February 26, 2024

Via Electronic Submission

Office of Associate Chief Counsel
(Passthroughs & Special Industries)
Internal Revenue Service
1111 Constitution Ave, NW
Washington, D.C. 20224

Comments in Response to Notice of Proposed Rulemaking
Section 45V Clean Hydrogen Production Credit
[REG–117631–23]

Dear Office of Associate Chief Counsel Porter,

The American Council on Renewable Energy ("ACORE") appreciates the opportunity to submit the following comments in response to the U.S. Department of the Treasury ("Treasury" or "Department") and Internal Revenue Service ("IRS") notice of proposed rulemaking that provides guidance ("proposed regulations") for the Clean Hydrogen Production Credit under section 45V of the Internal Revenue Code ("IRC"), as amended by the Inflation Reduction Act of 2022 ("IRA"). ACORE is a 501(c)(3) national nonprofit organization that works to unite finance, policy, and technology to lead the transition to a renewable energy economy. ACORE's membership includes renewable energy developers, institutional investors, corporate buyers of renewable energy and environmental attributes associated therewithin, manufacturers, electric power generators, retail energy providers, and other stakeholders. ACORE member companies collectively hold $22 trillion in assets. Last year, roughly 90% of the booming utility-scale U.S. renewable growth was financed, developed, owned, or contracted for by ACORE members.[1]

The success of the section 45V credit depends on its swift and effective implementation, and the proposed regulations are a crucial step. However, the stringent requirements set forth in the proposal could significantly hinder the quantity and quality of clean hydrogen projects able to qualify for the credit, derailing the growth of a promising decarbonization technology and constraining its ability to play a meaningful role in the energy transition. Notably, the proposed regulations could significantly increase the costs of clean energy production, hindering its ability to achieve economies of scale and to compete with fossil fuel alternatives.

The comments below offer recommendations to address several areas of potential improvement for the section 45V credit. We recommend (1) authorization of an annual matching safe harbor to provide certainty for early mover clean hydrogen projects, (2) establishment of a phase-in period and safe harbor for incrementality requirements, (3) clarification that any new capacity added to existing generators or the entirety of repowered facilities satisfying the "80/20 rule" qualify as incremental, including reasonable exceptions for certain curtailed and unprofitable assets, (4) accommodation of direct interregional

[1] The views expressed are those of the American Council on Renewable Energy and do not necessarily reflect the views of any individual ACORE member company. Not all ACORE members agree with all of the recommendations included in our comments.

transmission connections under the deliverability requirements, and (5) inclusion of a safe harbor for status quo grid regions and proper alignment with final deliverability zones under the Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation ("GREET") Model, among other definitional and methodological enhancements.

Background and General Observations

The section 45V credit is the most significant policy measure to date intended to incentivize U.S. clean hydrogen production. Clean hydrogen has the potential to play a critical role in decarbonizing hard-to-abate sectors, including heavy industry and transportation, as well as other important applications, such as its use as a chemical feedstock and a clean energy storage and generation technology. The section 45V credit creates an unparalleled opportunity to scale this important decarbonization technology at a critical time in the energy transition. As such, ACORE applauds the continued efforts by Treasury and the IRS to promulgate timely guidance on the section 45V credit and other critical IRA provisions. While we are encouraged by the availability of these initial rules, we are concerned that the proposed regulations as written could significantly limit the number and success of such transactions.

The European Union ("E.U.") offers an instructive example for the U.S. in considering stringent hydrogen requirements. Last year, the European Commission adopted two Delegated Acts to define the parameters of clean hydrogen in the E.U. as required under the Renewable Energy Directive.[2] The Delegated Acts, which became effective in June 2023, incorporated revisions following significant industry feedback,[3] partly because of a concerning rise in clean hydrogen production costs.

The developments in the E.U. underscore how critical it is for governments and industry to collaborate in order to ensure that clean hydrogen regulations are crafted in a way that allows market actors to make use of them over a sustained period. This core principle was articulated by the International Energy Agency (IEA) in its 2019 report, *The Future of Clean Hydrogen*:

> "Government and industry must work together to ensure existing regulations are not an unnecessary barrier to investment. Trade will benefit from common international standards for the safety of transporting and storing large volumes of hydrogen and tracing the environmental impacts of different hydrogen supplies."[4]

At present, no U.S. grid region can qualify for any of the section 45V credit tiers with its basic electricity generation mix alone.[5] Due to the energy intensive nature of hydrogen production, some critics warn of detrimental pollution outcomes absent three tests or "pillars" that would require the clean energy used by hydrogen electrolyzers under the section 45V credit to be: (1)

[2] European Commission. Commission sets out rules for renewable hydrogen (February 2023), available at: https://ec.europa.eu/commission/presscorner/detail/en/IP_23_594
[3] BloombergNEF. Europe's Green Hydrogen Rules Raise Costs for Industry (August 2022), available at: https://about.bnef.com/blog/europes-green-hydrogen-rules-raise-costs-for-industry
[4] IEA. The Future of Hydrogen. Seizing today's opportunities (June 2019), available at: https://www.iea.org/reports/the-future-of-hydrogen
[5] King, B., Larsen, J., Bower, G., & Pastorek, N. How Clean Will US Hydrogen Get? Unpacking Treasury's Proposed 45V Tax Credit Guidance (January 2024), available at https://rhg.com/research/clean-hydrogen-45v-tax-guidance

temporally matched to the operation of the electrolyzer ("temporality" or "time matching"), (2) sourced from assets newly placed in service ("incrementality" or "additionality"), and (3) sourced from the same region as the taxpayer or producer ("deliverability" or "regionality"). However, rushed implementation of these pillars could constrain the future of the U.S. clean hydrogen sector and weaken the ability of the section 45V credit to assert a competitive role for domestic producers in the global marketplace.

ACORE appreciates that the three pillars reflect an attempt by Treasury and the IRS to adopt a "reasonable methodological proxy" for the statutory directive to measure lifecycle greenhouse gas ("GHG") emissions under GREET Model. However, the three pillars as contemplated under the proposed regulations are a flawed proxy for the incentive Congress enacted and could significantly limit a domestic clean hydrogen market that has yet to take its first steps. The Senate Environment and Public Works ("EPW") Committee Chairman, Tom Carper, has since clarified that the section 45V credit was never intended to incorporate the three pillars as proposed in the regulations, which have occupied much of the ensuing post-IRA debate and are required under the proposed regulations.[6]

An impressive analytical effort has been underway since the emergence of the section 45V credit to model the potential emissions outcomes of various implementation pathways, including requirements that are both within and outside the scope of Treasury and the IRS's authority to administer. Proponents of the three pillars approach have cited studies that draw connections to the level of carbon emissions from hydrogen production[7] but, in crucial other respects, fail to account for the realities of a nascent commercial industry, transmission congestion, and a resource-constrained environment, while occasionally losing sight of the objectives that the section 45V credit was written to achieve.

The real-world adverse impacts of the proposed regulations on the industry could be significant. First, Treasury and the IRS have opted for rules categorically more rigid than those governing the production of clean hydrogen in other jurisdictions, including the E.U. As a result, the certainty offered by the now finalized E.U. Delegated Acts and their comparatively greater flexibility could reduce the impetus for European multinational corporations to target the U.S. to onshore future operations or shift incumbent activities toward clean hydrogen. The same is true of other players in those countries with strong clean hydrogen policies, such as Japan.[8] While the E.U. Delegated Acts are based on similar pillars to this proposal, the requirements have delayed phase-in schedules with certain first-mover exemptions as a result of the aforementioned compromises on more workable alternatives.

---

[6] See letter from EPW Chairman, Sen. Tom Carper (D-DE) to senior administration officials (November 2023), available at: https://www.epw.senate.gov/public/_cache/files/e/4/e4183b35-14e4-47ca-b125-a60f69a35cb0/FDBCE69166D6C705D0B40634487EC73A.2023.11.09-45v-hydrogen-letter-final.pdf

[7] Ricks, B., Xu, Q., & Jenkins, J. Minimizing emissions from grid-based hydrogen production in the United States (January 2023), available at https://iopscience.iop.org/article/10.1088/1748-9326/acacb5/meta

[8] The World Economic Forum. Which countries could become the world's hydrogen superpowers? (February 2022), available at: https://www.weforum.org/agenda/2022/02/clean-hydrogen-energy-low-carbon-superpowers

Second, early indicators point to a market-chilling effect within the U.S. following the proposed regulations. For example, the surge in electrolyzer sales one North American manufacturer had anticipated last October did not ultimately come to fruition following the release of the proposed regulations.[9] Prior to the release of the proposed regulations, the U.S. Chamber of Commerce and 32 companies spanning the clean hydrogen value chain, including companies that had previously announced electrolyzer gigafactories in the U.S., warned that strict adherence to the three pillars could drive new clean hydrogen investments overseas.[10] One hydrogen company that has now opened an electrolyzer manufacturing facility in the U.S. has since commented that the proposed regulations have already suppressed demand for their products and could stifle innovation in the sector.[11]

Paused or canceled plans attributed to guidance uncertainty by recipients of the Department of Energy's Regional Clean Hydrogen Hub awards are additional reason for concern,[12] although support another critical takeaway: just as the guidance on the section 45V credit should not exist in a silo with respect to international frameworks, the same holds true for related initiatives that the U.S. is simultaneously undertaking. In fact, the section 45V credit requires Treasury and the IRS to implement not only the next phase of clean hydrogen policy in the U.S., but requirements that could influence an array of other provisions that hinge on questions of carbon accounting. For this reason, and those stated previously, Treasury and the IRS would be well-served to consider the full weight of this opportunity and exercise appropriate caution in finalizing the section 45V credit rules within their authority to do so. Our priority recommendations for any final rulemaking are contained in the remainder of these comments.

I. Time-matching

<u>Recommendation</u>: Safe harbored clean hydrogen projects that begin construction on or before December 31, 2027, should qualify for the credit with annual matching through the life of the credit, with beginning of construction determined under existing IRS guidance, including a 4-year continuity safe harbor.

ACORE members have expressed concerns about the proposed requirement for taxpayers to use hourly matching beginning on January 1, 2028 to qualify for the credit, particularly the lack of an exception that would allow first-mover projects that start construction before 2028 to continue to use annual matching for the life of the credit. Without such an accommodation, the initial short annual matching period would

[9] Hedreen, S. US hydrogen projects still on ice as developers seek answers on tax credit rules (January 2024), available at: https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/energy-transition/011624-us-hydrogen-projects-still-on-ice-as-developers-seek-answers-on-tax-credit-rules

[10] See letter from Plug Power Inc, and 31 other organizations (July 2023), available at: https://www.plugpower.com/wp-content/uploads/2023/07/PTC_Letter_to_Administration_072423_F.pdf

[11] Moore, D. Zero-Carbon Hydrogen Tax Rules Spark Divide Over Grid Emissions (January 2023), available at: https://news.bloomberglaw.com/environment-and-energy/zero-carbon-hydrogen-tax-rules-spark-divide-over-grid-emissions

[12] Dabbs, B., Portuondo N., & Robles, C. Hydrogen industry slams Biden tax rules (December 2023), available at: https://subscriber.politicopro.com/article/eenews/2023/12/22/hydrogen-industry-slams-biden-tax-rules-00133095

not provide much benefit to the market as financiers would likely underwrite clean hydrogen deals as though hourly matching was required from the start.

Treasury and the IRS voluntarily identified a critical and highly consequential impediment to implementation of the proposed hourly-matching approach. Specifically, the preamble of the proposed regulations acknowledged that:

> "Hourly tracking systems for [Energy Attribute Credits ("EACs")] are not yet broadly available across the country and will take some time to develop. In a recent survey of nine existing tracking systems, two of the tracking systems indicated that they are already tracking on an hourly basis, although software functionality in these two systems remains limited."[13]

If the virtue of the three pillars approach is to uphold the highest standard of emissions integrity, surely any effort to equip an industry that has no past experience with the proposed tools to meet it should not entail reliance on an unproven tracking regime, which faces numerous challenges. According to Treasury and the IRS: "In the same survey, tracking systems identified a number of challenges to hourly tracking that will need to be overcome, including cost, regulatory approval, interactions with state policy, sufficient stakeholder engagement, data availability and management, and user confusion."[14]

The hourly matching requirement of the proposed regulations also operates under the presumption that an annual matching framework would lead to inferior emissions outcomes. However, numerous findings show that is not uniformly the case, including an ACORE analysis with Energy and Environmental Economics, Inc. ("E3") in April 2023, which found that an annual matching requirement actually reduced emissions relative to an hourly matching approach in 25 of 40 different scenarios.[15] Under those scenarios, emissions intensities fluctuated between -1.23 and +1.18 kg CO2e per kg of clean hydrogen, resting comfortably within the ranges that qualify for the highest section 45V credit amounts.[16] Another study published by REsurety in July 2023 noted that: "in many locations hourly matching can lead to no change in emissions or even an *increase* in overall emissions. For example, in Texas, the impacts of transmission tend to dominate the impact of timing. Furthermore […] even in cases where hourly energy matching reduces net emissions compared to annual energy matching, net emissions are still significant and do not regularly fall below the threshold for the maximum $3 [per kilogram of clean hydrogen ("kgH2")] production tax credit."[17] This can be attributed to the fact that aligning electrolyzer operations to periods of high renewable output in transmission-constrained regions such as West Texas may actually increase emissions because that generation is unlikely to affect clean hydrogen power consumption in nearby demand centers (e.g., Houston).[18]

---

[13] 88 FR 89233.
[14] Id.
[15] ACORE and E3. Analysis of Hourly & Annual GHG Emissions (April 2023), available at: https://acore.org/resources/analysis-of-hourly-annual-ghg-emissions-accounting-for-hydrogen-production
[16] Id.
[17] Ostridge, C. & Lukas, D. Emissions Implications for Clean Hydrogen Accounting Methods (July 2023), available at: https://resurety.com/wp-content/uploads/2023/07/Emissions-Implications-for-Clean-Hydrogen-Accounting-Methods.pdf
[18] Id.

Putting the market readiness issues and relative efficacy of hourly matching aside, such a rigid requirement threatens to keep the costs of clean hydrogen well above the levels needed to entice heavy industrial and large corporate customers from leaving behind the cheaper fossil fuel-based derivatives that have dominated the U.S. and global hydrogen markets to date. BloombergNEF notes that "economies of scale, and supportive policy" are two necessary factors underlying its projection that by 2030, clean hydrogen could surpass the cost advantage of hydrogen produced from natural gas, or "gray" hydrogen – which is currently one-third of the levelized cost to produce ($2.13/kgH2) on average relative to clean hydrogen ($6.40/kgH2).[19] Concerningly, however, the hourly matching requirement as proposed in the regulations risks leaving both of those critical boxes unchecked by neglecting to provide a reliable onramp for first-time investors to help achieve such cost declines.

A key disadvantage of an hourly matching standard with no safe harbor provision concerns the reticence of conventional hydrogen customers to embrace hydrogen produced by renewable energy sources, or "green" hydrogen, largely a combined result of the current cost discrepancies and producers' ability to earn tax credits under section 45Q by deploying qualified carbon capture equipment used to make "blue" hydrogen. Prolonging the historic market advantage of blue over green hydrogen is not a foregone conclusion if Treasury and the IRS act decisively. A more lucrative incentive under section 45V is available to blue hydrogen producers who can achieve its highest emissions thresholds.[20] The Department of Energy ("DOE") projected in December 2023 that domestic costs for blue hydrogen production would miss the $1/kgH2 target set by the Biden Administration, while BloombergNEF estimated in advance of the proposed regulations that green hydrogen would be marginally less expensive to produce in the U.S. than blue hydrogen.[21] However, McKinsey reports that the 2030 projected capital cost for unsubsidized, levelized cost of clean hydrogen in the U.S. Gulf Coast has risen by more than 80% due to rising financing, labor, and material costs, and that the renewable electricity cost projection increased by 30%.[22]

The significant price premium of clean hydrogen relative to gray hydrogen is not the only consideration for large customers in hard-to-decarbonize sectors such as ammonia, petrochemicals, and power generation. These industries rely on a constant flow of hydrogen, which would be mismatched with intermittent renewable energy supply under an hourly framework without either battery or other forms of energy storage, or gaseous or liquid hydrogen storage. The costs to install adequate storage are not accounted for under the section 45V credit and could therefore make the incentive uneconomical.

[19] Bhashyam, A. 2023 Hydrogen Levelized Cost Update. Cost of capital and inflation take hold (July 2023), available at: https://www.bnef.com/insights/31769/view
[20] Ati, N. et al. Unlocking clean hydrogen in the US Gulf Coast: The "here and now" (August 2023), available at: https://www.mckinsey.com/industries/oil-and-gas/our-insights/unlocking-clean-hydrogen-in-the-us-gulf-coast-the-here-and-now
[21] DOE National Technology Energy Technology Laboratory. Hydrogen Shot Technology Assessment (December 2023), available at: https://netl.doe.gov/projects/files/HydrogenShotTechnologyAssessmentThermalConversionApproaches_120523.pdf
[22] Ati, N. et al. Unlocking clean hydrogen in the US Gulf Coast: The "here and now" (August 2023), available at: https://www.mckinsey.com/industries/oil-and-gas/our-insights/unlocking-clean-hydrogen-in-the-us-gulf-coast-the-here-and-now

Ensuring the competitiveness of green hydrogen relative to blue and gray hydrogen also comes with high environmental stakes and should thus be a foremost consideration for Treasury and the IRS in finalizing the section 45V credit rules.

Any final rulemaking on the section 45V credit should enable the diverse end uses of clean hydrogen that Congress intended and are critical to realizing the potential of the U.S. market over the long term.[23] ACORE therefore respectfully urges Treasury and the IRS to allow annual matching through the duration of the section 45V credit if the qualified facility starts construction before January 1, 2028, determined under existing IRA guidance including a 4-year continuity safe harbor. This straightforward adjustment to the proposed regulations would avoid encumbering first-movers who are essential to setting the U.S. clean hydrogen market on the path toward greater economies of scale.

Recommendation: Consider seeking more information on an alternative "carbon-matching" approach in a supplemental notice of proposed rulemaking ("NOPR").

ACORE respectfully requests Treasury and the IRS to seek more information on carbon-matching[24] as an alternative mechanism for assessing induced emissions from hydrogen production through a supplemental NOPR. Where locational marginal emissions ("LME") data is available and subject to standards for reliability and verification, a carbon matching approach would identify the annual emissions induced by the energy consumption of a hydrogen electrolyzer and offset them by at least an equivalent amount of avoided emissions attributable to the procurement of onsite or offsite sources of renewable energy generation.

II. Incrementality

Recommendation: To allow large-size projects to reach commercial operation, safe harbored clean hydrogen projects that begin construction on or before December 31, 2027, should not be required to meet incrementality requirements, with beginning of construction determined under existing IRS guidance.

In addition to hourly matching, the proposed regulations would require renewable energy consumption associated with clean hydrogen production to come from assets with a commercial operations date ("COD") no more than 36 months before the qualified facility was placed in service. The imposition of an incrementality requirement without a phase-in schedule and safe harbor period seems to be premised on an overestimation of the pace at which new energy infrastructure can be financed, approved, and constructed in the U.S over the short term. For a single transmission line, those processes can take up to 18 years.[25] Indeed, the slow pace of U.S. transmission expansion is one of several key constraints to the interconnection of new renewable energy resources in the U.S, which in turn impedes renewable resource

[23] The US Can Lead in the Hydrogen Economy — If the Treasury Encourages Lifecycle Thinking and Diverse Investments: https://www.bakerinstitute.org/research/us-can-lead-hydrogen-economy-if-treasury-encourages-lifecycle-thinking-and-diverse

[24] TCR. A Comparison of Strategies for Tackling Corporate Scope 2 Carbon Emissions. https://tcr-us.com/paths-to-carbon-neutrality-tcr-white-paper.html

[25] Plautz, J. Western transmission line breaks ground after 18-year wait (June 2023), available at: https://www.eenews.net/articles/western-transmission-line-breaks-ground-after-18-year-wait

development.[26] Others include siting and permitting delays, supply chain and labor shortages, high interest rates, and political pushback. Moreover, the proposed regulations appear to overlook the well-documented backlog of over 1,250 GW of carbon-free generation and 680 GW of storage waiting in regional interconnection queues as of the end 2022, as well as the high network upgrade costs those projects may incur, thus increasing the expenses associated with clean hydrogen investment that relies upon new resources only.[27]

Because the severity of such challenges varies by location, it is likely that regions of the country with the fastest rates of renewable project deployment will fare better under the proposed regulations than regions with slower rates. This is particularly problematic for large industrial customers that would prefer a direct supply of hydrogen – due to the significant costs of transporting hydrogen over larger distances – which are often located closer to urban centers.[28] This imbalance threatens to further discourage gray hydrogen customers from converting to cleaner sources by confining clean hydrogen production to a finite number of actors in narrow geographic areas. Modeling of the section 45V credit by the Electric Power Research Institute ("EPRI") found that qualifying for the incentive would cover approximately 90% of clean hydrogen production costs in areas with the highest availability of low-cost renewable resources, compared with roughly 40% in those with the weakest access. Taking as a baseline the earlier cited average production costs for different forms of hydrogen in 2023, a 40% credit benefit could still fail to bring clean hydrogen production costs level with gray hydrogen, as well as blue hydrogen.[29]

The section 45V credit was intended to reward the greater use of existing renewable energy in the interim as new resources are developed. Currently installed assets operating during non-peak periods or renewable generation that would otherwise be curtailed can provide valuable electricity to hydrogen producers without inducing emissions.[30] These assets are also critical to fulfilling near-term demand for clean hydrogen that cannot be met with new resources alone. DOE projects that "[i]f water electrolysis dominates as the production method, up to 200 GW of new renewable energy sources would be needed by 2030 to support clean hydrogen production."[31]

However, BloombergNEF estimates that 105 GW of new wind and solar resources in the U.S. would qualify under the proposed incrementality requirements, with solar accounting for roughly two-thirds of

---

[26] DOE. Queued Up…But in Need of Transmission. Unleashing the Benefits of Clean Power with Grid Infrastructure (April 2022), available at: https://www.energy.gov/sites/default/files/2022-04/Queued%20Up%E2%80%A6But%20in%20Need%20of%20Transmission.pdf

[27] Reigstad., G. et al. Moving toward the low-carbon hydrogen economy: Experiences and key learning from national case studies (December 2022), available at: https://www.sciencedirect.com/science/article/pii/S2666792422000269

[28] 100%RE - Multi Actor Partnership. Green Hydrogen Market: Potentials and Challenges (August 2023), available at: https://100re-map.net/green-hydrogen-market-potentials-and-challenges

[29] Using the earlier figures from BloombergNEF, 40% of the average production cost for clean hydrogen in 2023 ($6.40) totals $3.84/kgH2, still higher than the average production costs for both blue ($3.10/kgH2) and gray ($2.13/kgH2) hydrogen.

[30] See Senate EPW Chairman Carper (D-DE) letter: https://www.epw.senate.gov/public/_cache/files/e/4/e4183b35-14e4-47ca-b125-a60f69a35cb0/FDBCE69166D6C705D0B40634487EC73A.2023.11.09-45v-hydrogen-letter-final.pdf

[31] DOE. Pathways to Commercial Liftoff: Clean Hydrogen (March 2023), available at: https://liftoff.energy.gov/wp-content/uploads/2023/05/20230523-Pathways-to-Commercial-Liftoff-Clean-Hydrogen.pdf

that newly commissioned volume. Assuming the same capacity factors used by DOE (i.e. 27% for solar, 45% for wind) and a standard conversion factor of 55 kilowatt hours ("kWh") of electricity per kilogram of clean hydrogen produced, wind and solar resources projected to be eligible by BloombergNEF would contribute roughly 5.5 billion kg or 5.5 million metric tons ("MMT") in total output if all of those projects were dedicated to powering clean hydrogen production facilities for one year. For comparison, industrial applications in the state of Texas alone could account for roughly 6 MMT in clean hydrogen demand per year by 2050, when the Biden Administration has set a target of 50 MMT of annual clean hydrogen production.[32] However, a sizeable portion of the incremental wind and solar projects making up the 105 GW estimate by BloombergNEF may have been planned before the enactment of the section 45V credit or issuance of the proposed regulations and thus were not designed with clean hydrogen production applications in mind.

Without greater flexibility around the use of existing clean energy resources, it is difficult to see how new renewable energy capacity can be brought online quickly enough to realize DOE's forecast that by 2030 "most demand for low carbon clean hydrogen is likely to be as a drop-in replacement for carbon-intensive hydrogen currently used in ammonia and oil refining."[33] A report by the Energy Futures Initiative ("EFI") noted that "new contracts, new infrastructure, and strong alignment between producers and consumers" would be needed before such a shift can occur. EFI additionally found after examining several hydrogen production pathways that "[i]n all cases, levelized costs increase as capacity factors decline due to the diminished productivity of the pathway." These conclusions help to demonstrate how the proposed incrementality requirements, by sealing off near-term access to the vast majority of existing renewable energy resources, would likely work at odds with the goals of the section 45V credit to expand long-term market offtake for clean hydrogen.

ACORE appreciates the recognition by Treasury and the IRS in the proposed regulations that it may be appropriate to treat existing resources as incremental under certain circumstances if it is demonstrated that those sources and circumstances would not give rise to significant induced emissions. As a preliminary matter, we strongly recommend adding to any final incrementality requirements a phase-in date of January 1, 2028, which would align with the proposed hourly matching requirements. Similar to our recommendations under hourly matching, ACORE would appreciate the establishment of a safe harbor for projects that start construction before January 1, 2028, determined under existing guidance including a 4-year continuity safe harbor.

<u>Recommendation</u>: Any capacity added to an existing generation asset should be treated as incremental. If the "80/20 rule" is satisfied, the entire repowered asset should qualify as incremental.

Proposed § 1.45V–4(d)(3)(i)(B) provides an alternative test for establishing incrementality for electricity generating facilities that are uprated no more than 36 months before the placed in-service date of the

[32] Center for Houston's Future. Houston as the epicenter of a global clean hydrogen hub (May 2022), available at: https://www.mckinsey.com/~/media/mckinsey/business%20functions/sustainability/our%20insights/houston%20as%20the%20epicenter%20of%20a%20global%20clean%20hydrogen%20hub/houston-as-the-epicenter-of-a-global-clean-hydrogen-hub-vf.pdf

[33] DOE. Pathways to Commercial Liftoff: Clean Hydrogen (March 2023), available at: https://liftoff.energy.gov/wp-content/uploads/2023/05/20230523-Pathways-to-Commercial-Liftoff-Clean-Hydrogen.pdf

qualified hydrogen production facility. Rewarding new capacity as part of an uprated facility comes with the added benefit of incentivizing taxpayers to repower, rather than demolish and rebuild, existing assets. ACORE respectfully urges Treasury and the IRS to clarify two key circumstances in which uprated facilities should qualify under any final incrementality requirements. First, we respectfully ask Treasury and the IRS to clarify that any new capacity added to an existing power generation asset qualifies as incremental.

The same benefit would apply to the second pivotal circumstance, whereby a taxpayer satisfies the "80/20 rule" upon retrofitting an existing generation facility. In such instances, ACORE respectfully urges Treasury and the IRS to clarify that the entire retrofitted generation plant qualifies as incremental. Examples 4 and 5 of proposed § 1.45V–6(c) illustrate how the regulations would apply the "80/20" test to clean hydrogen production facilities, whereby the existing facility may establish a new original placed-in-service date provided that the used property is not more than 20% of the facility's total value. In providing these examples, Treasury and the IRS rightfully anticipate that the conversion of existing clean hydrogen infrastructure is a critical part of scaling industry growth. We therefore respectfully ask Treasury and the IRS to clarify that retrofits to existing renewable generation facilities also fall under the scope of these rules, in keeping with the longstanding application of the "80/20" rule.

Recommendation: Consider broadening the definition of incrementality to include hydrogen purchase agreements (HPA) that make use of renewable energy that would have otherwise been curtailed or can otherwise extend the life of the renewable asset.

A key argument in favor of incrementality assumes that power from existing generation facilities will force dirtier plants to operate and lead to increased emissions by diverting renewable electricity towards clean hydrogen production. However, experts suggest that this argument is somewhat exaggerated when considering the almost negligible level of U.S. clean hydrogen production to date, which is likely to stagnate over the near-term barring improved regulatory certainty (e.g., IEA reported only 1.5 million tons of global clean hydrogen production capacity as commercially operating or nearing a final investment decision in September 2023).[34]

More crucially, this argument underemphasizes the risk of curtailment to renewable resources and the economic downturn or retirement of those assets as a result. Overly strict incrementality requirements would also likely exacerbate those risks by minimizing the value of merchant power from existing renewable energy plants after their investment tax credit ("ITC") recapture period or production tax credit ("PTC") expires, and the initial power purchase agreement ("PPA") with the offtaker ends, which threatens to reduce project investment and increase the cost of capital for renewable energy.[35]

By reducing the curtailment and increasing the use of existing resources, green hydrogen projects will increase the renewable energy flowing on the grid in the same manner as a new resource. ACORE therefore appreciates the additional acknowledgement by Treasury and the IRS that a growing trend of

[34] IEA. Global Hydrogen Review 2023 (September 2023), available at: https://www.iea.org/reports/global-hydrogen-review-2023

[35] Trabish, H. K. Zombie wind and solar? How repowering old facilities helps renewables keep cutting costs (October 2016), available at: https://www.utilitydive.com/news/zombie-wind-and-solar-how-repowering-old-facilities-helps-renewables-keep/429047

renewable energy curtailment over recent years is likely to continue according to projections from the National Renewable Energy Laboratory's ("NREL") Cambium model. We further appreciate the invitation by Treasury and the IRS to provide comments on various pathways to account for resource curtailments under the incrementality requirements, including the so-called "five-percent allowance approach" whereby a fixed percentage of existing minimal-emitting electricity generation placed in service before January 1, 2023, as satisfying the incrementality requirement. Treasury and the IRS requested comments on whether a higher percentage allowance "such as up to 10 percent, would be appropriate, either in general or in certain cases or circumstances."

While ACORE generally supports the use of a formulaic approach to incorporate certain curtailed renewable energy generation, we would recommend applying a 10 percent allowance for these purposes. We further support applying a 10 percent allowance on an operator fleet-wide basis within the same grid region.

To complement a formulaic approach for curtailed renewable generation, ACORE would support a mechanism to qualify as incremental existing generation facilities placed in service before January 1, 2028, and subject to a hydrogen purchase agreement ("HPA") enabling their generation that would not otherwise have occurred, thereby increasing the potential of future investment to extend the life of such previously curtailed assets. An HPA resembles a PPA as a buyer-seller transaction and provide long term certainty that hydrogen will be delivered "at a set price, set frequency and quantity, and at the desired quality."[36] It is important for any final section 45V credit rules to help incentivize the use of HPAs, which are an important tool for de-risking uncertain clean hydrogen market demand.[37]

III. Deliverability

<u>Recommendation</u>: Allow taxpayers to import clean energy from regions other than where the hydrogen production facility is located if transmission rights or redirects have been demonstrated, and by scaling the allowance to the level of grid congestion observed within the locational marginal pricing ("LMP") zone where the facility is located.

Although ACORE does not oppose the applicable grid regions as defined under the proposed regulations, which derive from DOE's 2023 "National Transmission Needs Study" ("Needs Study"). But final deliverability requirements should account for interregional transmission that exists between the regions.

Because some of the regions in the Needs Study are outside of markets operated by Regional Transmission Organizations, in those cases, firm transmission rights or redirects, which are currently required for Energy Attribute Certificates, from the location of the qualified hydrogen facility to sources of renewable energy electricity should be sufficient for the purposes of achieving deliverability.

[36] Ljunggren, E. Evaluation of the industrial Feasibility of Hydrogen Production with Small Modular Reactors. (November 2023), available at: https://kth.diva-portal.org/smash/get/diva2:1824818/FULLTEXT01.pdf
[37] The World Bank. Scaling Hydrogen Financing for Development (n.d.), available at: https://www.esmap.org/sites/default/files/2022/2023/H4D/Full_Slide_deck_Scaling%20Hydrogen%20Financing%20for%20Development_November17.pdf

Though interregional ties are limited, the deliverability requirements should at a minimum account for existing interregional transmission through existing transmission rights between the regions. Treasury and the IRS could also use the amount of interregional transmission identified in the Needs Study. Final rules that omit exceptions for interregional transmission would also disincentivize multi-state collaboration toward the development of a national "connective infrastructure," one of the foundational objectives of the DOE Regional Hydrogen Hubs program.[38]

Recommendation: Clarify that the same grid region applicable to the qualified facility in the first taxable year that the section 45V credit is claimed also applies throughout the life of the credit.

The proposed regulations did not make clear whether future iterations of the DOE Needs Study will be used to derive grid regions for purposes of determining the section 45V credit for existing facilities, and therefore leaves taxpayers in doubt as to the applicability of the current regions over the credit's 10-year lifespan. ACORE therefore supports the establishment of a safe harbor provision whereby the same regional designation in effect during the first year that a project begins construction also applies in subsequent tax years. Such a safe harbor would also protect taxpayer certainty should Treasury and the IRS contemplate adding a more granular geographic resolution to the GREET Model for purposes of determining regionality, tracking marginal emissions data, or otherwise.

Recommendation: Align the power grid carbon intensity factors under the GREET Model with final deliverability zones.

For purposes of administering the GREET Model, Treasury and the IRS should ensure that the regions listed along the power grid carbon intensity factors correspond with those derived from the DOE Needs Study. For example, the current GREET model lists the Western Electricity Coordinating Council ("WECC") Mix as one region, whereas the Needs Study establishes four distinct regions that overlap with WECC territory (California, Northwest, Mountain, Southwest). Updating the current GREET Model to reflect this alignment would be relatively simple, and the improved emissions accuracy it could deliver may be significant, as the Needs Study identified disparate levels of transmission congestion and other factors that could dictate emissions outcomes between the regions it examined.

IV. Other Recommendations

A. Impact of Electricity Storage on Temporal Matching

Recommendation: Clarify that stored electricity has a time stamp that correlates to the time such electricity is used in the production of clean hydrogen rather than when the electricity was generated or stored.

The proposed regulations do not address the treatment of electricity storage for purposes of applying the time-matching requirements. Furthermore, the preamble provides that "[a]mong the issues that require

[38] DOE. Regional Clean Hydrogen Hubs Selections for Award Negotiations (n.d.), available at: https://www.energy.gov/oced/regional-clean-hydrogen-hubs-selections-award-negotiations#:~:text=The%20Regional%20Clean%20Hydrogen%20Hubs,end%2Duse%20of%20clean%20hydrogen.

resolution as EAC tracking systems move to hourly resolution is the treatment of electricity storage."[39] ACORE respectfully urges Treasury and the IRS to provide for consideration of energy storage, which helps to avoid fossil fuel generation by providing carbon-free power in periods of high demand on the grid.[40]

The limited adoption of time-stamped EACs to date leads to the question of how they will be effectively "stored," raising other complicated issues such as efficiency losses. For this reason, ACORE supports an approach whereby the time stamp for electricity from storage is when it is discharged for use in clean hydrogen production and therefore the stored clean energy is considered matched to the production of hydrogen, which will help to standardize compliance with any final time-matching requirements.

B. Energy Attribute Certificate Clarifications

Recommendation: Clarify that electricity from generation facilities that are directly connected to the hydrogen production facility may be taken into account for purposes of determining the lifecycle GHG emissions rate regardless of whether such electricity generation creates an EAC that is retired.

The proposed regulations provide that the requirements to record the acquisition and retirement of qualifying EACs in a qualified EAC registry or accounting system apply regardless of whether the electricity generating facility is grid connected, directly connected, or co-located with the hydrogen production facility. However, ACORE respectfully asks Treasury and the IRS to clarify that this requirement does not apply to renewable generation assets tied directly to qualified clean hydrogen production facilities. Electricity from these sources is self-evidently emissions-free and not displaced from other uses.

Recommendation: Clarify that 4.9% line loss assumption does not apply to electricity generation facilities that are directly connected to a hydrogen production facility.

In determining the emissions associated with the consumption of electricity from specific power sources, 45VH2-GREET assumes that 4.9% of generated electricity produced is lost in transmission and distribution prior to consumption.[41] While this adjustment may be sensible to apply in areas of the country with the highest rates of grid congestion, a blanket assumption would inadvertently penalize and, by extension, disincentivize clean hydrogen project configurations with direct transmission connections.

Thank you for the opportunity to submit these comments. Please do not hesitate to contact ACORE's Senior Vice President of Policy and Engagement, Lesley Hunter, at hunter@acore.org with any additional questions you may have.

---

[39] 88 Fed. Reg. At 89233.
[40] DeAngelis, J. Exploring energy storage for grid innovation https://tech.facebook.com/engineering/2022/9/energy-storage-boosts-electrical-grid-reliability
[41] U.S. Dept. of Energy, Guidelines to Determine Well-to-Gate Greenhouse Gas (GHG) Emissions of Hydrogen Production Pathways using 45VH2-GREET 2023 (Dec. 2023) ("DOE 45VH2-GREET Guidelines"), §§ 2.4.1 (Emissions of Electricity Generation) and 3.2 (Accounting for Electricity in 45VH2-GREET 2023).

Sincerely,

/s/ Lesley Hunter
Lesley Hunter
Senior Vice President, Policy & Engagement
American Council on Renewable Energy
1150 Connecticut Ave NW, Suite 401
Washington, D.C. 20036
hunter@acore.org
(202) 963-1914

/s/ Noah Strand
Noah Strand
Policy Manager
American Council on Renewable Energy
1150 Connecticut Ave NW, Suite 401
Washington, D.C. 20036
strand@acore.org