ZeroAvia Comments on U.S. Department of Treasury's Notice of Proposed Rulemaking on Section 45V Credit for Production of Clean Hydrogen

Submitted on *2*6 February 2024

ZeroAvia is grateful for the opportunity to comment on the Dept. of Treasury's proposed rulemaking on the Section 45V Credit for the Production of Clean Hydrogen as established and amended by the Inflation Reduction Act of 2022.

ZeroAvia's Interest in Clean Hydrogen Production

ZeroAvia is a leader in zero-emission aviation, focused on hydrogen-electric aircraft propulsion solutions as the most economically and environmentally attractive solution to aviation's climate impact.

Revolutionary approaches to aircraft emission reduction are needed to realize continued growth in air travel – and thus the enormous social, economic, and cultural benefits it brings - without increases in the negative environmental and public health impacts. With around four times higher specific energy and lower cycling costs than lithium-ion batteries, and numerous advantages over other decarbonization solutions, hydrogen-electric powertrains are the only viable, scalable solution for zero-emission aviation; they also offer significant operating cost reductions.

Furthermore, ensuring clean hydrogen availability at airports is a pressing need given the rapid development of the technology. ZeroAvia plans to introduce its first engines into service before the end of 2025, following regulatory approval.

ZeroAvia is confident that clean hydrogen and related technologies, such as electric motors and hydrogen fuel-cells can play a role in tackling greenhouse gas emissions in aviation and other hard to abate sectors. This will support the Biden Administration's goal of achieving net zero aviation emissions by 2050. It will also help maintain U.S. leadership in aerospace innovation amid the current global race toward more sustainable flight.

However, the adoption of these technologies and our ability to scale their manufacturing --and create American jobs-- rely on the cost-competitiveness of the clean hydrogen fueling their operations. To nurture a market with stable and predictable cost-competitiveness, the clean hydrogen production sector needs the incubation period, conditions and support provided by the IRA's 45V clean hydrogen production tax credit.

Under the Proposed Regulations, hydrogen producers will have to reside in the same DOE Transmission Needs Study region as its associated clean energy generation resources, find eligible renewable power projects commissioned in the last three years within such region, and, beginning in 2028, purchase EACs minted at an hourly resolution from eligible clean energy generators in that region. This will not create the conditions suitable for a national network of clean hydrogen production needed to support clean flight operations and will consequently undermine ZeroAvia's ability to help decarbonize aviation, create

jobs, and support continued U.S. aerospace leadership. It is worth noting that the regulations call for an earlier adoption of hourly temporal correlation than the EU's RED II directive.

The 45V Credit and the Three Pillars

The 45V Credit provides a 10-year production tax credit for clean hydrogen that is produced at a qualified clean hydrogen production facility.[1] In order to qualify for the 45V Credit, the hydrogen must be produced through a process (i) with a lifecycle GHG emissions rate of not more than four kilogram of carbon dioxide equivalent ("CO2e")/kilogram of hydrogen, (ii) produced (A) in the United States (or a United States territory), (B) in the ordinary course of a trade or business of the taxpayer, and (C) for sale or use, and (iii) the production and sale or use of such hydrogen is verified by an unrelated third-party.[2] As described in more detail below, section 45V also requires that lifecycle GHG emissions only include emissions through the point of production (i.e., well-to-gate), as determined under the most recent Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation ("GREET") model.[3] Depending on the lifecycle GHG emissions rate as determined under the GREET model, the amount of the 45V Credit varies—the lower the GHG emissions, the higher the credit. In addition, if the qualified clean hydrogen facility meets the prevailing wage and apprenticeship requirements, the full value of the credit is multiplied by five.[4]

Lifecycle GHG emissions has the same meaning given such term under section 211(o)(1)(H) of the Clean Air Act ("CAA").[5] The lifecycle GHG emissions rate is generally determined using the most recent GREET model, and only if the relevant lifecycle GHG emissions rate has not been determined under the most recent GREET model, the taxpayer may request a provisional emissions rate.[6] The term "most recent GREET model" means the latest version of 45VH2-GREET developed by Argonne National Laboratory that is publicly available on the first day of the taxpayer's taxable year in which the qualified clean hydrogen for which the taxpayer is claiming the 45V Credit was produced.[7]

The Proposed Regulations are vulnerable to legal challenges

While ZeroAvia understands the potential concerns regarding the unintended consequences on grid emissions, we are concerned because several respondents have asserted that Treasury and IRS have exceeded their authority in implementing the "three pillars" of incrementality, deliverability, and temporal matching because there is no mention of the three pillars in the statutory language and, insofar as Congress deemed it necessary, the statute accounts for the carbon intensity of hydrogen production in determining the amount of the credit.

Like other administrative agencies, Treasury has "no power to act unless and until Congress confers power upon it," and such authority is expressly limited by the statutory text and structure.[8] Congress granted Treasury with limited rulemaking authority "to carry out the purpose of Code section 45V,

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[1] I.R.C. § 45V(a)(1).
[2] Code section 45V(c)(2)(A) and (B); *see also* Prop. Treas. Reg. §§ 1.45V-1(a)(9) and 1.45V-5.
[3] I.R.C. § 45V(c)(1)(B).
[4] I.R.C. § 45V(e).
[5] Code section 45V(c)(1).
[6] *Id*.
[7] Prop. Treas. Reg. § 1.45V-1(a)(8)(ii).
[8] *Mozilla Corp. v. FCC*, 940 F.3d 1, 74 (D.C. Cir. 2019).

including regulations or other guidance for determining lifecycle greenhouse gas emissions." Code Section 45V does not authorize the Secretary to introduce new qualification requirements in the form of the three pillars, as such requirements are contrary to the language of section 45V.[9] Moreover, the implementation of the three pillars has been seen by some respondents as directly undermining the statutory language and thwarting its objective to incentivize large-scale clean hydrogen production.

ZeroAvia is therefore concerned that publishing a rulemaking that is vulnerable to legal challenges will delay implementation of the 45V regulations and subsequent access to the credit.

The Proposed Regulations undermine Biden Administration goals and programs

Hydrogen is recognized as a critical element and significant energy technology that will support the reduction in United States GHG emissions from 2005 levels by 50 to 52 percent in 2030 under the Paris Agreement, create a carbon pollution-free power sector by 2035, and reach net zero emissions no later than 2050.[10] In addition to these commitments, the Biden Administration along with Congress have acknowledged and supported hydrogen's role in meeting the decarbonization and economic goals through $9.5 billion in clean hydrogen initiatives enacted under the Infrastructure Investment and Jobs Act ("Bipartisan Infrastructure Law)[11], the formation of the Hydrogen Energy Earthshot ("Hydrogen Shot") program, and the related federal tax credits to incentivize clean hydrogen under the IRA.

In support of zero- and low-carbon hydrogen playing a key role in a comprehensive portfolio of solutions to achieve a sustainable and equitable clean energy future, and at the direction of Congress, DOE prepared the *U.S. National Clean Hydrogen Strategy and Roadmap*.[12] This report is the result of a collaborative effort from the hydrogen industry and various stakeholders, as well as contributions across multiple agencies and key experts in the Executive Office of the President.[13] The intent of such report was to create an "all of government" approach to increase the production of clean hydrogen.[14] Throughout the roadmap, DOE outlines the opportunity and goals for clean hydrogen to increase production from nearly zero today to 10 million metric tons ("MMT") per year by 2030, 20 MMT per year by 2040, and 50 MMT per year by 2050.[15] The three strategies proposed to reach such goals include: (1) target strategic, high-impact uses for clean hydrogen; (2) reduce the cost of clean hydrogen; and (3) focus on regional networks.[16]

In furtherance of the strategy to reduce the cost of clean hydrogen, the Hydrogen Shot program, the first of DOE's Energy Earthshots, was born. Developed in response to President Biden's April 2021 Climate Summit request to DOE to accelerate progress towards tackling the climate crisis, the Hydrogen

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[9] *See, e.g.*, *Ethyl Corp. v. EPA*, 51 F.3d 1053, 1058–60 (D.C. Cir. 1995) (holding agency "acted contrary to the plain language of" the statue when it based its decision on criteria not included in the statute).
[10] *See* Energy.gov; U.S. National Clean Hydrogen Strategy and Roadmap; chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.hydrogen.energy.gov/docs/hydrogenprogramlibraries/pdfs/us-national-clean-hydrogen-strategy-roadmap.pdf (accessed February 12, 2024).
[11] Bipartisan Infrastructure Law, Public Law 117-58 (November 1, 2021).
[12] *See* Energy.gov; U.S. National Clean Hydrogen Strategy and Roadmap; chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.hydrogen.energy.gov/docs/hydrogenprogramlibraries/pdfs/us-national-clean-hydrogen-strategy-roadmap.pdf (accessed February 12, 2024).
[13] *Id*.
[14] *Id*.
[15] *Id*.
[16] *Id*.

Shot program aims to accelerate breakthroughs of more abundant, affordable, and reliable clean energy solutions within the decade while creating good-paying union jobs and growing the economy.[17] The Hydrogen Shot program set a goal of producing clean hydrogen at $1 per kilogram by 2030. To achieve this goal, the cost of producing clean hydrogen from electrolysis must significantly decrease from the current estimate of $5 per kilogram, which is highly sensitive to the cost of electricity.[18] DOE recognizes that access to low-cost energy with a high-capacity factor and incentives, such as the 45V Credit, among other federal programs, can facilitate much lower electricity cost when combined to decrease the cost to produce hydrogen.[19]

In addition to the issue of high electricity cost, the hydrogen market also faces obstacles obtaining long-term offtake agreements (e.g., power purchase agreements ("PPA")). These types of agreements were also critical for the scale-up of the wind and solar industries.[20] Long-term PPA's are important in securing financing for hydrogen projects as such agreements help mitigate both volume and price risk. This is further highlighted by the fact that only 10 percent of the 12 MMT per year clean hydrogen production capacity announced in the United States has reached final investment decision ("FID"), which DOE largely attributes to the lack of long-term offtake agreements.[21]

In its hydrogen roadmap, DOE further elaborated on the importance of reduced hydrogen prices and a supportive policy environment to the 45V Credit's success, explaining that "[s]takeholders on the production, demand, and financing sides highlight hesitancy to commit resources due to lack of price transparency and risks in clean hydrogen supply. Regulatory drivers at the state and federal level could help provide these long-term demand signals. Catalyzing long-term offtake would ensure that clean hydrogen production projects break ground while tax credits are active, allowing for production cost-downs in the 2020s and early 2030s."[22]

Meeting the Biden Administration's decarbonization goals requires rapid deployment of clean hydrogen. To achieve the Department of Energy's base-case targets for the National Clean Hydrogen Strategy and Roadmap, clean hydrogen use must increase from near-zero today to 10 million metric tons (MMT) by 2030 and 20 MMT by 2040. To realize that level of clean hydrogen production, electrolyzer costs must fall by 30% by 2030 and 50% by 2040, which can only be accomplished through the immediate and sustained build-out of electrolyzer production capacity.

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[17] *Id*.

[18] *Id*.; Note the $5 per kilogram is the levelized cost of hydrogen calculated using the DOE's H2A model using a conservative $1,500/kW for PEM electrolyzer capital cost (at low volume manufacturing), a $50/MWh electricity price, and a capacity or utilization of 90 percent. In comparison, using today's $29/MWh for solar and 35 percent capacity factor, based on the 2020 National Renewable Energy Laboratory (NREL) Annual Technology Baseline, results in a levelized hydrogen cost of about $7.50 per kilogram. U.S. Department of Energy, "Cost of Electrolytic Hydrogen Production with Existing Technology," September, 22 2020. https://www.hydrogen.energy.gov/pdfs/20004-cost-electrolytic-hydrogen-production.pdf.

[19] *Id*.

[20] *Id*.

[21] *Id*.

[22] *See* Energy.gov; U.S. National Clean Hydrogen Strategy and Roadmap; chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.hydrogen.energy.gov/docs/hydrogenprogramlibraries/pdfs/us-national-clean-hydrogen-strategy-roadmap.pdf (accessed February 12, 2024).

DOE projects that this expanded electrolyzer capacity is more than 5X the amount of currently announced electrolyzer projects. If all of these electrolyzers were required to be powered by newly-built wind or solar generation, DOE estimates that up to 200 gigawatts of new renewables would be needed just for hydrogen production—roughly equivalent to all of the wind and solar generation ever built in the United States. That is an amount of new renewable generation that is impossible to bring online by 2030 given the state of permitting and the ongoing grid connection delays in the U.S.

In addition, while a clean hydrogen economy matures, large amounts of new wind and solar also must continue to be built to meet state clean energy mandates and other procurements. Access to available sources of carbon-free electricity from existing generators is therefore essential for the Section 45V tax credit to increase the production, reduce the cost, and de-risk the adoption of clean hydrogen.

Over the past decade, the U.S. power sector has reduced emissions by approximately one-third through the adoption of smart climate policies that preserved existing carbon-free resources while deploying new clean energy at an increasingly fast rate. During that same period, emissions have held steady or increased in other major sectors of the economy. To address the climate crisis, solutions must be deployed now to reduce pollution across all sectors, but producing clean hydrogen using today's technologies can be as much as 5X the cost of fossil-based hydrogen. This puts clean hydrogen out of reach for American industries trying to decarbonize. The 45V credit helps overcome this price gap, but only when hydrogen producers make their product cheaper by passing the credit value to their customers. That is the entire point of the federal support: to lower the cost of clean hydrogen and unlock the potential of the power sector to decarbonize hard-to-abate sectors of our economy.

The Proposed Regulations undermine the Infrastructure Investment and Jobs Act of 2021

In addition to violating the intent of the IRA, the proposed regulations are incompatible with the Infrastructure Investment and Jobs Act of 2021, which created the Department of Energy's Regional Clean Hydrogen Hubs program. Applications for that program were required by the DOE to be submitted in April 2023. The proposed rulemaking considerably alters the technoeconomic models used by project sponsors to develop hub applications such that the Biden Administration might very well end up starving the nascent hydrogen economies IIJA was drafted by Congress to cultivate --at a cost of $8 billion to the American taxpayer.

The hubs were permitted to use the GREET 1 Series model in computing their respective well-to-gate lifecycle GHG emissions, which includes computing emissions related to the direct connection to renewables or integration with the electricity grid. The hubs FOA did not include the use of EACs and the associated three pillar qualification requirements, as introduced in the Proposed Regulations. The FOA required an applicant to disclose whether it intended to "pursue federal (or state) incentives, such as the 45V Credit, and clearly state the credit value that they are targeting." However, the hubs computation of their LCAs under the GREET 1 Series model and the GREET model mandated under the Proposed Regulations are <u>not</u> analogous and will have different results, with the latter GREET model placing the hubs under an undue burden to comply with the three pillars.

The proposed regulations are also inconsistent with policy objectives established by the Biden Administration itself: to drive 2030 deep decarbonization, to attain $1 per kilogram clean hydrogen production, to secure 10 million metric tons per year of clean hydrogen production, to create 20-25 gigawatt per year of domestic electrolyzer manufacturing capacity, and to generate a large number of

good-paying jobs with a multi-billion dollar public investment that seeds significantly more private investment in the nascent clean hydrogen industry.

Defining as off-limits to 45V credits the use of available carbon-free electricity to power hydrogen production would violate the plain language of Section 45V and undermine the purpose of the IRA: to incentivize investment in clean energy technologies that enable the transition to a carbon-free economy.

The EPA has been inconsistent regarding induced emissions

When the 45V credit was enacted, it immediately positioned the United States as the global leader in clean hydrogen. Following the release of the proposed rulemaking, that leadership has been called into question. The IRS and the Treasury are bound by law to follow the congressional intent of this credit, to wit: growing a domestic clean hydrogen economy that helps drive broad decarbonization and helps solidify American technology leadership.

Prior to publication of the Proposed Regulations, the EPA responded to Treasury's request for information related to the definition of lifecycle GHG emissions under the Clean Air Act ("CAA") to support Treasury's interpretation and implementation of Code section 45V.[23] Specifically, Treasury asked whether it would be consistent with EPA's interpretation of CAA section 211(o)(1)(H) in the Renewable Fuel Standard ("RFS") program[24] for Treasury to determine that indirect GHG emissions associated with increased demand for electricity from electrolytic hydrogen production constitute "significant indirect emissions."

In its response, EPA "emphasizes that it has not analyzed the lifecycle greenhouse-gas emissions associated with or conducted a lifecycle analysis for electrolytic hydrogen production. Nor has it interpreted CAA section 211(o)(1)(H) in the context of hydrogen production." However, based on the EPA's prior implementation of CAA section 211(o)(1)(H), the EPA believes it would be reasonable and consistent with the agency's precedent for Treasury to determine that induced grid emissions are an anticipated real-world result of electrolytic hydrogen production that must be considered in lifecycle greenhouse-gas analyses under IRC section 45V.

Conclusion

ZeroAvia concurs that indirect greenhouse gas emissions would be associated with increased hydrogen production; but we have concerns that unduly strict rules will hamstring the impact that hydrogen can have on tackling climate impact across a range of sectors. In addition, we believe the statutory language,

[23] Environmental Protection Agency, Letter to Honorable Lily Batchelder, Assistant Secretary for Tax Policy, in response to Treasury's request that the EPA provide information related to the definition of lifecycle GHG emissions under the Clean Air Act to support Treasury's interpretation and implementation of Internal Revenue Code Section 45V, December 20, 2023. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://home.treasury.gov/system/files/136/45V-NPRM-EPA-letter.pdf.

[24] The RFS program was created under the Energy Policy Act of 2005, which amended the Clean Air Act, to ensure fuels are manufactured to meet certain regulatory requirements and provide cleaner air for the public. It requires that a certain volume of renewable fuel be replaced with or reduced the quantity of petroleum-based transportation fuel, heating oil or jet fuel, which is transported via commercial pipeline between the renewable fuel providers and users.

congressional intent, and near-term goals of the Biden Administration argue for less regulatory activism regarding EACs than Treasury and IRS have demonstrated.

ZeroAvia asks that Treasury and IRS align the final 45V regulations to further support the Biden Administration's goals of accelerating economy-wide decarbonization by maximizing production and affordability of clean hydrogen. We look forward to working with the Treasury Department to address these challenges, and we provide our specific responses to the 45V Notice of Proposed Rulemaking below.

General Comments

1. Please confirm that there is no monetary threshold required for capital expenditure paid or incurred with respect to modifications made on an existing facility (i.e., placed in service before January 1, 2023) to produce qualified clean hydrogen, assuming all other requirements are met, for such facility to qualify under Code section 45V(d)(4) and under Prop. Treas. Reg. §§ 1.45V-6(a)(1) and (2).
2. Please clarify that if a specific clean electricity generator is directly connected to a qualified clean hydrogen production facility and the electricity from such generator is solely used for the production of qualified clean hydrogen, then an EAC is not required.

Comment Regarding Electrolyzed Hydrogen and Energy Attribute Certificates (EACs)

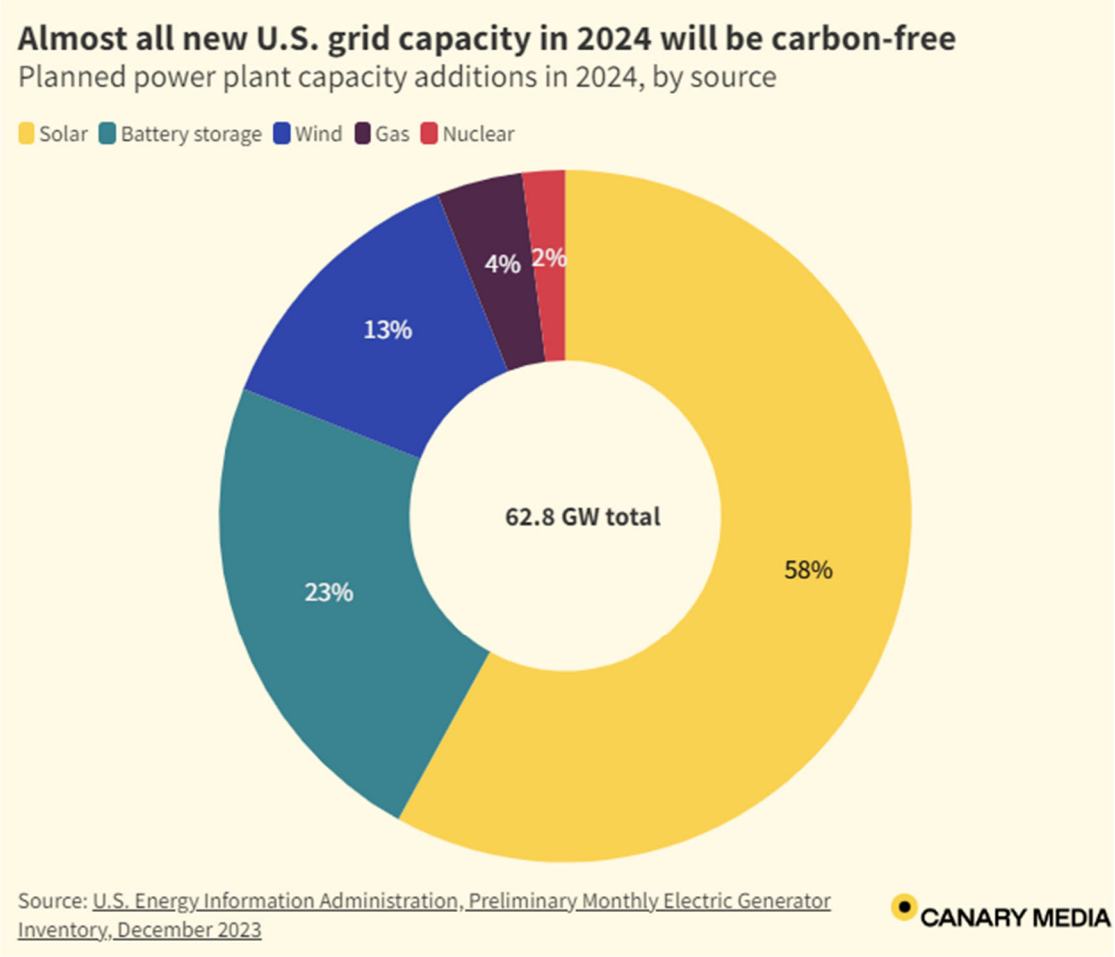
Incrementality and Induced Emissions

As 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 COD (as defined in proposed § 1.45V–4(d)(2)(i)) that is no more than 36 months before the hydrogen production facility for which the EAC is retired was placed in service."

3. ZeroAvia recommends eliminating the incrementality requirement regarding EACs for the reasons below:
    a. An "additionality" requirement is inconsistent with the statute. Congress clearly intended for electricity generated by renewable energy to produce hydrogen; for example, the IRA explicitly links eligibility for the Section 45V tax credit with the Section 45U tax credit that is available only to <u>existing</u> nuclear plants.
    b. Congress directed Treasury to use the GREET model, which is pre-populated for different types of hydrogen production (including electrolyzers) and does not include "additionality" requirements.
    c. Congress clearly knew how to create vintage requirements in the IRA and even included them in Section 45V for in-service and construction dates for hydrogen production itself. But, importantly, Congress did *not* carve out generation facilities constructed prior to IRA passage.

d. Studies claiming that additionality will not hinder hydrogen development assume an immediate and limitless supply of new wind and solar projects. In the real world, interconnection queue congestion, difficulties in building transmission, supply chain constraints, and permitting challenges limit the supply of new grid-connected renewables in multiple regions through the late 2020s. Congress enacted the hydrogen tax credit to spur investments that will accelerate technological breakthroughs in decarbonizing difficult to electrify sectors in this decade, which cannot happen without access to available zero-emissions electricity.

e. The incremental requirement fails to understand the market for renewables: the renewable grid will grow of its own accord as growing demand for renewable electricity manifests itself; it doesn't need hydrogen producers to instigate its growth. Strong incentives are already in place under federal and state policy to ensure the expansion of renewables. Note, for example, the record addition of renewable energy in 2023 and the plans for 2024 (as illustrated below).



f. But, that said, the pace of renewables growth is simply not fast enough to support the proposed incremental renewables rulemaking. As much renewable power as was added last year, that amount is still far short of the Administration's own goals of cutting power generation emissions 40% by 2030. To catch up, the U.S. will need to add orders

of magnitude more clean energy than ever before, something on the order of between 60 and 127 gigawatts of capacity in 2024 alone, and 70 to 126 gigawatts annually between 2025 and 2030. Again, this is due to siting and permitting delays, backlogged grid interconnect queues, and supply chain challenges. The grid itself is not expanding fast enough to accommodate the new clean energy the country needs to hit its goals. Princeton's Repeat Project[25] has found that hitting the Biden administration's goal of a zero-carbon grid by 2035 will require 75,000 miles of new high-voltage lines —far less than what's being built today— and that over 80 percent of the Inflation Reduction Act's emissions-reduction potential cannot be realized if the current pace of expansion is not dramatically increased. This constraint sets hydrogen production on hold for at least 3 years by putting it at the back of a very long and slow line.

g. We must add to wind and solar projects the even longer lead times for both nuclear power and hydro-electric projects, where a proposal drafted today could not be expected to even break ground before the IRA's 45V credits are due to expire.
h. All of this will stifle the stated goals of the IRA as well as the Administration's own aspirations of nurturing development of the emerging hydrogen economy. As but one example, limiting access to the full amount of the 45V tax credit will significantly alter the outlook for the DOE Regional Clean Hydrogen Hubs program, to which Congress has allocated $8 billion of U.S. taxpayer money.
i. Further, this is an inequitable and unprecedented singling out of promising carbon-abating technology. For example, the EV tax credits, also in the IRA, have no corresponding rule specifying the electricity source a vehicle owner must use to charge a newly purchased vehicle before receiving the EV purchase tax credit. A vehicle owner getting electricity from the highest-emitting generation source is rewarded with the same credit as the vehicle owner getting electricity from a 100% renewable source. In that section of the IRA and its subsequent implementation, there was no attention to the impact of a considerable increase in incremental demand.

4. ZeroAvia asks that, should the incremental provision be retained, hydrogen producers using EACs from states or regions with GHG emissions caps or renewable portfolio standards be considered compliant, as proposed by California, New York, and Washington submissions to earlier Requests for Comment for the reasons below:
    a. In states with renewable portfolio standards (RPS) based on a percentage of load, by definition, if an electrolyzer load is added to that grid, new renewables must be built to cover the percentage of obligation in place.
    b. An RPS or emissions cap enables the clean electricity sector to automatically adjust its renewables requirements for new clean load without putting this obligation onto the new electrolyzer load.
    c. Under current RPS or emissions cap implementation policies, no state requires additionality tied to individual heat pumps installed, electric vehicles connected to the grid, lithium-ion energy storage, nor any other decarbonization solution being deployed at scale to meet local, state, or national climate and energy goals. It is unclear why a different approach should be applied to hydrogen.

[25] https://repeatproject.org/docs/REPEAT_IRA_Transmission_2022-09-22.pdf

    d. The suggested additionality restrictions are not only unnecessary in a statutory clean energy state; they would also complicate development of electrolytic hydrogen production in such states. An additionality requirement would prevent the use of electricity from existing hydroelectric, wind, solar, or nuclear generating facilities even if those facilities are most suitable to serve a particular hydrogen production facility and even if state law ensures this use would not result in any increase in GHG emissions.
5. ZeroAvia asks that, should the incremental provision be retained, Treasury should implement a transitional period through 2032.

Temporal matching

As 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, and § 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."

ZeroAvia believes that hourly matching should be the long-term goal because demonstrably clean hydrogen production is key to the industry's integrity. However, the federal government should consider the industry's level of preparation for such detailed temporal matching.

6. ZeroAvia requests temporal matching be introduced in a way that allows hydrogen production and power generation to develop pathways to accurately determine temporal matching such that regulations transition more gradually from annual matching to monthly and, only in 2030, to hourly for the reasons below:
    a. Effectively, there is no safe harbor transition for hydrogen producers, where project developers will have to plan for hourly compliance in advance to adequately finance these projects. Producers will also have to design facilities from the start to work with hourly matching, which will delay projects, increase costs, and defeat the purpose of the proposed transition period.
    b. Further, the Proposed Regulations do not account for the state of electrolyzer technology, where current alkaline electrolyzers are not able to ramp up and down efficiently. As such, electrolyzers would have to be overbuilt to maintain electrolyzer utilization.
    c. Any decision to move towards a more granular approach to temporality should be taken only after a thorough evaluation of the state of the hydrogen market, the uptake of renewables and an assessment of the maturity of the technologies available to ensure information and data is being provided in a reliable manner.
    d. An initial progression from annual to monthly temporal correlation would be more suitable. Monthly matching gives extra granularity while also providing sufficient flexibility for actors as the market develops.
7. ZeroAvia requests that language be inserted such that the temporal matching pillar allows the producer to match electricity produced to when the electricity is delivered, not to when it is used for hydrogen production.

a. The Proposed Regulations do not allow a producer to purchase renewable power in one hour and store that power for use in another hour. For example, producers relying on solar power and wanting to run electrolyzers in the overnight hours could purchase low carbon-intensity electricity during the day, e.g. during a period of high solar production and low electricity consumption, and store it via battery for use in overnight electrolysis.

Deliverability

As proposed by the Department, § 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."

8. ZeroAvia asks that EACs created in one DOE Needs Study Region be usable in another region if the two regions are within a larger interconnection region for the reasons below:
    a. The proposed 13 regions will be particularly challenging for parts of the country with minimal new renewable development projects already in the interconnection queue. As a result, projects will inevitably shift towards two or three large authorities.
    b. The IRS and the Treasury have effectively subdivided the markets for EACs into such fine segments that it will exacerbate concerns with liquidity and price spikes. Regions with renewable power either entering into service or planned in the near future will attract hydrogen production. Whereas other regions will lack investment. The consequence is a failure to create a national network of hydrogen hubs as intended in the IIJA and instead create a regional system of winners and losers.
    c. The transmission infrastructure enabling delivery of electricity across Needs Study Regions and within interconnection regions exists today.
    d. The burden of temporal matching on an hourly basis will further hinder development in some regions relative to others.
9. ZeroAvia asks that, if the deliverability regions are not modified, Treasury and IRS allow 45V eligibility for hydrogen production using EACs from a neighboring region where transmission interconnection capability exists for the reason below:
    a. More flexibility in project design could be gained even if the proposed regions are used, but with the additional allowance for projects to span adjacent regions (cross one regional boundary.)

ZeroAvia welcomes the opportunity to collaborate with the IRS and Treasury on the issues and solutions outlined above. Please contact us with any questions or comments.

Thank you again for the opportunity to respond to the notice of proposed rulemaking; we look forward to seeing the Department's final guidance.

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