



November 14, 2022

Subject: Draft Guidance for a Clean Hydrogen Production Standard

To whom it may concern,

Avina Clean Hydrogen Inc. is pleased to submit select replies to the Draft Guidance for a Clean Hydrogen Production Standard.

Sincerely,

*Vishal Shah*

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### 3) Implementation

- a) How should the GHG emissions of hydrogen commercial-scale deployments be verified in practice? What data and/or analysis tools should be used to assess whether a deployment demonstrably aids achievement of the CHPS?

**Avina Reply: CHPS should be based on operational emissions. Updated life cycle inventories of PEM and alkaline electrolyzers are needed for accurate cradle to gate life cycle assessment. Once these inventories are available, SimaPro or a similar tool can be used.**

- b) DOE-funded analyses routinely estimate regional fugitive emission rates from natural gas recovery and delivery. However, to utilize regional data, stakeholders would need to know the source of natural gas (i.e., region of the country) being used for each specific commercial-scale deployment. How can developers access information regarding the sources of natural gas being utilized in their deployments, to ascertain fugitive emission rates specific to their commercial-scale deployment?
- c) Should renewable energy credits, power purchase agreements, or other market structures be allowable in characterizing the intensity of electricity emissions for hydrogen production? Should any requirements be placed on these instruments if they are allowed to be accounted for as a source of clean electricity (e.g. restrictions on time of generation, time of use, or regional considerations)? What are the pros and cons of allowing different schemes? How should these instruments be structured (e.g. time of generation, time of use, or regional considerations) if they are allowed for use?

**Avina Reply: Yes, characterizing the intensity of electricity emissions for hydrogen production with renewable energy credits is vital. Prohibiting the use of RECs and PPAs to offset the carbon intensity of the electrical grid would inhibit the development of the electrolytic hydrogen industry. Without the use of RECs a renewable hydrogen project would need to be directly coupled with a renewable energy system, which would result in a low (20-30%) capacity factor and the resulting levelized cost of hydrogen would be above parity with SMR.**

- d) Time of generation, time of use, regional considerations? industry-wide?
- e) What is the economic impact on current hydrogen production operations to meet the proposed standard (4.0 kgCO<sub>2e</sub>/kgH<sub>2</sub>)?

**Avina Reply: Off-grid hydrogen plants that utilize solar or wind energy are operationally zero carbon solutions. However, they operate at a low capacity factor and thus have a higher levelized cost of hydrogen than grid-tied electrolyzer systems. Today, the most direct route to economical electrolytic hydrogen is the electrical grid. Until the electrical grid is less than 4.0 kg CO<sub>2e</sub>/kgH<sub>2</sub>, however, RECS will be essential to qualifying for the CHPS for electrolytic hydrogen projects.**