

# United States Senate

WASHINGTON, DC 20510

October 16, 2023

The Honorable Janet Yellen  
Secretary  
U.S. Department of the Treasury  
1500 Pennsylvania Avenue NW  
Washington, D.C. 20220

Ethan Zindler  
Climate Counselor  
U.S. Department of the Treasury  
1500 Pennsylvania Avenue NW  
Washington, D.C. 20220

Dear Secretary Yellen and Climate Counselor Zindler:

Hydrogen is the ‘Swiss army knife’ of our decarbonization toolkit. Beyond displacing fossil-fuel-derived hydrogen from its applications in chemical production, clean hydrogen could help reduce emissions from some of the hardest to abate sectors: aviation, shipping, steelmaking, and heavy-duty vehicles, and in certain instances could even serve as long-term grid storage. To realize this potential clean hydrogen will have to outcompete conventional ‘grey’ hydrogen. It is paramount that we give the technology a fighting chance by deploying the Section 45V Tax Credit for Production of Clean Hydrogen (45V) of the *Inflation Reduction Act* expeditiously.

45V is based on the Clean Hydrogen Production Incentives Act of 2021 (S.1017), which Sen. Heinrich introduced on March 25, 2021. The intent of the bill and 45V is to ensure that hydrogen is produced cleanly using zero-carbon electricity sources. Our recommendations below will help to ensure and preserve this intent.

Clean hydrogen is no panacea and, like all technologies, has limitations. Converting renewable power to hydrogen and then back to power costs energy; electrification—where possible—will always be a more efficient decarbonization solution.<sup>1</sup> Because of the small physical density of hydrogen gas, expanding the hydrogen economy will require the buildout of specialized transportation and storage infrastructure, including pipelines, which could exacerbate existing inequities in fenceline communities.<sup>2</sup> And when released into the atmosphere, hydrogen acts as an indirect greenhouse gas (GHG), exacerbating warming from methane, ozone, and

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<sup>1</sup> Eriko Shrestha and Tianyi Sun, “Rule #1 of deploying hydrogen: Electrify first,” Environmental Defense Fund, January 30, 2023, <https://blogs.edf.org/energyexchange/2023/01/30/rule-1-of-deploying-hydrogen-electrify-first/>.

<sup>2</sup> Mathias Zacarias and Jane Nakano, “Exploring the Hydrogen Midstream: Distribution and Delivery,” Center for Strategic and International Studies, April 28, 2023, <https://www.csis.org/analysis/exploring-hydrogen-midstream-distribution-and-delivery>.

stratospheric water vapor.<sup>3</sup> These risks warrant careful oversight, but they are no reason to halt the development of clean hydrogen.

Of far graver concern is the risk posed by weak standards for what constitutes clean hydrogen. Fundamentally, the 45V tax credit must not be applied to any projects that directly or indirectly increase power sector GHG emissions. Without safeguards, 45V risks creating a shell game in power markets, where existing clean generation gets nominally claimed by hydrogen electrolyzers but the resulting gap in grid capacity is backfilled by fossil fuel generation.<sup>4</sup> In such a scenario, the program would undermine climate progress and lead to the production of hydrogen with a true emissions intensity higher than even its conventional fossil fuel-derived counterpart.<sup>5</sup> 45V must be designed to account for the risk of these induced power grid emissions.

In that same vein, 45V must not be applied to hydrogen chemically derived from natural gas. Industry is recommending that Treasury allow credits using methane capture to offset their calculated GHG emissions. This practice promotes the continued production of natural gas as a source for hydrogen and may incentivize a market that is detrimental to our overall goal of reducing GHGs. Therefore, we recommend that Treasury disallow methane capture and offsets as an accounting tool to receive the 45V tax credit for fossil-based hydrogen production.

In considering implementing rules for 45V, Treasury would do well to start by examining the European Union's (EU) rules governing their clean hydrogen economy, promulgated earlier this year.<sup>6</sup> To ensure our industry has ready access to the European clean hydrogen market, Treasury should promulgate rules for 45V that meet the requirements set out by our European allies. However, the EU's rules should not be copied wholesale. The cap on emissions imposed by the EU Emissions Trading System limits how much fossil fuel generation can backfill increased power demand from hydrogen. In the glaring absence of any federal cap or price on U.S. emissions, Treasury's rules for 45V must be more stringent to ensure an equivalent outcome.

Environmental advocates and industry have coalesced around three broad principles for how 45V can ensure environmental integrity: additionality, deliverability, and time-matching.<sup>7</sup> However, the devil is in the details, and there remains disagreement over the finer points of these

<sup>3</sup> Maria Sand et al., "A multi-model assessment of the Global Warming Potential of hydrogen," *Nature*, June 7, 2023, <https://www.nature.com/articles/s43247-023-00857-8>.

<sup>4</sup> Gernot Wagner and Danny Cullenward, "Get tax right or clean hydrogen will be bigger boondoggle than biofuels," *Washington Post*, April 27, 2023, <https://www.washingtonpost.com/opinions/2023/04/27/clean-hydrogen-tax-credit-stringent-rules/>.

<sup>5</sup> Wilson Ricks, Qingyu Xu, and Jesse D. Jenkins, "Minimizing emissions from grid-based hydrogen production in the United States," *IOPscience*, January 6, 2023, <https://iopscience.iop.org/article/10.1088/1748-9326/acacb5>.

<sup>6</sup> European Commission, "Renewable hydrogen production: new rules formally adopted," June 20, 2023, [https://energy.ec.europa.eu/news/renewable-hydrogen-production-new-rules-formally-adopted-2023-06-20\\_en](https://energy.ec.europa.eu/news/renewable-hydrogen-production-new-rules-formally-adopted-2023-06-20_en).

<sup>7</sup> See, e.g., Clean Air Task Force, "Implementation of the IRA 45V Clean Hydrogen Tax Credits as It Relates to Guidelines for Emissions Accounting of Grid-Connected Electrolyzers," February 23, 2023, <https://cdn.catf.us/wp-content/uploads/2023/02/23171218/joint-letter-45v-implementation.pdf>; American Clean Power, "Three Pillars for Building a Green Hydrogen Industry for Decarbonization," June 2023, <https://cleanpower.org/resources/acp-green-hydrogen-framework-proposal/>.

principles. To ensure clean hydrogen lives up to its decarbonization potential, we urge Treasury to implement the following rules for 45V:

- **Additionality:** Given a limited supply of zero-carbon energy, increased demand from hydrogen production could be balanced by increased coal or gas generation, leading to a net increase in GHG emissions. Therefore, clean hydrogen projects should generally supply their own, new renewable power, rather than competing with other consumers.

This is readily achieved by clean generation built behind-the-meter and connected directly to the electrolyzer. Allowances should also be made for power purchase agreements with generation assets brought online within the 3 years prior to an electrolyzer's start of operation; for additional clean generating capacity resulting from repowering, uprating, or the utilization of waste heat from existing assets; as well as for existing clean power assets when they are at risk of curtailment, as proxied by the price of electricity falling below \$10 per megawatt hour in a market with renewable assets for which there is historical evidence or analysis demonstrating curtailment.<sup>8</sup>

- **Deliverability:** Since availability of clean energy varies geographically, excepting the clean electricity produced behind-the-meter, hydrogen electrolyzers should only be allowed to claim electricity from generation assets to which they are physically connected. Stricter, more granular co-location requirements improve the emissions integrity of the 45V program.<sup>9</sup> Initially, electrolyzers and their generation assets should be required to be located in the same geographic region identified by the U.S. Department of Energy in their 2023 National Transmission Needs Study.<sup>10</sup> Treasury should consider strengthening this co-location requirement as the industry matures, but allowance should be made for power purchased from clean assets in a separate but interconnected region with equal or higher electricity prices (which act as a proxy for grid congestion).<sup>11</sup>
- **Time-Matching:** Since availability of clean electricity varies by season and time of day, production of clean hydrogen should occur within the same hour of production as the clean power it claims. Electricity produced behind-the-meter necessarily meets this requirement, but a system of tracking hourly energy procurement will be required for clean power purchased from the grid. While voluntary systems exist for tracking energy

<sup>8</sup> Tessa Weiss et al., "Calibrating US Tax Credits for Grid-Connected Hydrogen Production: A Recommendation, a Flexibility, and a Red Line," Rocky Mountain Institute, 2023, <https://rmi.org/insight/calibrating-us-tax-credits-for-grid-connected-hydrogen-production/>.

<sup>9</sup> Aaron Bergman and Kevin Rennert, "Emissions Effects of Differing 45V Crediting Approaches," Resources for the Future, June 30, 2023, <https://www.rff.org/publications/reports/emissions-effects-of-differing-45v-crediting-approaches/>.

<sup>10</sup> U.S. Department of Energy, "National Transmission Needs Study – Draft for Public Comment," February 2023, <https://www.energy.gov/sites/default/files/2023-02/022423-DRAFTNeedsStudyforPublicComment.pdf>.

<sup>11</sup> Dan Esposito, Eric Gimón, and Mike O'Boyle, "Smart Design Of 45V Hydrogen Production Tax Credit Will Reduce Emissions And Grow The Industry," Energy Innovation, April 11, 2023, <https://energyinnovation.org/publication/smart-design-of-45v-hydrogen-production-tax-credit-will-reduce-emissions-and-grow-the-industry/>.

procurement at this granularity, the implementation of a federal system for hourly matching will require careful study and deliberation.<sup>12</sup> This should not delay rulemaking for 45V.

Electrolyzers should be allowed to initially comply through the current annual matching system of renewable energy certificates. However, hourly matching standards must be fully phased in as soon as practicable and certainly before the end of the decade. No projects should be allowed to grandfather in annual matching standards. These hourly matching requirements should allow for the purchase of otherwise curtailed clean electricity (as identified per the aforementioned rules), and Treasury should explore backstops to prevent gaming of the system, such as a check against an electrolyzer's annual average emissions intensity.<sup>13</sup>

Truly clean hydrogen has enormous potential to deliver emissions reductions beyond the reach of other decarbonization technologies, but today those ambitions are undercut by a market that overwhelmingly favors dirty hydrogen. The robustness of 45V can bridge these economics until our decarbonized grid can support a competitive clean hydrogen industry. But this same potency presents an enormous risk to our climate safety if we compromise on the standards for 45V. We cannot afford the hydrogen tax credit to serve as yet another subsidy for the fossil fuel industry.

We urge Treasury to implement rules for 45V that accord with the intent of Congress and align with what science tells us is necessary to secure human well-being and planetary health.

Sincerely,




Sheldon Whitehouse  
United States Senator



Martin Heinrich  
United States Senator



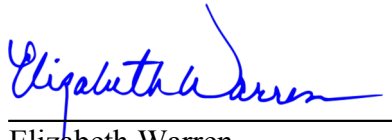
Jeffrey A. Merkley  
United States Senator



Peter Welch  
United States Senator

<sup>12</sup> See, e.g., <https://www.mrets.org/>.

<sup>13</sup> Energy Innovation, *op. cit.*



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Elizabeth Warren  
United States Senator



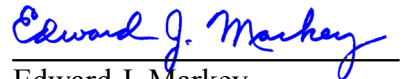
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Bernard Sanders  
United States Senator



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Cory A. Booker  
United States Senator



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Edward J. Markey  
United States Senator