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Comments on Implementation of clean hydrogen program

Additional submitted attachment is included below.

Synergistic Solutions

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December 16, 2022

California Energy Commission

Re: Docket 22-ERDD-03 / Clean Hydrogen Program

To Whom It May Concern:

I would like to offer the following commentary concerning certain core concepts and metrics which will be essential in implementing a clean hydrogen program. To the extent possible, I have organized this material in a manner responsive to the "Questions for Stakeholders" as listed on Slide 29 of the workshop presentation.

A. Proposed Scope

- 1. Are the proposed topics a feasible and impactful approach? If not, what are your recommendations?** The provision for onsite production and use is greatly appreciated, as the primary focus and priority among many if not most stakeholder groups concern the upward scaling of hydrogen production for hard-to-decarbonize sectors (heavy industry, rail, ports, shipping, long-haul trucking, etc.). While this effort is paramount and will be the primary driver of economies of scale, more distributed applications featuring production co-located to generation and end-use, will be essential to maximize capacity and resilience within energy distribution systems.

By strategically locating electrolysis facilities as an offtaker of excess energy within areas of high potential capacity, local energy systems can be designed to host the maximum amount of output of any given area. While centralized production and distribution systems may allow for lower cost through higher volume, there will need to be minimal level of resilience within hydrogen infrastructure that can only be accomplished through co-location of hydrogen production, energy generation and end use applications that more often than not involve critical infrastructure.

- 2. Are the proposed scales and funding allocations feasible and effective?** The proposed scales and funding allocations are appropriate at this stage, allowing for 3-4 projects to demonstrate cost effectiveness, scale and technological/market advancement. Project selection should prioritize common use cases to ensure replicability. With regard to

onsite production and use, I agree with comments submitted by DENSO¹ to lower the scale from 1 MW to .1 MW and to lower the TRL requirement from 6 to 3. This would allow projects that encompass more distributed applications that can scale not in volume, but in number.

- 3. Are clean hydrogen technologies sufficiently mature or should we focus more on early stage and emerging technologies?** Production technologies such as electrolysis and pyrolysis (for biomass) have existed for some time, as have many industrial storage and handling technologies. That said, projected diversification of hydrogen applications will require production units occupying the full operational scale, from centralized, utility scale facilities down to smaller units that can operate onsite or alongside refueling stations. Furthermore, production facilities located in remote or offshore locations will likely require ancillary early stage/emerging technologies. A more aggressive, systems-based approach will be needed to assess the role of hydrogen within different system scales and be amenable to employing such technologies in a less developed state.

B. Proposed Requirements and Considerations

- 1. How should we weigh different benefits, and which should we be prioritizing the most?** Benefits that accrue to centralized and distributed hydrogen production and use should be weighed on their own merits, with the understanding that what can't be achieved through scale (centralized) can be realized through aggregation (distributed). Furthermore, hydrogen production and use cases should also be valued to the extent they are complementary and add value to other elements of local energy systems.
- 2. How do water concerns impact the success of the prospective projects?** Projects incorporating electrolysis will obviously require a reliable water supply, while pyrolysis or technologies using other feedstocks may not require high volumes of water. Projects requiring certain volumes of water should be distinguished from projects that have sufficient available capacity but require processing of available water supplies via desalination or distillation. In both cases, a prospective project should identify a means of procuring sufficient amounts of requisite quality for continuous operation.
- 3. What criteria should CEC consider for equity benefits?** The CEC should prioritize disadvantaged, low-income areas, particularly as they are usually located adjacent to heavy industry, which will be a prime off-taker for hydrogen production. Projects located within this dynamic should evidence multiple cross-benefits between industry and the local residential/business community. Specifically, equity benefits should be accorded to the community, with extra points given to investment and partnership with local industry to provide hydrogen for transit and emergency back-up services.

¹ DENSO Comments to Clean Hydrogen Program,
<https://efiling.energy.ca.gov/GetDocument.aspx?tn=248060&DocumentContentId=82373>

4. **Should CEC set requirements regarding end use (offtake agreements, commitment letters)?** Commitment letters from key stakeholders should be required, with additional points given to offtake agreements, whether final (higher value) or conditional (lesser value).
5. **What safety considerations should CEC include as requirements?** Primary safety concerns involve adequate ventilation, pressure regulation and in the case of liquid hydrogen, thermal insulation. Project parameters should be compliant with existing safety protocols and incorporate safety elements that satisfy general safety requirements should no such protocols exist.

C. Conclusion

It is important that implementation of the clean hydrogen program encompass all potential applications, from centralized utility-scale production to distributed applications that enhance local resiliency. Equally important is the need to move forward in parallel and not defer distributed onsite production until economies of scale are reached via utility-scale procurement. Emphasizing the salient qualities of all applications in parallel should create a virtuous cycle that will accelerate supply chain development.

Synergistic Solutions appreciates the opportunity to provide these comments and looks forward to working collaboratively with the Commission and all interested parties to craft a policy framework necessary to effectively implement a clean hydrogen program in California.

If you have any questions, please feel free to contact me by email or phone (818-384-4557).

Sincerely,



Robert Perry, Principal Analyst