February 23, 2024

Internal Revenue Service
CC:PA:LPD:PR (REG-117631-23)
Room 5203
P.O. Box 7604
Ben Franklin Station, Washington, DC 20044

RE: Section 45V Credit for Production of Clean Hydrogen

Submitted via Federal Rulemaking portal: www.federalregister.org

1. INTRODUCTION

Matrix Renewables (hereinafter "Matrix") appreciates the opportunity to submit comments to the draft guidelines issued by the US Government defining clean hydrogen on December 22nd, 2023, and applying the production tax credit for hydrogen. We acknowledge the efforts made by the US Government in setting such guidelines, which attempt to strike the right balance between spurring investments in this nascent industry while ensuring overall greenhouse gas emissions (GHG) are significantly reduced, in line with expectations outlined in the Inflation Reduction Act (IRA), a legislative package launched in 2022 that covered a wide range of tax laws and provided funds for the production of clean energy, among other issues.

Matrix's current portfolio is comprised of around 1.6 GW of operational, under construction or nearly ready to build solar PV and storage projects in Europe, Latin America and US. Additionally, Matrix owns over 14 GW of solar, wind and BESS pipeline projects globally. Specifically in the US, Matrix has a pipeline of 6.7 GW, with 422 MW in operation/construction, highlighted by the Gaskell project in Kern, CA with 162 MW of PV power.

The company has also started activities under the Hyren subsidiary, a dedicated platform for the development of green hydrogen projects in Spain, with a portfolio of more than 1.6 GW of hydrogen production through electrolysis and associated renewable assets of more than 2.6 GW (PV and wind combined). Moreover, Hyren has a multidisciplinary team with more than 50 years of experience in the hydrogen sector and has witnessed firsthand the similar exercise that took place in Europe regarding the definition of green hydrogen. Thus, Matrix has the knowledge of the impact of the hydrogen regulation established in the European Union last year, through the Delegated Act under the Renewable Energy Directive II.

In the US, these guidelines establish, in a similar model to the one adopted in Europe in 2023, the definition of clean hydrogen. To summarize, clean hydrogen is only defined by the GHG emissions. Below 4 kg CO_{2eq}/kg H_2, hydrogen is considered clean, and the projects will benefit from a tax credit of up to 3 \$/kg H_2 (there are 4 levels depending on the GHG intensity). Moreover, the rules for clean hydrogen production are set:

1. Hydrogen production plants shall be power sourced from new renewables assets on the same regional grid within three years of hydrogen production plant starting (additionality criterion).
2. Electricity shall have an hourly correlation with the hydrogen production form January 1st, 2028, onwards. Before then, annual correlation is allowed (time correlation criterion).
3. Electricity dedicated to hydrogen production must be placed in the same region in which the hydrogen production takes place (geographic correlation criterion).

Much as was the case in Europe, the focus in the US guidelines is on ensuring that clean hydrogen production is accompanied by reductions in GHG emissions. The message is clear: hydrogen production units that may use grid electricity could have unintended additional emissions during those periods in which they function using thermal power plants using fossil fuels. Therefore, new renewable energy capacity should be a part of the hydrogen production projects and the timely correlation should be designed to diminish the perils of this reliance on a dirtier grid.

2. COMMENTS ON SECTION 45V

On the one hand, Matrix welcomes the speed with which the current proposal was issued, which is comparably faster than was the case in Europe, after all the speculation that has surrounded this issue. We remain confident that the prompt resolution with a final set of guidelines will allow hydrogen production players to have clear guidelines and implement the investments to turn the US hydrogen sector into a world-leading economic powerhouse.

Nonetheless, Matrix would like to underline some major issues we have identified, as outlined below.

2.1 TIME CORRELATION

As mentioned in Section 1, the U.S. Government establishes an hourly correlation form January 1st, 2028, onwards. This is in line with the requirement in Europe, except it is instituted 2 years earlier. This requirement is quite possibly the most damaging to the hydrogen industry with multiple impacts across various levels.

The main effect is that the **production cost of clean hydrogen is artificially inflated**. Hourly correlation implies that, for a given hydrogen demand, the capital costs associated with the hydrogen plant will increase significantly, since there will be electrolyzers of higher power that have lower annual hours of operation. If continuous supply of hydrogen is required by large scale consumers, as is commonly the case in industrial settings, additional storage is needed, again contributing to increased capital costs. Internal calculations indicate that the resulting Levelized Cost of Ownership of Hydrogen (LCOH) could increase by up to a factor of 2, automatically making a large share of projects economically unviable.

Another aspect is that **hourly correlation also directly discriminates between renewable sources** favouring wind and Nuclear against solar power generation, which is certainly a concern for certain areas of the US. Solar production may reach around 2000h per year, leaving an additional 6000h+ of production of clean hydrogen to be filled with other wind-powered farms or nuclear energy in regions where it is available. This will unfairly discriminate the western US where nuclear energy development is not as prevalent noting that it will be unrealistic to use only wind-power to fill the additional 6000 h+ of clean hydrogen production that cannot be fulfilled by solar.

The **focus on decarbonization is artificially removed**. As a hypothetical example, a new clean hydrogen plant of 10MW could unlock an investment including a 100MW PV plant. In such a case, an annual correlation using this new PV plant would amply account for far more than the energy consumed by the electrolyzer, ensuring that the hydrogen produced would be well below the threshold of 4 kg CO_{2eq}/kg H_2 established in the guidelines. Incidentally, such a plant would also contribute to the decarbonization of the electrical grid.

To ensure alignment with the policy **goal of lowering GHG emissions from clean hydrogen plants, we suggest an alternate methodology** based on a “CO2 account” for any clean hydrogen production plant, based on the following:

1. Track the source of flows of electricity on an hourly basis if technically feasible (we are not certain that the technology exists to do this accurately).
2. At any given point in time, the following can happen:
    a. the associated renewable energy plant produces more energy than consumed by the electrolyzer and the excess energy is sent to the grid, during which period the emissions are equal to zero.
    b. the energy consumed by the electrolyzer uses more energy than is available from the renewable energy asset and draws from the grid; since the data is available, in this last instance, calculate the carbon footprint generated by the hydrogen plant.
3. Add up the GHG emissions throughout the year according to the previous steps and ensure that these are less than or equal to zero (or in fact, the threshold established in the guidelines of 4 kg CO_{2eq}/kg H_2).
4. If these emissions are not compliant (i.e. above the threshold), subtract the corresponding number of tax credits for the portion of hydrogen that is considered non-compliant.

There is a **clear and unequivocal unequal treatment of hydrogen versus electricity**. We are unaware of any guidelines that make tax credits or any other economic advantages contingent upon such constraints for uses of clean electricity, such as heat pumps or electric vehicles. Electricity used for such purposes is normally supplied using annual time matching and to our knowledge the impact on GHG emissions has not been put into question.

The overall effect and distinct possibility, already being observed in Europe, is that **the overwhelming majority of announced projects will not reach financial investment decisions** and not be executed. In the short term, this would imply that most of the public funding of $7B being committed to the 7 hydrogen hubs recently announced across the US will simply not be spent.

In the medium and long terms, the consequence will be devastating as the US will simply be left behind as China and other emerging economies will lead this push. **The definition of clean hydrogen does not encourage the growth of US capital goods** (i.e. electrolysers), which is fundamental for the creation and growth of the hydrogen economy, and instead incentivizes lower cost products from China. Therefore, the economic growth associated with the hydrogen industry will not be realized.

Last, but certainly not least, the **decarbonization required for certain sectors will not advance** since badly needed government subsidies cannot go far enough in covering the cost premiums associated with clean hydrogen. We point out that clean hydrogen is essentially a premium product that lacks an economic driver; without restricting regulations on decarbonization for certain hard-to-abate industries, there is simply little incentive for such industries to invest in this technology.

For all these reasons, Matrix suggests the reconsideration of this hourly correlation. Instead, Matrix suggests that a monthly correlation could be beneficial for the clean hydrogen production process as a reasonable compromise between annual correlation (using the methodology proposed herein above or similar) and hourly correlation. Once 80% of the grid uses renewable electricity, we suggest that the time matching requirement be eliminated.

2.2 Green Hydrogen vs Blue Hydrogen

As mentioned in Section 1, clean hydrogen is only defined by the GHG emissions of its production process. The implications of this definition are explained below:

1. Green hydrogen (defined as hydrogen produced through electricity provided by renewable energy production plants) will be unnecessarily more expensive than blue hydrogen (defined

as the hydrogen produced through a Steam Methane Reforming with a Carbon Capture Unit integrated in the process). This effect is due to the hourly matching requirement and was covered in the previous section.

2. The emissions associated with blue hydrogen are potentially higher than those associated with green hydrogen when considering the whole supply chain. Multiple analysis has already concluded that the methodology for the GHG emissions calculation could underestimate the GHG emissions associated with blue hydrogen due to upstream emissions of natural gas, a potent greenhouse gas. The unintended consequence may well be that clean hydrogen production through blue hydrogen causes far higher levels of GHG emissions than the established threshold, and on par with current standard hydrogen production methods, if certain studies are to be believed. Therefore, Matrix recommends that the regulation should focus on the green hydrogen production making clear the difference between green and blue hydrogen (i.e. defining the production process, not only the GHG emissions).

Matrix believes that electrolyzers should rather benefit from the liberalized energy market to buy electricity supply. Renewable energy certificates (RECs) should be the required proof to demonstrate that electrolysers are taking renewable energy from the electricity grid, including generation beyond support schemes. As is the case already in the US, these RECs can be used across the US to justify use of renewable energy, and we see no reason why production of green hydrogen should be an exception. To allow otherwise sends a clear signal of discrimination against green hydrogen that will discourage the necessary investments to jumpstart the market in any significant way.

For all these reasons, Matrix suggests the reconsideration of the definition of clean hydrogen. Instead, Matrix suggests that the U.S. government should put the spotlight on the green hydrogen.