

POLICY PAPER

The True Cost of the 45V Tax Credit

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Executive Summary

As the White House and Congress weigh budget cuts, there are active discussions around the cost-savings impact of eliminating the Section 45V clean hydrogen production tax credit (45V). The credit provides up to \$3 per kilogram (kg) of hydrogen produced, below a certain carbon intensity threshold.

Delays in implementing the 45V tax credit have stunted the U.S. clean hydrogen market, and the final rules have decreased the number of viable projects. It is also true, however, that the final rules are sufficient for jump-starting a new domestic industry and bringing enough supply online to reduce the technology costs. Any further changes to the credit would jeopardize this opportunity.

The EFI Foundation's (EFIF) analysis, based on real-world project data, shows that the cost of 45V to taxpayers will be significantly less—up to an order of magnitude less—than is currently being estimated by the U.S. Department of the Treasury.

The following memo evaluates the cost projections of the 45V tax credit.



Introduction

The 2.5-year process for finalizing the rules of the 45V tax credit — originally passed in mid-2022 as part of the Inflation Reduction Act — created a cooling effect on the U.S. clean hydrogen market. The final 45V rules established a complex and bespoke approach to defining the emissions footprint of clean hydrogen, including adding emissions beyond the direct control of the producers.ⁱ The final rules are nearly 400 pages long.

The prolonged and highly debated rulemaking process caused significant project delays, including across the Regional Clean Hydrogen Hubs funded by the Infrastructure Investment and Jobs Act (IIJA). Without clear tax credit rules, producers could not estimate supply costs, and buyers could not sign offtake agreements. The final rules were published in January 2025.

Since the final rules were issued, a new wave of uncertainty about the credit has emerged, as Congress and the White House are considering new budget cuts. Any consideration of changing the 45V policy must factor in accurate assessments of the potential cost of the credit to taxpayers.

Estimating the Cost of the Credit

It is difficult to estimate the cost of any tax credit, especially one for a new industry. Early cost and demand discovery can deviate from modeled expectations for any new industry. Changes in the macro environment can have greater effects on nascent sectors than on established ones with robust supply chains and offtake.ⁱⁱ Analysts must project a taxpayer's behavior (i.e., utilization of the credit) and any interactions between the expenditures and other tax provisions.

Furthermore, the projected tax expenditure of a credit is not the same as the potential savings or revenue raised from repealing it.ⁱⁱⁱ A credit allows a taxpayer (e.g., a U.S. hydrogen producer) to lower its tax bill in exchange for creating new economic value (e.g., producing clean hydrogen). A well-designed tax credit can generate more economic value—including creating jobs, attracting investment capital, and increasing export revenue—than it costs the government in revenue. This value creation is in addition to the climate and environmental benefits of increasing clean energy use, which itself has long-term economic value. Repealing tax credits that already have been enacted produces less revenue (compared to the baseline) than may be expected, as there will be deleterious effects on planned new spending.^{iv}

Policymakers and industry rely on Treasury’s tax expenditures^v estimates to understand the potential cost of any tax credit. Each year, Treasury puts out 10-year estimates of tax expenditures. However, Treasury did not change its estimates of 45V over the last two years, even as the final rules were delayed and the IRS tightened eligibility requirements. Thus, the current estimates do not reflect changes in the market.

According to EFIF’s project-level data, fewer than 10 projects may have been eligible for 45V in 2024. If these projects operated at their maximum output, they could have generated roughly \$36 million in credits, assuming there was no tax credit transfer and that all production received the maximum credit value. For fiscal year (FY) 2024, Treasury estimated 45V costs to be \$540 million (Figure 1).

Figure 1. Comparing 45V Cost Estimates		
	EFIF estimate of eligible production	Estimated cost of 45V
Operating projects eligible for 45V in calendar year 2024 Data from: EFIF, public sources	12,000 tons/year	\$36 million
Treasury’s tax expenditures estimates for FY 2024 Data from: U.S. Treasury ¹	-	\$540 million
Source: U.S. Treasury, ^{vi} EFI Foundation Analysis		

EFIF has tracked more than 250 publicly announced clean hydrogen projects; roughly half are reformation (“blue”) and half are electrolytic (“green”) production pathways.^{vii} Currently, EFIF estimates that 41 of the green hydrogen projects have been canceled, decommissioned, or are inactive, while 120 remain in active development. Figure 2 shows the current status of the green hydrogen projects.

¹ Treasury’s fiscal year ends September 30.

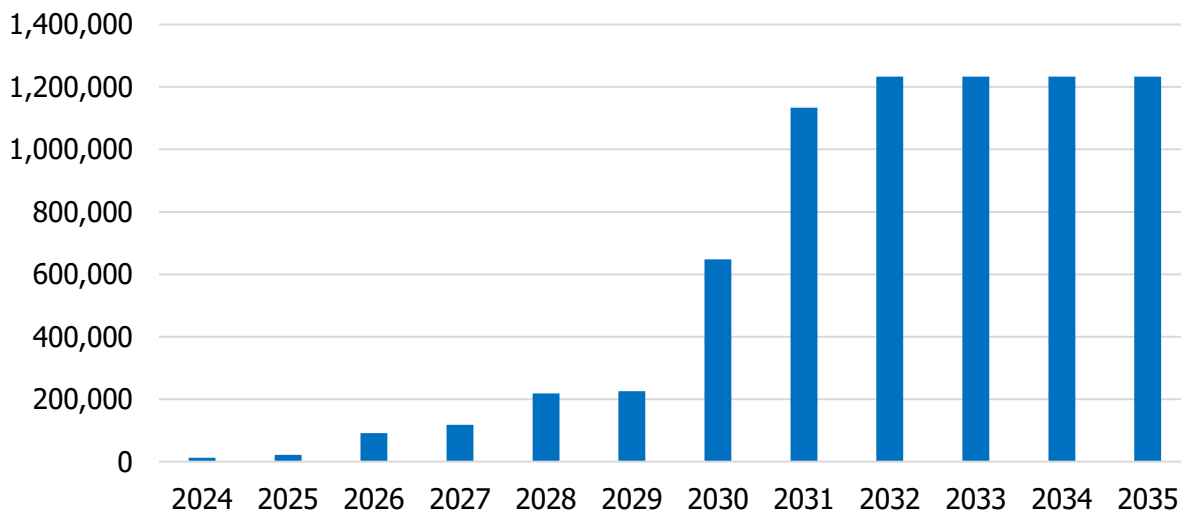
Figure 2. Status and count of green hydrogen projects in EFIF's tracker

Total Green Projects	Canceled, Decommissioned, or Dormant	In Active Development
161	41	120

Source: EFI Foundation Analysis

EFIF has modeled a more accurate picture of how much eligible low-carbon hydrogen can be produced each year. EFIF analyzed the readiness of announced U.S. projects based on public announcements, their current project status, and their ability to secure offtake contracts over time. EFIF applied a simple weighted probability score for each project based on its level of readiness and thus likelihood to become operational in the future and utilize the 45V tax credit (methodology in Appendix). For the assumed hydrogen (H₂) production of each project, EFIF used the planned electrolyzer capacity, efficiency rates by electrolyzer technology,² and an optimistic average capacity factor of 40%. The results are shown in Figure 3.

Figure 3. EFIF estimates of 45V-eligible H₂ production per year (metric tons)



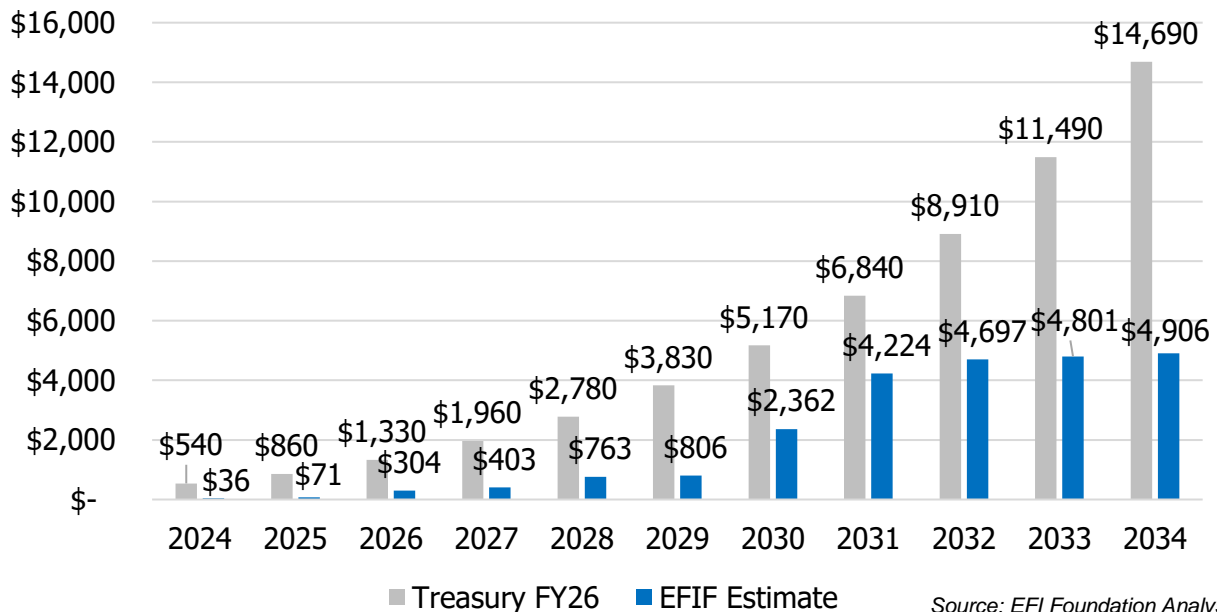
Source: EFI Foundation Analysis

Assuming all projects in active development receive the maximum \$3/kg credit, the total tax expenditures of 45V are still up to an order of magnitude lower than Treasury's recent 10-year projections by 2034 (Figure 4). This is likely a result of the cooling effect that the 45V process and final rules had on the industry. If blue projects are able to qualify, then the total

² Alkaline (65%), proton exchange membrane (61%), solid oxide electrolysis cell (74%)

cost of the credit would increase. On the other hand, repeal of 45V would likely push producers to seek other tax credits, such as by reconfiguring their projects to qualify for the 45Q (carbon oxide sequestration) or 45Z (clean fuels production) credits, further decreasing the savings from repeal.

Figure 4. Comparing estimated tax expenditures of 45V (\$ millions)



Cumulatively, according to EFIF's analysis, 45V is expected to cost taxpayers roughly \$23.3 billion through 2034 and result in 8-10 gigawatts (GW) of new electrolyzer facilities. The implied capital expenditure of these new facilities (not including the new energy or enabling infrastructure to support them) is \$29 billion. Additionally, using industry-standard learning curves of 18%,^{viii} the 45V credit can enable additional cost reductions, especially by lowering the balance of plant costs and reducing the total cost per kilowatt. These lasting cost reductions can help sustain the industry beyond the initial life of the 45V credit.

Conclusion

EFIF finds that 45V tax credit can both jump-start a new domestic industry—creating real economic and employment benefits in the near term—and cost taxpayers significantly less than is currently being estimated by the Treasury. Changing the tax credit now, on the heels of a protracted rollout, would ensure further uncertainty and project development delays.

Appendix

Figure 5 provides a detailed breakdown of the data shown above.

Figure 5. Tabular Breakdown of Data in Figures 3 and 4					
	Annual clean hydrogen production projected by EFIF		Estimated cost of 45V credit (\$ millions)		
Year	Metric tons	Kilograms	EFIF (no inflation)	EFIF (GDP deflator, 2022)	Treasury, FY26
2024	12,000	12,000,000	\$36	\$36	\$540
2025	21,619	21,619,391	\$65	\$71	\$860
2026	90,995	90,994,517	\$273	\$304	\$1,330
2027	118,005	118,004,517	\$354	\$403	\$1,960
2028	218,722	218,722,048	\$656	\$763	\$2,780
2029	225,958	225,958,048	\$678	\$806	\$3,830
2030	648,227	648,226,857	\$1,945	\$2,362	\$5,170
2031	1,133,353	1,133,353,471	\$3,400	\$4,224	\$6,840
2032	1,232,702	1,232,701,806	\$3,698	\$4,697	\$8,910

2033	1,232,702	1,232,701,806	\$3,698	\$4,801	\$11,490
2034	1,232,702	1,232,701,806	\$3,698	\$4,906	\$14,690
2035	1,232,702	1,232,701,806	\$3,698	\$4,942	N/A

Source: EFI Foundation Analysis

EFIF reviewed the 250 publicly announced clean hydrogen projects and determined the probability of their proceeding and using the 45V credit (Figure 6). The probabilities are based on EFIF's experience working closely with the hydrogen sector.

Figure 6. Probability of a project to use 45V from current status

Project status	FID	Probability	Category
Operational	Yes	100%	Operational
Under construction	Yes	100%	High
Advanced planning	Yes	90%	Medium-high
Advanced planning	No	50%	Medium
Early planning	No	30%	Low-medium
Announced	No	20%	Low

Source: EFI Foundation Analysis



References

- ⁱ <https://www.federalregister.gov/documents/2025/01/10/2024-31513/credit-for-production-of-clean-hydrogen-and-energy-credit>
- ⁱⁱ <https://home.treasury.gov/system/files/131/Tax-Expenditures-FY2026.pdf>
- ⁱⁱⁱ <https://taxfoundation.org/blog/inflation-reduction-act-ira-credits-repeal-reform/>
- ^{iv} <https://taxfoundation.org/blog/inflation-reduction-act-ira-credits-repeal-reform/>
- ^v <https://taxfoundation.org/blog/inflation-reduction-act-ira-credits-repeal-reform/>
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