RESOURCES *for the* FUTURE

# Comments on the Proposed Guidance for the 45V Tax Credit

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RESOURCES *for the* FUTURE

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Internal Revenue Service
1111 Constitution Ave, NW
Washington DC, 20224

To whom it may concern:

On behalf of Resources for the Future (RFF), I am pleased to share the accompanying comments on the Department of Treasury and the Internal Revenue Service on the 45V tax credit, docket REG–117631–23.

RFF is an independent, nonprofit research institution in Washington, DC. Its mission is to improve environmental, energy, and natural resource decisions through impartial economic research and policy engagement. RFF is committed to being the most widely trusted source of research insights and policy solutions leading to a healthy environment and a thriving economy.

While RFF researchers are encouraged to offer their expertise to inform policy decisions, the views expressed here are those of the individual authors and may differ from those of other RFF experts, its officers, or its directors. RFF does not take positions on specific policy proposals.

These comments focus on the role of state energy and climate policies and the risks associated with the use of annual emissions rate in the tax credit. Similar comments also appear in an **RFF blog post** on Treasury's proposed guidance on the tax credit.

If you have any questions or would like additional information, please contact me at **abergman@rff.org**.

Sincerely,

Aaron Bergman
Fellow, Resources for the Future

# Comments on the Proposed Guidance for the 45V Tax Credit

These comments focus on two aspects of the proposed guidance for the 45V tax credit (26 USC 45V).

1. Binding state policies, such as an emissions cap or renewable portfolio standard, can lead to equivalent lifecycle emissions as the proposed approach based on incrementality, deliverability and hourly matching. States could use modeling to demonstrate this equivalence and receive the equivalent tier of the tax credit.
2. The calculation of emissions rates on an annual basis will subject the use of electrolyzers to significant risks, potentially interfering with markets for unbundled EACs, making it more challenging to finance electrolyzers, and increasing hydrogen prices. Basing the credit on hourly emissions rates would mitigate these risks.

## 1. The Role of State Policies

The proposed guidance recognizes the role state policies can play in reducing lifecycle emissions. Comment is specifically taken on whether modeling can be used to show compliance with the *incrementality* requirement: "The Treasury Department and the IRS seek comments on whether to provide an opportunity to demonstrate zero or minimal induced grid emissions through modeling or other evidence under specific circumstances." That is, comment is requested on whether the modeling of state policies can be used to show compliance with only one of three requirements in the proposed guidance. However, under the statute, the lifecycle emissions of hydrogen production are the ultimate determinant of the rate of credit. If a project can demonstrate "zero or minimal … emissions", it should be able to fully qualify for the credit based on this demonstration, without the need to further satisfy the deliverability and hourly matching requirements.

As I discuss in the blog post "Unpacking the Proposed Guidance on the 45V Tax Credit for Clean Hydrogen,"[1] the three requirements of incrementality, deliverability, and hourly matching work together to generate a high price for energy attribute credits (EACs) in some hours. Each of the requirements restricts the supply of EACs, creating shortages, which in turn drives higher prices for the EACs. To allow the use of modeling to satisfy only one of the requirements creates an artificial distinction among the three requirements that does not accord with their means of action.

I suggest that modeling be used to demonstrate *equivalence* to the three requirements approach in the proposed guidance rather than be used to directly determine the lifecycle emissions of the hydrogen production, and, consequently, the value of the tax credit. This equivalence should be based on the level of emissions from electricity generation, perhaps in comparison to a set baseline, across a region large enough to incorporate any leakage that may result from a state policy. For example, a state may have an overall cap on emissions but could increase imported electricity in response to a greater load from electrolyzers. Any

[1] **https://www.resources.org/common-resources/unpacking-the-proposed-guidance-on-the-45v-tax-credit-for-clean-hydrogen/**

emissions associated with these imports should be part of the equivalence calculation to fully account for the emissions associated with the electrolyzers.

It would not be consistent with the proposed guidance to use modeled emissions to calculate the value of the tax credit. In fact, the three requirements do not ensure zero or even small consequential lifecycle emissions.[2] In the proposed guidance, the level of the tax credit is not based on modeled consequential emissions but rather by deeming any electricity consumption covered by a qualifying EAC to have zero lifecycle emissions. Using modeling to demonstrate equivalence with the emissions outcomes of the approach based on the three requirements rather than to directly calculate lifecycle emissions is consonant with this approach.

## 2. Risks from Using Annual Emissions Rates

In the proposed guidance, IRS and Treasury state that the value of the tax credit be calculated for all hours of the year based on the annual lifecycle emissions rate rather than calculating the credit separately on an hour-by-hour basis. Consequently, the difference in the value of the tax credit received by an electrolyzer with an average emissions rate below 0.45 kg/kg $H_2$ as compared to one right above that value would be $2 for every kilogram of hydrogen produced over the course of the year, or two-thirds of the full $3 value. Given grid emission rates in 45VH2-GREET, this means that an electrolyzer must cover upwards of 97 percent of its electricity consumption with qualifying zero-emission EACs or risk losing two-thirds of the annual value of the tax credit. This risk can be mitigated by computing emission rates and determining the tax credit separately on an hour-by-hour basis during electrolyzer operation.

This risk is amplified because the supply of EACs in a given hour is fixed and not completely predictable. Furthermore, unlike in electricity markets, where the market clears on the scale of minutes, it is likely that unbundled EACs will be procured well after the hour of generation, with no real-time market. Without a real-time market, an electrolyzer operator will not know definitively the extent to which they must ramp down in response to a low supply of EACs. Consequently, the use of unbundled EACs represents a substantial risk for electrolyzers as there simply may not be enough EACs in any given hour to cover all the electrolyzer load in a deliverability region. If 2-3 percent of electricity consumption by an electrolyzer goes uncovered, it will likely mean that a year's worth of hydrogen production would be sold at a loss.

In response to this, electrolyzer operators may constrain themselves to solely using bundled EACs and rely on real-time signals from the contracted generators to match its production to their generation. This would reduce or eliminate the demand for unbundled EACs, limiting their market. Furthermore, electrolyzers may have to shut down below a minimum capacity factor. These electrolyzers could resell the electricity, but any revenue for the unused EACs would depend on the existence of a functioning market for unbundled EACs.

Modeling also suggests that electrolyzer operators may over-procure clean energy to maintain a high capacity factor. In other words, the electrolyzer operator may contract sufficient clean energy such that the electrolyzer can maintain a high capacity factor in hours when renewable energy is scarce at the cost of procuring more clean energy than it can consume during hours when clean energy is abundant. The cost of this strategy is mitigated when the electrolyzer operator can resell both the unused electricity and unused EACs. However, as above, without an EAC market, the potential revenue from EAC sales is lost, and, while the

[2] **https://www.rff.org/publications/issue-briefs/45v-hydrogen-tax-credit-in-the-inflation-reduction-act-comparing-hourly-and-annual-matching/**, **https://www.rff.org/publications/issue-briefs/45v-hydrogen-tax-credit-in-the-inflation-reduction-act-incorporating-the-demand-for-hydrogen/**

clean electricity can be resold, the price difference between the spot price and the contracted price of electricity represents a significant assumption of risk by the electrolyzer operator.

These additional risks will lead to higher costs where developers and financers may demand insurance or additional returns to compensate for the greater level of risk. In addition, reduced capacity factors, particularly when an electrolyzer has to shut off entirely, will increase the price at which hydrogen must be sold to recover capital and fixed costs.

I conclude by noting that the statute seems consistent with calculating the value of the tax credit on an hour-by-hour basis rather than on an annual basis. Moving to hourly accounting would reduce or eliminate the risks discussed in this section. At the same time, there will still be an economic incentive to minimize the amount of production not covered by EACs due to the loss of the tax credit in those hours, likely rendering the marginal cost of production higher than the potential sales revenue.