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AquaHydrex Comments on 23-IEPR-01 - 2023 Scoping Order

Additional submitted attachment is included below.

March 17, 2023

Commissioner Patty Monahan
California Energy Commission (CEC)
715 P Street
Sacramento, CA 95814

RE: AquaHydrex Comments on 23-IEPR-01 – 2023 Scoping Order

Dear Commissioner Monahan:

Thank you for the opportunity to comment on the Draft Scoping Order for the 2023 Integrated Energy Policy Report (IEPR). We appreciate CEC taking an increasing and dedicated focus on hydrogen's role in California's energy system, including through the 2022 IEPR, and now the 2023 and 2025 IEPR's, per Senate Bill 1075 (Skinner). We look forward to continuing to work with you, other staff and Commissioners at the CEC as you continue to evaluate the promise of green hydrogen in the electricity and other sectors in the coming years.

Low-cost green electrolytic hydrogen is practical at scale

AquaHydrex is an American company commercializing a purpose-driven, clean-sheet redesign of electrolysis for producing low-cost green electrolytic hydrogen from intermittent renewables at scale. We see green electrolytic hydrogen, aided by the dramatic reduction in the cost of renewable energy, practical at scale and as a key component of achieving deep decarbonization.

Our own proprietary insights, based on our clean-sheet redesign of electrolysis to create the ideal platform for green hydrogen at scale, show an incredible roadmap for reducing the cost of electrolysis and green hydrogen production, especially when directly tied to inexpensive variable renewable energy. The recent addition of production tax credits under the Inflation Reduction Act will support additional cost reductions and help make green hydrogen a more affordable and widely available clean energy solution than many currently anticipate.

We look forward to working with you and helping the state transition to 100 percent clean energy and achieve carbon neutrality as soon as possible.

Evaluate a complete array of opportunities for hydrogen and its derivatives to achieve carbon neutrality, including a deep dive in the transportation and power sectors

We support CEC analyzing hydrogen and its role in decarbonizing the electricity and transportation sectors, as directed by SB 1075. As you do so, we encourage you to evaluate the full array of opportunities for hydrogen and its derivatives to decarbonize these sectors, including under the assumption that green hydrogen production costs (LCOH) will be below

\$2/kg and in some cases may reach the \$1/kg cost target envisioned by the U.S. DOE's Hydrogen Shot Initiative, and including but not limited to:

- Transportation
 - Hydrogen directly used in fuel cell vehicles, including heavy-duty vehicles, or other transportation applications, such as aviation
 - Green hydrogen derivatives – including green ammonia, green methanol, and “e-fuels” like sustainable jet fuel or other synthetic, renewable liquid fuels – to decarbonize other hard-to-electrify transportation segments, including heavy-duty vehicles, aviation, shipping and rail.
- Electricity
 - Hydrogen blending with natural gas in existing power plants
 - Dedicated hydrogen power plants and fuel cell applications
 - Hydrogen as a fuel for distributed resources and backup power
 - Green hydrogen derivatives, including synthetic methane for use in the power sector
 - Storage of hydrogen, for example in geologic caverns or in a gas pipeline network, for long-duration energy storage

We hope the evaluation of hydrogen in the power sector will explore scenarios not just to comply with the retail sales requirement of SB 100, but will go farther than scenarios that have been previously presented to explore opportunities for hydrogen to decarbonize gas plants and move the electricity sector towards an entirely zero emissions solution. We encourage CEC to add SB 423 (Stern) to the list of “Key Statutory Initiatives” guiding the 2023 IEPR, and note that the timing and scope of the evaluation of firm zero carbon resources required by that legislation matches well with that of the 2023 IEPR. We encourage a deep analysis of hydrogen in the power sector in both the 2023 IEPR and through SB 423 implementation, and hope those analyses will support more ambitious scenarios in the next SB 100 Report, including those that achieve zero emissions in the power sector by no later than 2045.

Evaluate integrative benefits of hydrogen across sectors

While the evaluation required by SB 1075 focuses on the transportation and electricity sectors, there are clear cross-sectoral impacts of hydrogen supply and use that deserve analysis. We hope the 2023 will begin to explore these in greater detail than has been done before, including:

- Electrolytic hydrogen production as energy storage and a means to balance intermittent renewable generation on the power grid
- Pairing green hydrogen with captured carbon to create synthetic fuels and green hydrogen derivatives while supporting carbon removal and industrial decarbonization strategies
- Utilizing green ammonia to develop new, domestic supplies of renewable fertilizer to decarbonize agriculture

- Decarbonizing gas end uses, either through direct uses of hydrogen, hydrogen blending with conventional natural gas, or use of synthetic methane derived from captured carbon and green hydrogen, and opportunities to use the gas system as electricity storage through production of renewable hydrogen

Incorporate findings of the 2022 IEPR

Finally, we hope that the 2023 IEPR will directly build on the work and findings of the 2022 IEPR, as it related to hydrogen:

- ***Develop an agreed-upon and standardized method to measure the climate benefits of hydrogen while accounting for varying feedstocks and production processes***
 - We encourage such an accounting framework to take into consideration criteria air pollutants associated with hydrogen production processes, as well.
- ***Set targets for reducing GHG emissions from directly produced hydrogen production***
 - There are strong synergies between hydrogen production and decarbonizing the electricity grid. We hope that goals related to hydrogen production will consider these interactions and enable hydrogen to play a growing role in integrating intermittent renewable energy on the electricity grid, while decarbonizing other Hard-to-Abate sectors.
 - We hope the State will consider opportunities to direct curtailed electricity to hydrogen production, to improve operability of the electricity grid while encouraging more clean energy production, and enable electricity tariff structures that support effective grid integration of hydrogen production.
- ***Expand Senate Bill 100 analysis of hydrogen***
 - We strongly support this objective, as noted above. The state's current SB 100 planning continues to rely on existing natural gas power plants, and does not make a significant effort to decarbonize them, resulting in significant, ongoing greenhouse gas emissions – even under SB 100-compliant scenarios. The most recent example is CARB's Scoping Plan, which envisions *all* existing natural gas power plants remaining operational through at least 2045, and only adds carbon capture and sequestration to decarbonize them in 2045. Hydrogen can be used to help modernize and decarbonize these plants much more quickly than currently envisioned, delivering significant additional greenhouse gas emission benefits, while also supporting the role of hydrogen for long-duration energy storage.

- We encourage CEC to evaluate scenarios for achieving a truly zero carbon electricity grid, and not just 100% of retail sales, and the role that green hydrogen can play in quickly, reliably, and affordably achieving that outcome.
- ***Fully engage in the federal Hydrogen Hub initiative***
 - We agree that federal Hydrogen Hub initiative offers an exciting near-term boost for hydrogen development in the U.S. We support California's efforts, through ARCHES, to winning a hydrogen hub, and hope it will bolster green hydrogen development in the State.
 - We note, however, that the budget included a goal to produce or use at least 15,000 tons per day of clean hydrogen in California by 2030, and the State won't get there just with hydrogen hub funding from the federal government. One of the most compelling actions the state can take to support its Hub application is continued policy support to develop hydrogen demand and green hydrogen production opportunities.

Thank you again for the opportunity to comment on the Draft Scoping Order for the 2023 IEPR and your consideration of these comments. Please do not hesitate to reach out to me with any questions.

Sincerely,



Steven Kloos
Chief Executive Officer
AquaHydrex, Inc.