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Washington, DC 20585

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RE: U.S. Department of Energy Clean Hydrogen Production Standard (CHPS) Draft Guidance

Secretary Granholm and Assistant Secretary Moreno,

Fortescue Future Industries (FFI) respectfully submits these comments in response to the U.S. Department of Energy (DOE) request for comments on its proposal to implement provisions of Section 40315 of the Infrastructure, Investments, and Jobs Act (IIJA), Pub. Law No. 117-58, by adopting a Clean Hydrogen Production Standard (CHPS).

The Clean Hydrogen Production Standard represents a fundamental opportunity to achieve standards for emission reduction targets for Regional Clean Hydrogen Hubs Program and the Clean Hydrogen Research and Development Program. FFI applauds the DOE's work to establish an initial target for lifecycle greenhouse gas (GHG) emissions. Green hydrogen plays a critical role in the comprehensive energy profile of the United States, and the use of green hydrogen resources promotes energy security and resilience as well as provides economic value and environmental benefits across multiple sectors of the economy. The United States plays a leading role in the development of global hydrogen standards. The CHPS will undoubtedly inform and influence the development of hydrogen standards in other jurisdictions. To the extent practicable, the CHPS should support the development of the highest global standards in support on energy security and climate change goals.

FFI is a global green energy and product company committed to producing zero-emission green hydrogen from 100 percent renewable sources. FFI is a developer, financier and operator investing in zero emission resources to produce renewable energy at a scale equal to the oil and gas super majors. FFI's vision is to make renewable green hydrogen the most globally traded energy commodity in the world. Examples of recent and relevant FFI developments include the recent acquisition of Williams Advanced Engineering on March 1, 2022; signing a long-term agreement on January 17, 2022 with Covestro, a world-leading, Germany-based supplier of high-tech polymer materials, for the supply of green hydrogen and its derivatives of up to 100,000 tons per year, starting as early as 2024; and starting construction of FFI's Green Energy Manufacturing Centre (GEM) in Queensland Australia, the world's largest electrolyzer manufacturing facility.

In addition to pursuing green hydrogen objectives abroad, FFI has recently announced a partnership with the DOE's National Renewable Energy Laboratory (NREL) to create green jobs in America and advance green hydrogen production and technologies. We expect to invest approximately $80 million

over 10 years in research projects with NREL. The collaboration has the potential to create more than 350 high quality research, engineering, and management jobs. Combined with the impact of IIJA, this investment is expected to catalyze a strong increase in manufacturing in the green industrial ecosystem, which must be established if the world is to transition to a clean economy future.

The US has shown itself to be a global leader in the green hydrogen space and has demonstrated the significant opportunity for growth. Development of a CHPS represents a significant opportunity to export green hydrogen and green hydrogen products as an American energy source. In order to remain competitive within other markets, creating and adhering to a global definition of green hydrogen and a CHPS is of the utmost importance.

I. FFI Comments on the Proposed CHPS

FFI supports the concepts underlying DOE's proposal to implement Section 40315 of the IIJA by adopting a CHPS. The establishment of a lifecycle GHG target aligns with the statutory requirements of the IIJA to consider not only emissions at the site of production but also technological and economic feasibility to support green hydrogen production from diverse energy sources. In that spirit, FFI offers the following suggestions to improve and augment the DOE's proposed standard. First, we strongly suggest that the DOE develop a more stringent CHPS standard for initial lifecycle targets. Additionally, we comment on the process of GHG emission verification under the standard and on the inclusion of upstream and downstream emission sources in the lifecycle target. Specifically, in that section we emphasize the importance of including fugitive methane emissions in the accounting of lifecycle emissions. In the final section, we recommend the use of Renewable Energy Certificates (RECs) as a source of green electricity when assessing hydrogen emissions intensity. These comments are designed to promote the strongest, most competitive clean hydrogen production ecosystem as DOE implements the Clean Hydrogen Production Standard. These comments are intended to help DOE work together with the private industry to achieve these mutually compatible objectives.

A. DOE Should Adopt a More Stringent Standard for Proposed Clean Hydrogen Production Standard Initial Lifecycle Targets.

The CHPS will serve as a guide for the DOE's hydrogen programs in the Energy Policy Act, thus the standard should be constructed in a manner that will consistently and effectively guide America into a green hydrogen future and align with the statutory requirements of the implementing legislation, the IIJA, the President's greenhouse gas pollution reduction target, and the Inflation Reduction Act's (IRA) production tax credit for qualified clean hydrogen. However, the initial target for lifecycle GHG emissions proposed by the DOE, 4.0 $kgCO_2e/kgH_2$, is too high to successfully differentiate and prioritize clean hydrogen production pathways. The standard proposed does not meet the statutory requirements of the IIJA, nor does it establish a standard that will meet the President's goal of reducing greenhouse gas emissions by 50-52 percent by 2030. Additionally, the standard proposed is modeled on the highest allowable limit of lifecycle GHG emissions in IRA, rather than the significantly lower emission lifecycle targets proposed in the law.

The DOE proposed CHPS of 4.0 $kgCO_2e/kgH_2$ varies too far above the CHPS title's definition of "clean hydrogen" - hydrogen produced with a carbon intensity equal or less than 2 $kgCO_2e/kgH2$. The CHPS title of the IIJA requires that the standard for the carbon intensity for clean hydrogen production should (1) support clean hydrogen production from sources described in the section (e.g., including fossil fuels with carbon capture, utilization and sequestration (CCUS); hydrogen-carrier fuels (including ethanol and methanol); renewable energy resources; and nuclear energy); (2) define the term "clean hydrogen" to mean hydrogen produced with a carbon intensity equal or less than 2 $kgCO_2e/kgH_2$; and (3) take into consideration technological and economic feasibility. In the proposed standard, DOE explains that the variance between the statutory 2 $kgCO_2e/kgH_2$ definition of clean hydrogen and the proposed standard of 4 $kgCO_2e/kgH_2$ is a result of the Department's consideration of technological and economic feasibility. However, varying so far from Congress' intended definition for clean hydrogen poses a risk to the stated purpose of CHPS. In Section 4031, the IIJA explains that the standard's purpose is to establish "a clean hydrogen strategy and roadmap for the United States."[1] The CHPS standard will guide the DOE's hydrogen programs in the Energy Policy Act, and the industry, in pursuing a green hydrogen future. Given the immense importance of the CHPS for setting the future agenda of clean hydrogen production, the CHPS should more closely align with the statutory definition, as identified in the IIJA.

In addition to the standards imposed in the IIJA, the CHPS should be structured in a way to assist in meeting the President's target for GHG reduction. On April 22, 2021, President Biden announced a government-wide target of achieving a 50-52 percent reduction from 2005 levels in economy-wide net greenhouse gasp pollution by 2030.[2] The President's message was clear "the health of our communities, well-being of our workers, and competitiveness of our economy requires… quick and bold action to reduce greenhouse gas emissions."[3]

The proposed standard exceeds the standards developed in the IRA on clean hydrogen production. While in the IRA Congress defined "qualified clean hydrogen" as hydrogen which is produced through a process that results in a lifecycle greenhouse gas emissions of not greater than 4 $kgCO_2e/kgH_2$, Congress clearly intended this definition to serve as the uppermost limit of emissions rather than the standard. Section 13204 of the IRA established the 10-year production tax credit (PTC) for the production of qualified clean hydrogen (the 45V credit) with the purpose of incentivizing long-term reduction of GHG emissions. The Credit for Production of Clean Hydrogen accomplishes this by establishing a four-tiered incentive in any taxable year at an amount equal to $0.60/kilogram(kg) of qualified clean hydrogen produced multiplied by an applicable percentage based on the resulting lifecycle GHG emission rate. Hydrogen produced with emissions between 2.5 - 4 $kgCO_2e/kgH_2$ has an applicable percentage rate of 20%, between 1.5 - 2.5 $kgCO_2e/kgH_2$ has an applicable percentage rate of 25%, between .45-1.5 $kgCO_2e/kgH_2$ has an applicable percentage rate of 33.4%, and between 0-.45 $kgCO_2e/kgH_2$ has an applicable percentage rate of 100%. Thus, while the absolute upper limit of the lowest tier of incentives conform to the proposed CHPS standard, Congress clearly intended to

[1] IIJA, Section 40311 (Findings; purpose.)
[2] The White House, " FACT SHEET: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target" available at: https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/
[3] *Id.*

incentivize significantly lower emission rates in the IRA, as evidenced by the increasing incentive levels.

Simply put, the proposed threshold of 4.0 $kgCO_2e/kgH_2$ is too high to meet the policy goals that motivated its creation. While the 4.0 kgCO2e/kgH2 lifecycle target aligns to the uppermost limit of the IRA's Clean Hydrogen Credit, it does not capture the significantly lower targets at the center of the GHG reduction legislation. Nor does the proposed standard provide the preferencing of green hydrogen that is central to the IIJA.[4] Adopting a high threshold of 4 $kgCO_2e/kgH_2$ undermines the credibility of truly renewable green hydrogen while locking in insufficient standards for hydrogen production pathways that will considerably impact GHG emission reduction for decades. To meet the statutory requirements of the IIJA, IRA, and the President's target for GHG emissions, a more stringent CHPS must be adopted.

Recently published analysis by global thought leaders on GHG emissions suggest that carbon intensity limits for low-carbon and renewable hydrogen will need to achieve verifiable low-carbon intensities that trend towards near zero by 2030 to support a rapid clean energy transition.[5] In the report titled "Accelerating Sector Transitions Through Stronger International Collaboration," the International Energy Agency (IEA), the International Renewable Energy Agency (IRENA), and the UN Climate Change High-Level Champions analyzed polices required to support stronger international collaboration to drive faster reductions in global greenhouse gas emissions. While the report does not define a specific carbon intensity limit for low-carbon and renewable hydrogen, it states:

> "…both of these production routes will need to achieve verifiable low-carbon intensities **that trend towards near zero by 2030**. This implies that fossil-based hydrogen production must operate with high carbon capture rates applied to all streams containing carbon dioxide, and that the captured carbon is permanently stored underground to prevent its release into the atmosphere. Additionally, it is critical that methane leakage is minimized to near zero, if not completely avoided. Rigorous measurement, reporting and verification of emissions will be necessary"[6]

A clean hydrogen production standard of 4.0 $kgCO_2e/kgH_2$ falls far short of the need for verifiable low-carbon intensities that trend towards near zero by 2030.

In addition to being necessary for ensuring clean energy transition, adopting the highest carbon intensity standards provides long-term regulatory certainty for hydrogen producers and consumers. Hydrogen producers and customers need clarity and consistency in order to plan for the long-term clean energy investments. Demonstrating adherence to the highest emissions and sustainability standards will strongly influence project development, hydrogen pricing and export opportunities. Customers and consumers want transparency and accountability throughout the supply chain. They

[4] Inflation Reduction Act of 2020, Sec. 13204
[5] International Renewable Energy Agency (IRENA), "Accelerating Sector Transitions Through Stronger International Collaboration," available at: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2022/Sep/THE-BREAKTHROUGH-AGENDA-REPORT-2022.pdf
[6] *Id.* at P. 56 (emphasis added).

want hydrogen that has close to zero-emissions and projects that contribute to sustainable development.

FFI played a leading role in supporting the establishment of the now independent Green Hydrogen Organisation (GH2), a global organization dedicated to promoting green hydrogen with close-to-zero greenhouse gas emissions. In May 2022, GH2 published the Green Hydrogen Standard that provides certainty and transparency to investors, producers, consumers, and other stakeholders that green hydrogen conforms to the highest standards on emissions, environmental issues such as water and land social issues including human rights, governance, and transparency.[7]

GH2 defines Green Hydrogen as "hydrogen produced through the electrolysis of water with 100% or near 100% renewable energy with close to zero greenhouse gas emissions (<=1 $kgCO_2e/kgH_2$ taken as an average over a 12-month period)". The Green Hydrogen Standard is aligned with the methodology proposed by the International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE), which was established in-part by the U.S. Department of Energy and the U.S. Department of Transportation to foster international cooperation on hydrogen and fuel cell standards. We commend the GH2's efforts to align global and national standards and would welcome greater collaboration and alignment between DOE and GH2 on the proposed CHPS.

B. DOE Should Require Producers to Demonstrate and Verify GHG Emissions for Hydrogen Commercial-scale Deployment.

FFI recommends that the DOE adopt a GHG emission verification process that places the onus of verifying GHG emissions on producers, with an independent verification process that maximizes transparency and allows for stakeholder involvement. For example, GH2's Green Hydrogen standard requires hydrogen producers to consult Independent Assurance Providers (IAP) that consult with project operators and other stakeholders during GHG emission assessments. Draft reports generated by IAPs are then made available for public comment.[8]

C. FFI Applauds the DOE for Including Upstream and Downstream Emission Sources in the Proposed Lifecycle Target.

FFI welcomes the accounting of upstream processes (e.g., electricity generation, fugitive emissions), as well as downstream processes in the lifecycle emission target proposed in the draft guidance. Including both upstream and downstream processes is vitally important for ensuring that CO_2 produced is safely and durably sequestered.

It is particularly important to include all methane emissions, including upstream supply chain fugitive methane emissions, in the life-cycle assessment as methane has up to 80 times the warming power compared with carbon dioxide. In 2021, the United States, the European Union, and global partners launched the Global Methane Pledge, an initiative to reduce global methane emissions to keep the goal

[7] Green Hydrogen Organisation (GH2), "The Green Hydrogen Standard", available at: https://gh2.org/our-initiatives/gh2-green-hydrogen-standard

[8] *Id.*

of limiting global warming to 1.5 degrees Celsius, 34.7 degrees Fahrenheit, within reach.[9] A total of over 100 countries representing 70% of the global economy and nearly half of methane emissions have now signed onto the pledge.

D. DOE Should Permit the Use of Renewable Energy Certificates (RECs) as a Source of Green Electricity when Assessing Hydrogen Emissions Intensity Following a Market-based approach.

FFI recommends DOE include specific provisions within CPHS on the use of RECs by producers to lower the overall emissions intensity of green hydrogen production. Flexibility is paramount in fostering partnerships and promoting increased penetration of clean energy sources to the grid. A flexible approach to the procurement of clean energy for the production of green hydrogen is more likely to incentivize investment, accelerating the production of green hydrogen, and thus the decarbonization of energy intensive industries.

As the DOE identified in the proposed CPHS, green hydrogen produced through electrolysis would require at least 85% of electricity demand to be sourced from clean energy sources, rather than grid-sourced electricity, to meet the proposed 4.0 $kgCO_2e/kgH_2$ emissions intensity. The share of green electricity required to meet FFI's recommended of 2.0 $kgCO_2e/kgH_2$ emissions intensity would be much higher. Without the use of renewable energy contracts, such as RECs, the clean electricity required to meet emissions intensity thresholds must be produced onsite. As capacity for onsite generation may be limited for some hydrogen producers, omission of a provision for the use of RECs may delay or create a barrier to the production of green hydrogen.

Further, in accommodating the use of RECs within CPHS, DOE would be consistent with other emerging low carbon hydrogen standards, such as UK's Low Carbon Hydrogen Standard[10] and the International Partnership for Hydrogen and Fuel Cells in the Economy's (IPHE) draft emissions accounting methodology[11], which have recognized a flexible approach to supporting electrolytic hydrogen production is needed while the hydrogen market grows

Conclusion

Thank you for the opportunity to provide these comments. FFI looks forward to working with DOE to help develop the Clean Hydrogen Production Standard.

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[9] European Commission, "Launch by United States, the European Union, and Partners of the Global Methan Pledge to Keep 1.5C Within Reach, (Nov. 2, 2021), *accessible at* https://ec.europa.eu/commission/presscorner/detail/en/statement_21_5766

[10] United Kingdom Department for Business, Energy, and Industrial Strategy, "UK Low Carbon Hydrogen Standard," (2022), available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1092809/low-carbon-hydrogen-standard-guidance-v2.1.pdf

[11] International Partnership for Hydrogen and Fuel Cells in the Economy, "Methodology for Determining the Greenhouse Gas Emissions Associated with the Production of Hydrogen", available at: https://www.iphe.net/_files/ugd/45185a_ef588ba32fc54e0eb57b0b7444cfa5f9.pdf

Sincerely,

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