. Department of Energy