

April 1st, 2022

Rajinder Sahota
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: AquaHydrex Comments on Initial Modeling Results for the 2022 Scoping Plan Update

Dear Ms. Sahota:

2008 called and wants its technology assumptions back! The 2022 Scoping Plan Update relies on these 2008-ish assumptions:

- 1) Biomass is economically available and viable as a scalable feedstock
- 2) Green Hydrogen is expensive and therefore impractical beyond niche plays

What's different now is:

- 1) The broad understanding that biomass, such as woody biomass, farm residue, or even purpose grown crops, is actually quite expensive to transport, process, and utilize. And all biomasses, including MSW, is only available in regionally limited supplies and not in the inexpensive quantities needed to serve a large-scale tool in the fight to Net Zero.
- 2) Green Hydrogen is widely viewed to soon become available at inexpensive costs. This is because of two main reasons:
 - a. The cost of renewable energy, which is the largest cost component of making Green Hydrogen, has fallen to incredibly low levels, and is projected to be even cheaper in the future.
 - b. The cost of the electrolysis systems, which is the second largest cost component of making Green Hydrogen, is projected to fall dramatically, due to significant investment as well as passionate, hard, and innovative work by companies such as AquaHydrex.

When these two new realities are properly considered, inexpensive and at scale Green Hydrogen will be shown to help the transition to California's air, energy, climate, and justice goals by being more practical, scalable, and economical.

Green Hydrogen, and green electrolytic hydrogen in particular, offers a fully scalable, cost-effective climate change solution that can help to decarbonize the entirety of California's

economy. CARB should prioritize and highlight green electrolytic hydrogen as a critical solution to achieve carbon neutrality in all scenarios, and develop a plan to quickly deploy it at scale in the Scoping Plan.

In all seriousness, there has been tremendous, game-changing progress in technology development since CARB developed its first Scoping Plan. Little over a decade ago, climate change solutions were expected to be forever more expensive than fossil fuels. Yet today, renewable power is cheaper than fossil fuels and electric vehicles are expected to hit cost parity with conventional vehicles within 5-10 years. California and CARB's leadership has helped get to this point, and the State deserves recognition for its successes since it embarked on its first Scoping Plan just 14 years ago.

Today, electrolysis faces a similar cost trajectory as those other technologies, and it is widely expected to become a cost-effective climate solution once it reaches scale, within the next 5-10 years. For example, Bloomberg New Energy Finance suggests costs for green electrolytic hydrogen could plunge by 80 percent by 2030,¹ while an analysis by McKinsey for the Hydrogen Council finds that green electrolytic hydrogen could become an increasingly cost-effective solution for decarbonizing many sectors of the economy, beginning as soon as the 2025-2030 timeframe.² The International Renewable Energy Agency (IRENA) agrees with this sentiment, finding that falling renewable power and electrolyzer costs could make green electrolytic hydrogen cost competitive by 2030.³ This is validated in a recent study by E3, which shows that power plants using green electrolytic hydrogen could be profitable in Southern California by 2025-2030.⁴

At AquaHydrex, we have validated that ourselves. 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 decarbonization. And 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. We look

¹ <https://www.bloomberg.com/news/articles/2019-08-21/cost-of-hydrogen-from-renewables-to-plummet-next-decade-bnef>

² https://hydrogencouncil.com/wp-content/uploads/2020/01/Path-to-Hydrogen-Competitiveness_Full-Study-1.pdf

³ <https://www.irena.org/publications/2020/Dec/Green-hydrogen-cost-reduction>

⁴ <https://www.ethree.com/e3-evaluates-hydrogen-opportunities-in-a-low-carbon-future/>

forward to helping the state transition to 100 percent clean energy and achieve carbon neutrality and net-negative emissions as soon as possible.

This is fully achievable if CARB envisions deploying green electrolytic hydrogen or its derivatives at scale, in all sectors where it is needed. In the Scoping Plan scenarios, residual emissions in the power sector, industrial sector, transportation sector, and building sector can be eliminated through the greater use of green electrolytic hydrogen or its derivatives – including synthetic methane, methanol, ammonia, jet fuel, or others. There is no longer a need to imagine tradeoffs among sectors, the best way to utilize limited and costly biomass resources, or whether we can even decarbonize some sectors. The solution to decarbonize all energy-using sectors in their entirety is now readily apparent – a combination of direct electrification and indirect electrification through Green Hydrogen.

Just as it has done for renewable power and electric vehicles, CARB and California can manifest these solutions through focused planning and policy support. RMI says it well, in identifying how we overcome the remaining “green gap” to make green electrolytic hydrogen cost-competitive:⁵

Policy is the best option we have to address this barrier. By using available policy levers that specifically address these higher costs of production, we can accelerate deployment and accelerate cost declines, thus further shrinking the cost premium of Green Hydrogen deployment.

Truly, the assumptions in the Scoping Plan scenarios can be reinforcing. You can assume limited climate solutions, ongoing barriers and costs – reinforcing the conventional wisdom dating back over a decade that we can’t cost-effectively address climate change – and only take gradual steps to move forward. Or you can recognize that the State’s vision and policies will largely dictate the level of market development, scale, and cost reductions for key technologies like electrolysis over the next decade – and quite simply choose to make it happen.

Choosing the latter path will lead to far better emissions and economic outcomes, much sooner, than the alternative. It’s a choice we hope you will make.

Sincerely,



Steven Kloos

Chief Executive Officer, AquaHydrex, Inc.

⁵ <https://rmi.org/policy-priorities-to-spur-the-green-hydrogen-economy/>