H2 green steel

February 23, 2024

U.S. Department of the Treasury
Internal Revenue Service

26-CFR-Part 1.
[REG-117631-23]
RIN 1545-BQ97

Re: Notice of proposed rulemaking - Section 45V Credit for Production of Clean Hydrogen; Section 48(a)(15) Election to Treat Clean Hydrogen Production Facilities as Energy Property

Introduction

H2 Green Steel (H2GS) is an industrial start-up driving one of the largest climate impact initiatives globally. The company was founded in 2020 with the purpose of decarbonizing hard-to-abate industries, starting by producing steel with up to 95% lower CO2 emissions than steel made with coke-fired blast furnaces. The construction of our first, flagship green steel plant in Boden, Northern Sweden, with integrated green hydrogen, iron, and steel production, is well underway and production is estimated to start in early 2026. For this project, H2GS has raised more than $6Bn in green project financing and equity.

The large-scale electrolysis plant in Boden of more than 700MW, one of the first of this size globally. The plant is based on a concept where H2GS uniquely uses several complementing technologies for green hydrogen production, enabling balancing of the system for cost-optimization and operational flow. For this purpose, H2GS has teamed up with world-leading partners and expertise in design, construction, equipment, and operations.

H2GS seeks to deploy the same innovative technologies in the U.S. by establishing a large-scale green direct reduction iron plant (DRI), powered by a 1GW electrolyzer for direct offtake in the iron production process, Project United Gaia. To support the business case of the Project, H2GS aims to apply for credits for production of clean hydrogen.

Comments on the proposed rulemaking – Section 45V Credit for Production of Clean Hydrogen

H2GS welcomes the proposed rulemaking on the credit for clean hydrogen production. It is important to implement clear rules to support hydrogen production with low lifecycle greenhouse gas emissions. H2GS has analyzed the consequences of the proposed rules and identified some ambiguities and implications for our business case of producing green hydrogen for production of green Hot Briquetted Iron (HBI) in the U.S.

Calculating the carbon intensity average on an annual or hourly basis has a significant impact on the possibility to achieve an average <0.45kg CO2e/kg hydrogen. Our understanding is that the proposed rules do not specify whether the carbon intensity average is performed on an annual or hourly basis. If the annual average is to be assumed it threatens the commercial viability of green hydrogen projects for industrial applications.

The HBI production, and most other large-scale industrial processes, are reliant on a stable and constant flow of hydrogen. The 45V rules, rightfully, favor renewable electricity production from solar and wind which are viable and deployable. Solar and wind can, to a large extent, power industrial processes. Particularly by combining a larger electrolyzer with hydrogen storage, balancing the intermittency. However, the intermittent profile puts pressure on the commercial viability and will inevitably lead to periods of extended downtime, which is problematic for continuous production processes.

There are multiple solutions to deal with the intermittency of solar and wind power. However, all of them are non-compliant with 45V or have low viability.

- Procure fossil-free baseload from the grid

There is a low rate of additional fossil-free baseload assets, and it is highly challenging to develop fossil-free baseload assets in a timely manner complying with the additionality criteria. Moreover, existing fossil-free baseload is limited to certain states, most grids are fossil based.

- Rely on large-scale energy (e.g. batteries) or hydrogen storage solutions.

Unfortunately, there is a low commercial, technical and financial viability of large-scale energy storage. Hydrogen storage is possible to an extent but pressures the commercial viability and can only supply the plant for a limited duration.

H2 Green Steel proposes that the rules should base the carbon intensity average on hourly performance from 2028 and onwards. The hydrogen producer should be able to claim the weighted average credit of its hydrogen production. For example, a hydrogen producer may have the following CO2e intensity:

- 85% of production volumes <0.45 kg CO2e/kg hydrogen, qualified for 3USD/kg tax credits
- 10% of production volumes between 0.45 and 1.5 kg CO2e/kg hydrogen, qualifying for 1USD/kg tax credits
- 4 % of production volumes between 2.5 and 4 kg CO2e/kg hydrogen, qualifying for 0.6 USD/kg tax credits

The scenario above would result in an average of tax credits of 2.68 USD/kg hydrogen. Production during hours with a carbon intensity average greater than 4 kg CO2e/kg hydrogen should not be allocated credits. This solution incentivizes producers to reduce their carbon emissions and creates a pathway for projects to become long-term commercially viable.

To further boost the deployment of new renewable electricity production and enabling green hydrogen we support the establishment of a minimum criterion such as, providing renewable PPAs or RECs covering all or large parts of the electricity consumption annually.