CHFC Position on Use of Energy Attributes

April 26, 2023

The Clean Hydrogen Future Coalition (CHFC) was founded to bring together a diverse group of stakeholders to promote clean hydrogen as a critical pathway to achieve global decarbonization objectives. The coalition's membership represents a diverse group of energy companies, labor unions, utilities, NGOs, equipment suppliers, and project developers who are committed to the advancement of a net-zero CO_2 economy that is supported by infrastructure across the supply chain necessary to fully scale clean hydrogen production and use in the U.S. (see www.cleanh2.org for a list of our members).

The coalition supports policy designs that stimulate the production and use of low-cost, clean hydrogen with a fully transparent full lifecycle greenhouse gas accounting system applied consistently across the value chain. To that end, the Coalition has been very engaged on the implementation of the 45V clean hydrogen production tax credit and the Department of Energy's (DOE) proposed clean hydrogen production standard (CHPS) to ensure that this policy delivers on the intent of stimulating the clean hydrogen economy in the U.S.

The following position on the use of environmental attributes related to both the Section 45V tax credit and the DOE's proposed CHPS represent the spirit of the CHFC's foundational principles to decarbonize, and to remain technology neutral and focus on reducing carbon intensity across the supply chain.

CHFC Position on Renewable Energy Credits (RECs) Accounting

CHFC Position on Time Matching of RECs:

The CHFC recommends reasonable restrictions in the accounting system for the use of renewable energy credits (RECs) on both time-matching and regional considerations when either may be used to offset the carbon intensity of clean hydrogen production methods.

First, CHFC recommends that IRS adopt a broader view of environmental attributes than just "renewable", using the term "Energy Attribute Certificate (EAC)", which is inclusive of a variety of clean energy technologies, including but not limited to nuclear, hydropower, low-carbon thermal power, and other low-carbon generation.[1]

With respect to time-matching of energy inputs, the CHFC recommends these be matched on an annual basis. This includes allowing the use of behind-the-meter RECs (EACs), if third-party verified, and that other zero-emitting resources such as nuclear should be treated the same as renewable (energy) resources for accounting purposes.

[1] Each EAC represents proof that 1 MWh of renewable (or clean) energy has been produced.

CHFC Position on Regional Restrictions on RECs:

With respect to regional restrictions, CHFC recommends the requirement that the RECs (EACs) be generated within the same interconnection region (Eastern, Western, and ERCOT) as the electrolyzer load.

Rationale for CHFC Position on Time Matching and Regional Restrictions on RECs:

The policy purpose of the clean hydrogen production tax credit program is to catalyze a clean hydrogen industry so that clean hydrogen can be adopted as a tool to decarbonize throughout the economy. Limiting a REC's (EACs) time-of-use to the time-of-its generation will significantly increase the cost of clean hydrogen and limit the proliferation of a clean hydrogen market. These economic considerations will deter investment and result in significantly fewer electrolytic hydrogen projects being built.

> *Cost Increases*. Electrolyzer technologies which are currently commercially available vary in both cost and in their ability to seamlessly work with intermittent renewables. For equipment that is less tolerant of fluctuations in electricity input, wear will increase, requiring significant maintenance and replacement costs. These costs are an important consideration for project developers. Note that this will not be the case for electrolytic hydrogen produced with nuclear power generation as it is a 24/7 resource, so the electrolyzers can run in a constant mode of operation. In addition to wear and tear and maintenance costs, some technologies are incapable of performing the ramping required to match operations to intermittent renewable electricity output and must rely on a fixed power supply.
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> *Investment Requirements*. Electrolyzers are the largest cost element of an electrolytic clean hydrogen plant and must be utilized at high levels to produce the volumes of hydrogen needed to make the sale of the hydrogen economic. Producing hydrogen 24/7 also provides certainty for customers. Until significant storage opportunities exist, purchasers of clean hydrogen will need a supply that can be provided on a 24/7 basis. If an electrolyzer producer is required to reduce its output, the producer may not be able to secure an offtake agreement nor get investment in a project.

The Energy Futures Initiative (EFI) has reinforced the annual time matching needs in the *U.S. Hydrogen Demand Action Plan*[2] EFI released in February 2023. One key recommendation made in this plan is that the Internal Revenue Service (IRS) should collaborate with the DOE and the Environmental Protection Agency (EPA) to create a practical and timely phased approach for issuing 45V guidance. The EFI, led by former Secretary of Energy Ernest Moniz, proposes that projects should be allowed to calculate emissions on an annual basis, with the expectation that more restrictive units of measurement will be required in the future. The CHFC supports this recommendation, and we provide additional details on a proposed phased approach below.

[2] See https://energyfuturesinitiative.org/reports/the-u-s-hydrogen-demand-action-plan-2/

Put simply, if either hourly or strict deliverability regional matching for RECs is required, there will be little investment in renewably produced electrolytic hydrogen. The Rhodium Group also reinforces the need for reasonable policies in a recent publication[3] –

> *For green hydrogen to play a role in a decarbonized future, the US needs to get experience building and installing electrolyzers at an unprecedented scale today in order to establish a domestic industry and drive down costs. Adhering to restrictive rules to claim the credit in the near term may hamper the ability of this industry to grow, reducing the range of clean hydrogen opportunities down the road.*

Overly restrictive time and regional matching would run counter to the intent of the policy to incentivize a domestic clean hydrogen industry in the near-term.

CHFC Position on Additionality:

The CHFC does not recommend that strict additionality requirements, including requiring clean hydrogen producers to utilize only newly built clean resources, be included in the 45V guidance. The CHFC values the importance of decarbonizing the grid and ensuring that clean energy resources are available for that purpose.

Rationale for CHFC Position on Additionality:

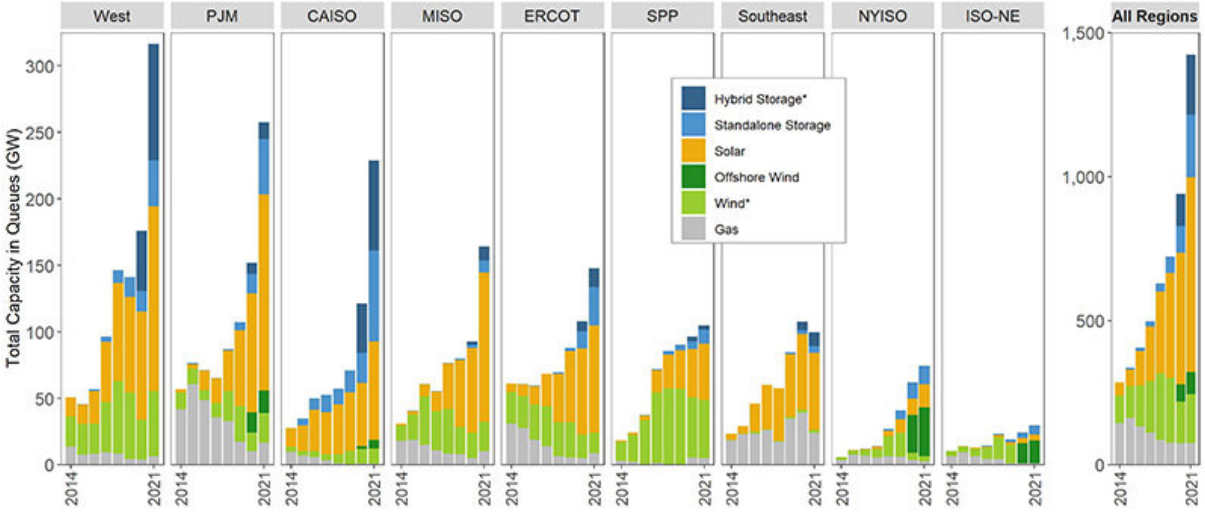
Nationwide, there are many renewable energy projects in interconnection queues (see Figure 1 below). In many cases these projects have waited 5+ years to break ground. Other regions have abundant clean energy resources but cannot build transmission lines to access the renewable capacity. Guidance on the 45V tax credit should recognize that these resources and associated transmission interconnections will take time to construct. As renewables are added to the grid and transmission capacity increases, time-matching and regional requirements should become more restrictive, but additionality should not be a requirement.

> *Congressional Intent*. The lack of additionality requirements in the 45V statutory language is explicit, making it clear that if Congress wanted requirements for additionality, they would have been included in the statutory language. Further, Congress allowed clean hydrogen production facilities to be able to claim the 45V tax credit even if the facility uses electricity produced from an existing nuclear power plant using the 45U tax credits, a clear demonstration that additionality does not align with congressional intent. Additionality was likewise not mentioned in the colloquy (see text below at end of the document) as the bill was being debated on the Senate Floor. The colloquy was intended to identify the Congressional intent on the use of RECs but not for setting any specific requirements on how RECs (no mention of additionality) should be ap-

[3] *Scaling Green Hydrogen in a post-IRA World*, Ben King, Galen Hiltbrand, Marie Tamba, Whitney Herndon, and John Larsen (Rhodium Group), March 16, 2023

plied. As noted above, the CHFC is supportive of establishing parameters for the generation resources that can be utilized for clean hydrogen production but does not recommend that additionality be required.

Timeline for New Renewables. Starting a renewable energy project today, once there is an interconnection agreement, is roughly a 7-year process. Assuming an interconnection agreement date of April 2023, this means the renewable electricity would become operational in April 2030, at the earliest, which is towards the end of the 45V tax credit program. Very few projects would be able to come online before the credit expires in 2032. Despite this, there should be significant growth in clean energy resources, in large part due to the other clean energy tax credits and transmission incentives included in the Inflation Reduction Act. Allowing clean hydrogen infrastructure to develop on a parallel track with these new generation assets will help to ensure that we are driving towards clean carbon hydrogen over time.



*Hybrid storage capacity is estimated for some projects, and that value is only included starting in 2020. Wind capacity includes onshore and offshore for all years, but offshore is only broken out starting in 2020.
Notes: (1) Hybrid generation capacity is included in all applicable generator categories. (2) Not all of this capacity will be built.

Figure 1: RTO-ISO interconnection queues 2014-2021 | Lawrence Berkeley National Laboratory

CHFC recommends an approach where more restrictive time and regional matching is phased in over time. For example, move to monthly accounting at the beginning of 2030 with regional matching within the six North American Electricity Reliability Council (NERC) regional entities, with time accounting becoming more restrictive over time beyond 2030 as the administrative system to undertake more restrictive accounting develops.

Given the equally critical importance of decarbonizing the electric grid, this phased approach will allow for the continued work of bringing additional clean energy resources online in the first six years of the 45V credit that will be aided by the incentives included in the IRA.

Under this regime, CHFC recommends that projects that begin construction prior to 2030 would comply with the time and regional requirements that were in place when they began construction, and similarly, projects that begin construction in 2030 or later would comply with the more restrictive requirements.

The European Union (EU) has adopted a similar phased approach[4] that recognizes the need to build out clean energy generation capacity to support clean hydrogen production over time. While the EU proposes more restrictive matching beginning in 2028, they have more zero-emitting energy on their grid (62% in 2021) compared to the U.S. (40% in 2022) and adopted their clean hydrogen rules earlier. In addition, the EU has more infrastructure in their system to enable interconnection to clean energy resources as well as distribution of the electricity. Proposing more restrictive matching in the U.S. beginning in 2030 allows time for more clean energy resources to be added to the grid and to establish a robust administrative system for more restrictive time and regional matching of RECs/EACs.

Conclusion

While there are concerns about grid emissions impacts in the short term, the policy should revisit the time-matching requirements over time, as the carbon intensity of the grid is reduced and after the market for clean hydrogen further develops. Currently, 40% of the U.S. electricity supply is generated by zero-emitting resources. The Inflation Reduction Act includes production tax credits for clean energy and incentives to build out transmission capacity which will improve this percentage over time. According to the NREL report *Evaluating Impacts of the Inflation Reduction Act and Bipartisan Infrastructure Law on the U.S. Power System*, clean electricity as a percentage of total generation could increase to 71-90% in 2030 when considering the impact of investments triggered by the IRA.[5] Given appropriate time, these incentives will result in a decarbonized grid that can support new load from electrolyzers. This will enable clean hydrogen production methods to use RECs with more restrictive time and regional matching requirements.

Likewise, Congress recognized the need for all forms of low-carbon hydrogen production methods to be eligible for the tax credit by allowing hydrogen produced with varying carbon intensities to claim the credit. This design was considered necessary to seed a clean hydrogen industry and allow it to grow, recognizing the long-term benefits of fully decarbonized hydrogen production and use throughout the economy. The Rhodium Group analysis supports this by stating –

> *Delays in installing electrolyzers in the near term will result in a slower overall scale-up of electrolyzer capacity and, therefore, fewer emissions benefits in the long run. When assessing trade-*

[4] See: https://www.europarl.europa.eu/doceo/document/A-9-2023-0032_EN.html

[5] Clean electricity as a percentage of total generation could increase to 71-90% in 2030 when you consider the impact of investments triggered by the IRA, see https://www.nrel.gov/docs/fy23osti/85242.pdf

> *offs of policy implementation, it's important to understand the balance of considerable long-term emissions reduction benefits vs. short-term impacts.*[6]

Additionally, research[7] from Princeton's ZERO Lab noted that additional near-term emissions may be necessary to encourage the scaling up of clean hydrogen production in the U.S., since the use of clean hydrogen in hard-to-decarbonize industries will reduce emissions over time. Specifically, the paper states:

> *Additional near-term emissions may be considered a necessary cost of encouraging early electrolyzer deployment in order to address concerns regarding the feasibility of scaling up clean hydrogen supply to meet future goals. By ensuring that clean hydrogen is cost-effective and available at scale for various decarbonizing applications in the 2030s and beyond, early electrolysis deployments could potentially improve long-run climate outcomes even if they increase emissions in the near term.*

The Rhodium Group analysis suggests that these near-term emissions impacts are negligible in comparison to the long-term gains that can result from use of clean hydrogen:

> *Under annual averaging, we estimate that electricity generation to fuel these electrolyzers could increase total [economy-wide] greenhouse gas emissions … [by] roughly 1% by 2030…*[8]

The main objective for incentivizing clean hydrogen production and use is to decarbonize our economy. For clean hydrogen to become a climate mitigation solution, the scale of production and use needs to increase sooner rather than later, so that costs begin to fall, markets are created, and widespread adoption can occur. If policymakers determine that scaling clean hydrogen needs to be accelerated in the near term so that it can be a mitigation solution "sooner rather than later", annual time-matching of RECs should be encouraged as it will trigger more investment in clean hydrogen and result in the cost of clean hydrogen coming down more quickly. Requiring overly restrictive policies too early in the process will only serve to dilute the intent of the 45V credit and introduce additional risk and costs into clean hydrogen production projects and limit the ability for it to play the role it must – to decarbonize our economy.

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[6] *Scaling Green Hydrogen in a post-IRA World*, Ben King, Galen Hiltbrand, Marie Tamba, Whitney Herndon, and John Larsen (Rhodium Group), March 16, 2023

[7] Wilson Ricks *et al* 2023 *Environ. Res. Lett.*

[8] *Scaling Green Hydrogen in a post-IRA World*, Ben King, Galen Hiltbrand, Marie Tamba, Whitney Herndon, and John Larsen (Rhodium Group), March 16, 2023

Colloquy[9]

Mr. CARPER. Mr. President, I rise for the purpose of entering into a colloquy with the chair of the Finance Committee, Mr. Wyden, concerning section 13204, clean hydrogen, which establishes for the first time tax incentives for the production of clean hydrogen, and section 13701, Clean Electricity Production Credit, which establishes for the first time technology neutral tax credits for clean electricity production.

I would like to commend my friend from Oregon, the chairman of the Senate Finance Committee, for his leadership in crafting title I of the Inflation Reduction Act of 2022, which includes new tax incentives that will promote clean energy, fight climate change, and help create good-paying, American jobs. I want to especially say thank you for including in the clean energy package, section 13204 of title I of the Inflation Reduction Act of 2022, which is similar to my legislation, S.1807, the Clean H2 Production Act.

Section 13024 of title I of the Inflation Reduction Act of 2022 provides a production and investment tax credit for the production of clean hydrogen. [[Page S4166]]

In Section 13204, the term ``lifecycle greenhouse gas emissions'' for a qualified hydrogen facility is determined by the aggregate quantity of greenhouse gas emissions through the point of production, as determined under the most recent Greenhouse gases, Regulated Emissions, and Energy use in Technologies--GREET--model. It is also my understanding of the intent of section 13204, is that in determining ``lifecycle greenhouse gas emissions'' for this section, the Secretary shall recognize and incorporate indirect book accounting factors, also known as a book and claim system, that reduce effective greenhouse gas emissions, which includes, but is not limited to, renewable energy credits, renewable thermal credits, renewable identification numbers, or biogas credits.

Is that the chairman's understanding as well?

Mr. WYDEN. Yes.

Mr. CARPER. Thank you, Mr. Chairman.

Additionally, I would like to clarify that the intent of section 13701 allows the Secretary to consider indirect book and claim factors that reduce effective greenhouse gas emissions to help determine whether the greenhouse gas rate of a qualified fuel cell property, which does not include facilities that produce electricity through combustion or gasification, is ``not greater than zero.'' Is that the chairman's understanding?

Mr. WYDEN. Yes.

Mr. CARPER. I thank the Senator from Oregon for his comments on these issues and his leadership.

[9] See: https://www.congress.gov/congressional-record/volume-168/issue-133/senate-section/article/S4165-3