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Onsite Distributed Hydrogen Production and End Use Solicitation Concept

Additional submitted attachment is included below.

California Energy Commission Onsite Distributed Hydrogen Production and End Use Solicitation Concept

NovoHydrogen's Comments

NovoHydrogen Inc. ("Novo") is pleased to provide these comments to the California Energy Commission for the Onsite Distributed Hydrogen Production and End Use Solicitation Concept.

Novo is a green hydrogen project developer based in the United States with several decades of combined renewable energy development and oil and gas experience throughout North America. Novo brings this expertise to the difficult-to-decarbonize industrial, transportation and power sectors through the development and supply of zero-carbon and renewable hydrogen. Novo's core areas of focus include the origination, procurement, project development, financial structuring, construction, and operation of renewable hydrogen and oxygen production facilities.

Yours Sincerely,

Manka Khanna
Chief Commercial Officer
NovoHydrogen

1. Are the Project Elements in Section IV of this document realistic, reasonable, and feasible?

The water consumption requirement states that a project will have to demonstrate consumption of 9–13.5 L water per kg H_2 produced. Most PEM electrolyzer technologies utilize more than this amount as an input to produce 1 kg H_2, but only a portion is reacted electrochemically. The balance is process water and comes out as effluent, or more concentrated mineralized water which could potentially be re-used, as an example, for agricultural use. If the water component of section 4 refers to consumed water, this requirement is feasible. However, if the requirement refers to total input water usage, then NovoHydrogen feels this is too stringent considering the average water input for electrolysis.

The solicitation specifically applies for production of between 1–5 tonnes of hydrogen per day. While this range is reasonable, we suggest expanding it to production up to 5 tonnes hydrogen per day and removing the minimum threshold. This allows emerging categories of customers to test smaller volumes until they better understand the impact of hydrogen blending on their end products, furnaces, turbines, etc. In addition, we have observed several existing use cases for hydrogen where daily volumes are lower than 1 tonne. The CEC should instead allow for a pathway for smaller scale demonstrations to scale overtime to meet the 1–5 tonnes per day production range.

We would also suggest that CEC allow project siting near the customer facility.. Building hydrogen production facilities, powered by clean energy, capable of producing 5 tonnes per day requires considerable land. The solicitation should allow developers to utilize adjacent land near the facility, especially if the customer is land constrained.

2. What would be the appropriate level of project funding that would leverage private investments associated with the work proposed in this draft concept, and why?
    a. How would limiting the use of grant funds to Eligible Project Costs in Section III impact the project? What changes do you recommend if any, and why?

Many existing state and federal funding opportunities for hydrogen projects have stated that grant funding would cover up to 50% of a project's total capital requirements. In other words, at least 50% of total capital costs would be supported by private investments. NovoHydrogen believes this is an appropriate benchmark to follow.

3. Provide any feedback on the two-phase solicitation approach. Are the 1-month abstract deadline and 3-month full application deadline realistic?

It takes significant time to put the right team together for a renewable energy generation asset collocate with onsite hydrogen production. We suggest reserving 6–8 weeks for the abstract, with 3 months for the full application. We also advise CEC to hold at least 1 check-in meeting with project applicants during the pre-application process and at least 2 check-in meetings during the full application process to answer questions and clarify different submission components.

4. To ensure that funded projects and their impacts can inform future deployment of hydrogen in California, should the CEC consider additional performance metrics beyond those proposed for the M&V plan in Section IV?

We suggest adding the following detail to the list of performance metrics proposed under the M&V section of applications:

- Decrease in region's GHG emissions – We suggest removing this section and instead using a metric demonstrating reduction of CO_2e per kg H_2 , which would be more effective at measuring the impact for smaller, onsite projects. These types of projects might not individually decrease the region's GHG emissions greatly but are still vital to decarbonize industrial processes. Multiple onsite projects will certainly have a larger impact on the region's emissions.
- System TRL and technical project performance compared to existing state-of-the-art technologies – We suggest including the requirement for project owners to identify the technology manufacturing partners and type of technology expected to be used. Its important developers have a clear pathway to securing necessary equipment in a timely manner and that involves having existing relationships and knowing exactly the technology expected to be used.

5. What type of technical assistance is needed to ensure equitable participation and project success, if any?

The CEC should use its resources and bring in third parties such as management consultants to support the formation and execution of community benefit plans (CBP). Such support (which can include strategy development, workforce development support, and benefit tracking) can help ensure all awardees equitably disperse project benefits and track benefits throughout the lifetime of the project. Support on consistently running the different GREET models will be very valuable as well, given how important the CI score of hydrogen is to the overall project success.

6. Are there specific end uses we should target with the one to five metric ton hydrogen capacity? If so, why?

Given the number of existing programs which fund zero-emission vehicles and renewable power projects in California, we suggest focusing on end uses in the industrial and manufacturing sectors. These often hard-to-abate industries will struggle to electrify operations entirely and will likely have to turn to non-

wires alternatives to decarbonize. This includes any entity that requires high-temperature heat from the combustion of coal, diesel, gasoline, heat, liquidized petroleum gas, natural gas, refinery feedstocks, and residual fuel. Hard to abate category also includes facilities that are utilizing fossil hydrogen for their operations today. A few example industries are provided below.

- Building materials (cement and concrete, limestone, gypsum, etc.)
- Metals (iron and steel, copper, aluminum, etc.)
- Semiconductors
- Glass
- Hydrogenated fats and oils
- Other manufacturing facilities reliant on fossil fuels
- Power generation

7. Are there any concerns with this solicitation allowing the use of CCUS for a project to be carbon neutral? If so, why?

CCUS projects will likely not meet the 0.45 kg CO_2/kg H_2 carbon intensity threshold given expected upstream methane leakage rates. These projects will have a smaller GHG emissions impact than projects using green (electrolytic) hydrogen to decarbonize. There are also major challenges with obtaining Class VI permits needed for CCUS projects and that could delay the timeline that CEC is looking for. Therefore, we suggest removing the eligibility of CCUS projects in this solicitation.

8. Please provide relevant comments regarding other considerations not explicitly listed above.

Novo would like clarity on the requirements for a 10-month demonstration period and what that entails