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Clean Hydrogen Program input from Erthos Inc

Additional submitted attachment is included below.

ERTHOS

California Energy Commission
715 P Street
Sacramento, CA 95815

December 16, 2022

RE: Implementation of the Clean Hydrogen Program

Dear California Energy Commission Staff:

Erthos Inc. appreciates the opportunity to provide our support and input on the implementation of the California Clean Hydrogen Program.

Erthos is committed to developing and deploying solutions for California's renewable energy future, including utility-scale solar and delivering a cost-effective green hydrogen solution. Leveraging the heat absorbing properties of the earth, favorable aerodynamics, lowest cost installation method, and robotic cleaning, Erthos has developed and fielded high-performing, utility-scale solar power plants deployed directly on the ground. Our Earth Mount Solar technology produces twice the energy per acre, requiring less than half the land compared to tracker or fixed tilt plants and can also be installed in half the time. Building on this technology, we developed a cost-effective solution to produce green hydrogen through electrolysis, directly powered by our utility scale solar solution. Our electrolyzer technology dynamically adjusts the electrode surface area to match the maximum power demand curve of the incoming variable DC source electricity – resulting in maximum hydrogen generation tracking and control.

As solicited follow up to the December 1st CEC workshop on the new Clean Hydrogen Program, Erthos respectfully provides the following responses the questions proposed by staff:

1. Are the proposed topics a feasible and impactful approach? If not, what are your recommendations?
Yes, solar-to-hydrogen can meet the renewable feedstock objectives, and with government support, compete with non-green hydrogen. We recommend including other projects, such as 1) replacing imported hydrogen with U.S.-produced hydrogen; and 2) funding projects that not only entail the clean production of hydrogen, but the clean use (burning, fuel cells, etc.) of it as well.

2. Are the proposed scales and funding allocations feasible and effective?
Yes, these are fair proposed funding levels targets.

3. Are clean hydrogen technologies sufficiently mature or should we focus more on early stage and emerging technologies?
While such high potential, emerging technologies exist, the resulting output is still far above the costs of non-clean hydrogen. Support of early-stage or emerging technologies is imperative and Erthos strongly recommends that it remains a focus of the program. For example, how can the source energy (e.g., sunshine) be optimized to reduce land use, imported materials, carbon-intensive components such as steel, and overall costs? Also, what innovative approaches to clean hydrogen production can lower costs such that they can compete head-to-head with fossil fuel-sourced hydrogen or natural gas? Are there new technologies that can convert water to hydrogen and oxygen, or even Brown's gas, that can be more cost effective with shorter lead times? With the production of alternative fuels, what additional technologies exist that can ensure clean use (e.g., burning) such that the entire lifecycle is without GHG and other critical pollutants? Finally, how can the state assist the applicant in overcoming the

"technology adoption chasm" of funding and insurance such that novel projects come to life without the traditional risk avoidance of these entities?

4. How should we weigh different benefits, and which should we be prioritizing the most?
We recommend a few top priorities including: (1) production of 100% clean fuel sources, as well as 100% clean uses of such fuel, (2) cost effective replacement of fossil fuels, including natural gas and coal, (3) local jobs and prevailing/union wages, and (4) a proven track record of the team's ability to build similar scale projects (including prior company experiences).

5. How do water concerns impact the success of the prospective projects?
Water is an essential component in the production of clean hydrogen. Ideally, the sites selected should have water rights and access to the necessary feedstock.

6. What criteria should CEC consider for equity benefits?
We recommend that the equity benefits of the project be modeled after the environmental justice and diversity, equity, inclusion, and accessibility objectives of the U.S. DOE EERE Hydrogen and Fuel Cell Technologies Office; as well as the White House Executive Order on Justice 40.

7. Should CEC set requirements regarding end use (offtake agreements, commitment letters)?
We do not recommend setting end use requirements. Often times, end users will not entertain off-take agreements without a clear line of sight to actual production. Requiring such commitments in advance will likely diminish the applicant pool and reduce the early benefits of the program.

8. What safety considerations should CEC include as requirements?
Adhering to standard hydrogen safety protocols is essential. We recommend including requirements for an organization to meet the intent and spirit of the codes and standards identified by NREL and the DOE EERE (https://www.energy.gov/eere/fuelcells/standards-development-organizations).

9. Are there permitting concerns, and if so, how should they be addressed in future solicitations?
Permitting for solar-to-hydrogen projects is a significant concern. It will be important to coordinate with agencies that have jurisdiction, which could include environmental health services departments, pollution control districts, county and city planning departments, CalTrans, the State and Regional Water Boards, State Historic Preservation Officer, U.S. Army Corps of Engineers, California Department of Fish and Wildlife, as well as various Federal agencies depending on funding and jurisdiction. State support for streamlining the permitting process, and prioritization of shovel ready projects will significantly help accelerate projects.

Erthos appreciates the opportunity to support and provide input on CEC's new Clean Hydrogen Program and look forward to continuing to work with the CEC and other stakeholders to establish the program and accelerate clean hydrogen production and use in the state.

Sincerely,

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