

Response to CHPS Draft Guidance from ZeroAvia

Introduction

ZeroAvia is pleased to provide its comments to the U.S. Department of Energy's (DOE) "Clean Hydrogen Production Standard Draft Guidance." ZeroAvia applauds DOE's work on the implementation of this standard as included in the Infrastructure and Investment in Jobs Act of 2021 (IIJA).

ZeroAvia supports DOE's efforts to make fully informed decisions about this investment for application in the DOE's hydrogen hubs initiative. ZeroAvia strongly urges DOE to move forward expeditiously with a low carbon-intensity standard that considers the full lifecycle of clean hydrogen.

ZeroAvia's Interest in the Request for Information

ZeroAvia is a leader in zero-emission aviation, focused on hydrogen-electric powertrain solutions to address a variety of markets, initially targeting a 300-nautical mile range in 9-19 seat aircraft used for commercial passenger transport, cargo, agriculture, and more, by 2025. The company is also working to introduce zero-emission engines to support 40-80 seat aircraft by 2027. Revolutionary approaches to aircraft emission reduction are needed to realize continued growth in air travel without increases in the negative environmental impacts. With around four times higher specific energy¹ and lower cycling costs than lithium-ion batteries, as well as numerous advantages over other decarbonization solutions, hydrogen-electric powertrains are a viable, scalable solution for zero-emission aviation.

ZeroAvia is confident that clean and renewable electricity used to produce clean hydrogen can play a significant role in tackling greenhouse gas emissions in difficult-to-abate sectors like aviation. The IIJA's investment in hydrogen, supplemented by a DOE Clean Hydrogen Production Standard (CHPS) that requires hydrogen producers to "mitigate emissions across the supply chain to the greatest extent possible," will advance achievement of the Biden Administration's goal of a net zero emissions economy by 2050. We look forward to working with DOE to attain that goal.

General approach to the CHPS

Whereas ZeroAvia understands the IIJA gives DOE broad latitude such that:

- The CHPS is not a regulatory standard;
- The CHPS serves only to guide the DOE's hydrogen programs in EAct 2005, as amended;
- These programs include the Regional Clean Hydrogen Hubs Program and the Clean Hydrogen Research and Development Program;
- The BIL provisions governing Regional Clean Hydrogen Hubs (Hubs) provide that DOE can select projects that do *not* meet the CHPS so long as DOE selects projects that "demonstrably aid the achievement" of the CHPS;
- The Clean Hydrogen Research and Development Program directs DOE to establish "a series of technology cost goals oriented *toward* achieving the CHPS" (emphasis added);

¹ https://www.energy.gov/sites/default/files/2014/03/f9/thomas_fcev_vs_battery_evs.pdf

- These programs are expressly designed to reduce the carbon intensity of hydrogen production from diverse feedstocks *over time* (emphasis added);
- The projects selected under those programs may not necessarily be required to meet the CHPS so long as they demonstrably aid the achievement of the CHPS;
- The Inflation Reduction Act of 2022 sets a lifecycle emission standard of 4.0 kgCO₂e/kgH₂ for “*qualified clean hydrogen*” (emphasis added) seeking 45V tax credits;
- Fossil fuel, electrolysis, and biomass hydrogen production pathways are all capable of achieving 4.0 kgCO₂e/kgH₂ on a lifecycle basis using technologies that are commercially deployable today;
- These pathways could also achieve emissions lower than 4.0 kgCO₂e/kgH₂ through optimized design choices, such as the use of greater shares of clean electricity;
- The GREET model used in various DOE facilities adopts a well-to-wheel accounting range; and
- Hydrogen is a global commodity, the production of which must take into consideration international standards,

We believe that:

- The significant investment (greater than \$8B) the IIJA makes in achieving clean hydrogen creates an expectation of improvement of current lifecycle emissions in hydrogen production;
- The standard DOE adopts should be strict (e.g the IIJA’s definition of clean hydrogen as 2 kgCO₂e/kgH₂ at the site of production);
- The standard DOE adopts should consider upstream emissions, including decisions (e.g. land use) that precede the GREET model’s “well,” consistent with ICAO’s CORSIA;
- The standard DOE adopts should look carefully at downstream emissions, particularly the tenuous nature of lifetime storage guarantees for sequestered carbon;
- The DOE should recognize that technology already exists to meet that 4kg standard with favorable economics via clean and renewable energy sources;
- The embrace of feedstock diversity in the IIJA should not be allowed to distract DOE and others from the primary goal of reducing carbon and other greenhouse gas emissions;
- The DOE should require program applicants to reduce emissions across their hydrogen supply chains as aggressively as technologically and economically feasible such that the initial proposed 4kg lifecycle standard is gradually reduced during the life of the IIJA’s DOE programs; and
- The DOE should give preference to funding applicants on the basis of their emissions.

ZeroAvia thanks DOE for the opportunity to comment on this draft CHPS guidance.