C2ES CENTER FOR CLIMATE AND ENERGY SOLUTIONS

COMMENTS OF THE CENTER FOR CLIMATE AND ENERGY SOLUTIONS

Comments of the Center for Climate and Energy Solutions (C2ES) on the Section 45V Credit for Production of Clean Hydrogen; Section 48(a)(15) Election To Treat Clean Hydrogen Production Facilities as Energy Property (88 FR 89220 (December 26, 2023)) Docket ID No. REG-117631-23; IRS-2023-0066).

This document constitutes the comments of C2ES on the proposed regulations relating to the credit for production of clean hydrogen (clean hydrogen production credit) and the energy credit (Proposal), proposed by the U.S. Department of Treasury (Treasury Department) and the Internal Revenue Service (IRS), and published in the Federal Register on December 26, 2023.

C2ES is an independent, nonprofit, nonpartisan organization working to secure a safe and stable climate by accelerating the global transition to net-zero greenhouse gas emissions and a thriving, just, and resilient economy. As such, the views expressed here are those of C2ES alone and do not necessarily reflect the views of members of the C2ES Business Environmental Leadership Council (BELC).

In December, the Treasury Department released its much-anticipated guidance for the 45V Credit for Production of Clean Hydrogen, which recognizes four tiers of tax credits based on the carbon intensity of the hydrogen produced. Once finalized, the guidance will add welcome certainty for participants in seven recently selected Hydrogen Hubs across the country and for many others planning to utilize this promising energy carrier.

Why low carbon fuels?

An electrification-alone approach to economywide decarbonization is limiting, costly, and may not be practical or achievable. Due to the urgency of climate change, it is prudent to pursue many promising decarbonization pathways simultaneously; low-carbon fuels like hydrogen will be necessary in certain hard-to-decarbonize sub-sectors, notably steel, chemicals, and as a fuel for long-distance transportation (i.e., aviation, shipping, and trucking).

Currently, the United States produces more than ten million metric tons of hydrogen each year, primarily for petroleum refining, treating metals, fertilizer production and food processing. But since it is almost exclusively produced from the unabated use of natural gas, this generates 44 million metric tons of carbon pollution each year, or about three percent of annual industrial emissions.

It is anticipated that early demand for hydrogen will substitute emission intensive hydrogen in the existing end uses mentioned above with new, cleanly produced hydrogen.

The three pillars

Though the Treasury guidance addresses additional cleaner production pathways, much of the attention has been focused on electrolysis—a process that splits water into hydrogen and oxygen using an electricity-powered electrolyzer. With respect to electrolysis, the Treasury Department adopted a strict systems approach to ensure that clean hydrogen production uses low-carbon electricity and does not induce emissions elsewhere on the grid.

With input from the U.S. Department of Energy and Environmental Protection Agency (EPA), industry, and environmental groups, Treasury adopted "three pillars" for clean hydrogen production through electrolysis. The pillars include: incrementality, regionality, and temporal matching.

To be eligible for the credit, producers must use new, clean electricity that came online within 36 months of when a hydrogen production facility begins operations. The electricity produced also must be located in the same regional grid as the hydrogen production. Finally, the electricity produced must also be temporally matched with the hydrogen production—initially, produced in the same calendar year but beginning in 2028, produced in the same hour. To ensure that facilities are in compliance with the "three pillars" guidance, producers may use energy attribute certificates (EACs), including Renewable Energy Certificates (RECs).

Why this approach?

With a generous credit of up to $3 per kilogram for the cleanest tier of hydrogen production, there is genuine concern that without the "three pillars" approach, clean energy producers will favor hydrogen production over existing energy demands. The potential result could thereby increase power sector emissions (also known as induced grid emissions) as existing clean grid electricity is diverted to hydrogen production, and natural gas- and coal-fired power plants generate even higher levels of electricity to make up the slack.

U.S. power sector carbon dioxide emissions have fallen 36 percent since 2005, but 60 percent of electricity is still generated by fossil fuels. Additionally, electrolyzers are not highly efficient. With current technology, producing 10 million metric tons of hydrogen from electrolysis would require 550 terawatt-hours of electricity – an amount equal to 13 percent of *total* U.S. electricity generation in 2022 from all sources. If that increased generation comes from running fossil-fuel fired power plants more often, it will lead to higher emissions.

As electrolyzers become more efficient and as the electricity grid becomes cleaner, these issues will become less of a concern.

A limiting approach that undercuts Congressional intent

As C2ES previously noted, strict adherence to incrementality, regionality, and temporal matching will ensure that new hydrogen production is clean, but it is also severely limiting. There is effectively no clean hydrogen production today. As proposed, the Treasury guidance will largely encourage only hard-wired clean hydrogen production projects, that is, where new wind and solar projects are directly connected to electrolyzers. Because electrolyzers need very low-cost electricity and must have high capacity factors (i.e., run almost constantly) to make business sense, this will limit clean hydrogen production to a handful of regions in the United States where both wind and solar resources are highly productive. To be clear, since the sun does not shine at night, projects will need to incorporate both wind and solar resources for their electricity, and electrolyzer technology cannot easily run flexibly while switching between wind and solar.

An additional and compounding issue is that the regions where clean hydrogen production will be economic under the proposed guidance will not necessarily coincide with where hydrogen demand exists. It will be costly to transport hydrogen to where it will be needed. Pipelines (and storage facilities) are the safest and most efficient way to transport product, but they do not (meaningfully) exist. Also, clear federal authority is needed for approving and siting this infrastructure. And the long-distance transport of hydrogen itself raises climate concerns associated with leakage, since hydrogen is an indirect greenhouse gas. All of this is to say that these challenges will severely limit the growth of a promising climate solution.

Furthermore, without more flexibility on incrementality, the "three pillars" could further undercut congressional intent. Specifically, the Inflation Reduction Act includes language that a clean hydrogen facility can claim the hydrogen production tax credit (PTC) even if it uses electricity from an existing nuclear power

plant using the nuclear PTC. Congress recognized that utilizing existing nuclear power is a highly efficient way of producing electrolytic hydrogen because one can make use of the steam and its carbon-free electricity; a strict interpretation of the "three pillars" would forestall that pathway.

Room for guidance improvement

Flexibility and certainty are needed to see more types of clean hydrogen production projects developed in diverse locations across the country; hydrogen's utility in reducing emissions and reaching our broader climate goals will only be realized when it is applied across all regions. We need to encourage first movers of all types to increase development, innovation, and investment. Critically, more early mover projects will help drive key infrastructure development (i.e., pipelines and storage facilities) through offtake agreements that will enable the hydrogen ecosystem to thrive. It must be acknowledged that adopting a less strict approach than the "three pillars" will lead to some near-term emission increases, but this flexibility is necessary for the timely development of a clean hydrogen industry that could play a critical role in the net-zero transition – and thus reduce emissions by much more over the longer term. What is more, the need for additional flexibility is greatest in the near term; we can and should adopt stricter controls once the clean hydrogen industry is firmly established.

On the issue of temporal matching, allowing annual matching to persist until 2030 or even 2032 would provide additional ease and flexibility. And, any project that kicks off with annual matching should be able to continue with annual matching for the full 10-year credit period. Hourly tracking systems are not yet widely available across the country. While it is not excessively technically challenging to develop this system, it might take a few years to organize and develop it.

On the issue of incrementality, the "three pillar" framework espoused by Treasury risks boxing out existing nuclear and hydropower facilities, almost all of which were built more than three years ago, unless it formalizes additional flexibility. Nuclear facilities that "restart" and facilities that obtain license extensions should have all their capacity counted as incremental. Facilities that perform "uprates" on existing units should have all the uprated power count as incremental. Additionally, as a proxy for avoided retirements, 10 percent of existing nuclear power capacity should be eligible as a clean electricity source for the full hydrogen production credit, and plant owners should be able to borrow capacity from across the fleet to right-size electrolyzer deployments. Hydrogen production offers a valuable revenue stream for nuclear plants, which have struggled economically because they are not fully compensated for the market, environmental, and other benefits they provide. When nuclear plants retire prematurely, emissions rise substantially as their power is typically filled in by natural gas and coal generators. This carveout goes some way to preserving congressional intent and will be helpful in maintaining power sector decarbonization gains as well as diversifying and amplifying clean hydrogen projects across the country.

Additionally, and with respect to instances where carbon capture and sequestration (CCS) has been added to an existing fossil fuel electricity-generating facility, that clean electric power for hydrogen production should be treated as "incremental."

Finally, a hydrogen-specific version of the GREET model will be used to determine the "well-to-gate" lifecycle emissions of the facility's hydrogen production, and ultimately the value of credit a facility is eligible to receive. Uncertainty around future versions of the GREET model will likely hamper investment decisions. Therefore, projects should be able to lock-in the model version under which their production will be evaluated for the full 10 years. To add further flexibility, a facility should be able to opt in to an updated version of GREET at a future time, when it chooses to do so.

Conclusion

In its current form, this guidance is highly unlikely to help meet the administration's goal of producing ten million metric tons of clean hydrogen by 2030 – three million of which would come from seven hydrogen hubs. The guidance strongly focuses on ensuring that additional electricity generation necessary for hydrogen production is not met by ramping up spare capacity from existing fossil-based electricity sources. While we believe that this approach will incentivize the cleanest possible hydrogen production from the start, it will also make it far more challenging to quickly achieve the necessary clean hydrogen volumes to incentivize infrastructure, growth in offtake agreements, and the wide scale deployment of hydrogen needed to meet our climate goals, as articulated by the proposed EPA power plant rules.

There is room for improvement. Adding flexibility on temporal matching and incrementality will help ensure more new production is deployed, encourage innovation, and allow more pathways in more regions to emerge. At the same time, more needs to be done to help deploy hydrogen infrastructure and support demand-side issues. Currently, C2ES is convening a technology working group to address demand-side (i.e., existing, and new demand) issues and helping to complete the hydrogen market.

There is a historical analog here with regard to EPA's treatment of the nascent electric vehicle (EVs) market. In the previous decade, EPA did not count the upstream emissions associated with electricity production in assessing emissions from EVs in its Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards. The final rule as published in the Federal Register summed it up well, "EPA believes it is worthwhile to forego modest additional emissions reductions in the near term in order to lay the foundation for the potential for much larger "game-changing" GHG emissions and oil reductions in the longer term."

Finding a middle ground that preserves congressional intent will help to ensure that a promising climate solution emerges strongly. This guidance can provide a new level of confidence, in both the incentives and regulatory structure, from which investors, producers, offtakers, and supporting infrastructure developers can begin to assemble a domestic clean hydrogen industry. Predictability and flexibility will be key to allowing hydrogen to flourish as America's next major energy carrier.