

US Treasury's 45V Guidance Draws Mixed Response from Hydrogen Industry



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Contents

Introduction	p3
Overview of the 'Three Pillars'	p4
Supportive Commentary	p5
Critical Commentary	p6
Conclusion	p7

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Introduction

The US Treasury Department unveiled its proposed guidance for a clean hydrogen tax credit in late December. The delayed guidance had long been awaited, with numerous would-be hydrogen producers thought to be holding off on launching new projects until they could be sure of qualifying.

The administration of US President Joe Biden is aiming to boost US production of clean hydrogen from less than 1 million metric tonnes (Mt) currently to 10 Mt by 2030 and 50 Mt by 2050. However, green hydrogen – which is the cleanest form, produced using electrolysis and renewable electricity – is more costly than hydrogen produced using natural gas. The Biden administration is thus aiming to use the 45V hydrogen production tax credit (PTC) to make green hydrogen cost-competitive and grow the nascent hydrogen industry, improving economies of scale to enable it to continue expanding beyond the period covered by subsidies.

Under the guidance, only hydrogen that is produced via a process that results in lifecycle greenhouse gas (GHG) emissions of no more than 4 kilograms (kg) of carbon dioxide equivalent (CO₂e) per kilogram of hydrogen would qualify for the 45V credit. The credits on offer are tiered, with only hydrogen yielding emissions of less than 0.45 kg of CO₂e per kg of hydrogen qualifying for the top-tier credit of \$3 per kg of hydrogen produced. At the other end of the scale, the base credit rate is set at \$0.60 per kg hydrogen produced.

According to an analysis by the Electric Power Research Institute (EPRI), the 45V credit could cover about 90% of the production costs of green hydrogen in the most favourable cases, and around 40% in the least favourable cases.

To qualify for the subsidy, however, hydrogen producers will have to follow rules that have been described as the world's strictest for using clean power for their electrolyzers. Producers using electricity from the grid to power their hydrogen facilities would have to buy and retire energy attribute certificates (EACs) to demonstrate the emissions impact of the electricity used. To qualify for 45V, the EACs would have to meet criteria that have become known as the three-pillar framework to ensure the power used in the hydrogen production process qualifies as clean. The three pillars are incrementality, temporal matching and deliverability.

Overview of the ‘Three Pillars’

Under the incrementality – or additionality – requirement, electricity used for hydrogen production must come from a new source of clean power generation. The guidance proposes that power-generating facilities have a commercial operating date (COD) that is not more than 36 months before the hydrogen facilities they serve are placed in service.

In order to meet the temporal matching requirement, electricity used by a hydrogen facility would need to be generated within the same hour. Under the proposed guidance, this requirement would only be phased in from 2028, and prior to this, electricity generated within the same year the hydrogen is produced is allowed to qualify.

Lastly, under the deliverability requirement, the electricity must be generated in the same region the hydrogen production facility is located in. The regions are set out in the National Transmission Needs Study, which was released by the US Department of Energy (DoE) in October 2023.

The three pillars are aimed at ensuring that the hydrogen being subsidized is truly clean and that its production does not inadvertently contribute to an increase in grid emissions. Using the electrolysis process to produce hydrogen requires large amounts of electricity, so the Treasury is trying to avoid a scenario where hydrogen facilities take up existing renewable capacity from the grid, leading to other power users sourcing their electricity elsewhere, potentially including gas- or even coal-fired generation. This is the thinking behind the incrementality pillar. Similarly, the deliverability and temporal matching pillars are aimed at ensuring that clean hydrogen production does not contribute to the use of electricity that is more emissions-intensive.

Various studies, including one by the EPRI, have found that only a structure incorporating all three pillars into the 45V credit would result in a hydrogen industry that does not increase overall GHG emissions from the grid. Those advocating for stricter rules in the run-up to the publication of the guidance have expressed concern that less strict rules could in fact lead to a worse emissions impact than producing hydrogen from natural gas.

Supportive Commentary

The response to the proposed 45V guidance is mixed, but has been positive among a number of parties, including companies that are developing clean hydrogen projects, industry groups and politicians. Indeed, some of those voicing their support for the rules are developing projects that are already set to be compliant with the guidance and would qualify for subsidies under 45V.

Companies welcoming the guidance and planning to be compliant with it include Air Products, Electric Hydrogen, Hy Stor Energy and Synergetic.

"We applaud the administration's strong three pillar hydrogen tax credit proposed rule, which will be essential to delivering real emissions reductions, creating the stimulus for broader investments across the hydrogen value chain and cementing the US' global climate leadership," stated Air Products' president and CEO, Seifi Ghasemi.

The guidance was also welcomed by certain industry groups, including the Solar Energy Manufacturers for America Coalition, whose executive director, Mike Carr, described it as "critical guidance that will help drive demand for domestic solar manufacturing".

And think-tank the Clean Air Task Force's US director of zero-carbon fuels, Emily Kent, was quoted by Power magazine as saying the guidance was "an excellent step toward developing a credible clean hydrogen market in the US".

Supporters of the guidance are seeking to ensure that it positions the clean hydrogen industry to be commercially viable beyond the 10-year period production facilities can qualify for 45V. Concerns have also been raised that rejecting the guardrails on which the guidance is based could create an industry dependent on subsidies for survival. Supporters also want to avoid an increase in electricity prices for consumers, which has been raised as a potential risk of hydrogen expansion without the incrementality pillar. And if hydrogen development leads to higher consumer prices and higher emissions, this could risk worsening the industry's reputation and leading to a loss of public and policy support.

Critical Commentary

At the same time, though, other companies, industry groups and politicians have expressed their disappointment in the proposed guidance and their opposition to some of its aspects.

One of the primary objections to the guidance is that it could increase costs for producers of clean hydrogen, thus denting their competitiveness. Unsurprisingly, the pushback is coming from parties including hydrogen developers that would be unlikely to earn the highest subsidy level with their current plans.

Companies opposing stricter guidance based on the three pillars include electrolyzer maker Plug Power and utilities Constellation Energy and NextEra Energy. Industry groups opposing stricter rules include the Clean Hydrogen Future Coalition and the American Clean Power Association.

NextEra has said that applying the three-pillar framework to 45V would drive up costs and limit production to a handful of locations. Indeed, given the deliverability pillar, it looks as though the regions set to benefit most from subsidies under 45V will be those where renewable generation capacity can be built at the lowest cost and at the largest scale. These include the US Midwest and Southwest.

However, if 45V means investment into hydrogen is driven to regions where new renewable capacity can be easily built out, it could undermine another Biden administration decarbonization initiative – the establishment of seven regional clean hydrogen hubs around the country. Some of the regions selected for hubs had planned on using nuclear power to feed hydrogen facilities. While the Treasury is seeking comment on certain aspects of its proposals that could yet result in some additional flexibility being built into the rules, the incrementality pillar makes participation by nuclear generators difficult given the long timeframes required to build new capacity.

This explains Constellation's opposition to the proposed guidance, given that it operates the US' largest fleet of nuclear plants.

"Restricting sources of power to newly built generation projects would undermine the investment needed to expand the use of clean hydrogen and achieve the administration's decarbonization goals," Constellation says on its website.

Members of Congress representing regions that have been selected to host hydrogen hubs but may be shut out from 45V subsidies are also critical of the proposals.

Other pillars in the guidance have also come under fire.

"The administration's failure to provide an economically viable phase-in for the transition from annual to hourly matching will make initial green H2 production significantly more costly than higher polluting options," the American Clean Power Association's CEO, Jason Grumet, stated. "Absent a meaningful number of first movers, a new industry will not develop."

Conclusion

The 45V guidance is not yet finalized, and will be challenged during the public comment period, and possibly also in court. It is already clear that the industry and other stakeholders are divided on the three-pillar approach.

It has been noted, though, that the European Union has recently adopted rules to meet the three pillars, and has seen an increase in electrolyzer investment since. While it is true that some producers could have to account for higher costs or rethink their plans if they want to qualify for 45V tax credits, the level of credits on offer is attractive and could serve as a considerable incentive.

Beyond the subsidy period, several models have suggested that once the tax credits expire, the most important cost variable will be the cost of electricity. And wind and solar are widely projected to increasingly be cheaper than fossil fuel-based power in the long run. With this in mind, it would make sense to take an approach that would encourage the build-out of clean energy that looks likely to help keep costs low. This also means there is a case for electrolyzer technology that can ramp up and down to deal with intermittency issues in renewable power supply.

Ultimately, to really spur the growth of the clean hydrogen industry, the Biden administration needs to finalize the 45V guidance as soon as possible, given hydrogen producers clarity on how best to proceed. Demand-side incentives could also help the nascent industry pick up momentum.