



April 24, 2020

Comments by the California Hydrogen Business Council on EPIC Program Policy and Innovation Coordination Group Partnership Area Framework Presentation

Introduction

The California Hydrogen Business Council (CHBC)¹ appreciates the opportunity to submit these comments on the EPIC Program Policy and Innovation Coordination Group (PICG) Partnership Area Framework results workshop. We greatly appreciate the support the EPIC program has extended thus far to advance renewable hydrogen production, as well as the inclusion of electrolytic hydrogen in the initial list of partnership areas identified in the PICG Partnership Area Framework presentation. We strongly encourage the Energy Commission to further support research and development of electrolytic hydrogen technology, among other solutions for producing low and zero carbon hydrogen, as a high priority to ensure California's success in achieving its clean energy, clean air, climate and resiliency goals.

Our main points are summarized as follows, with greater detail offered in the Comments section below.

- A. A growing number of financial analysts agree that renewable hydrogen has great potential to be cost competitive as volume increases and that this could be imminent with the falling cost of renewable power, but policy support is also needed to enable economies of scale.**

¹ The CHBC is comprised of over 100 companies and agencies involved in the business of hydrogen. Our mission is to advance the commercialization of hydrogen in the energy sector, including transportation, goods movement, and stationary power systems to reduce emissions and dependence on oil. The views expressed in these comments are those of the CHBC, and do not necessarily reflect the views of all of the individual CHBC member companies. CHBC Members are listed here: <https://www.californiahydrogen.org/aboutus/chbc-members/>



- B. UC Irvine has been developing a roadmap for how to achieve cost effective renewable hydrogen in California, which includes several specific recommendations for policy support, including research and development, which we highly encourage the EPIC program to consider.**

 - C. Support for renewable hydrogen aligns with several state laws and policies that also ought to be kept in view while developing upcoming EPIC programs.**

 - D. Zero carbon hydrogen also is needed to achieve zero greenhouse gas, zero criteria pollutant multi-day back up generation and microgrid power, which can be accomplished at mass scale by using green electrolytic hydrogen in fuel cells.**

 - E. The EPIC program also ought to consider supporting research and development to produce renewable hydrogen from biowaste feedstock, including but not necessarily limited to heeding the Lawrence Livermore National Laboratory recommendation to produce hydrogen by gasifying woody biomass, in order to cost effectively achieve California's negative carbon emissions goal.**
- II. Comments**
- A. A growing number of financial analysts agree that renewable hydrogen has great potential to be cost competitive increased volume and that this could be imminent with the falling cost of renewable power, but policy support is also needed to enable economies of scale.**



A report by Hydrogen Council, created with analytical support from McKinsey and Company, predicts that hydrogen costs will fall 50% across multiple applications and regions, including the US, by 2030.² Bloomberg predicts that falling cost of renewable power, production cost could fall as much as 80% by 2030.³ They also notably emphasize that to realize these cost drops, supportive policies are needed. The EPIC program can potentially provide important policy support.

B. UC Irvine has been developing a roadmap for how to achieve cost effective renewable hydrogen in California, which includes several specific recommendations for policy support, including research and development, which we highly encourage the EPIC program to consider.

UC Irvine makes a number of recommendations for research and development areas of focus that align with efforts on the federal level at the US Department of Energy and that CHBC believes the EPIC program should incorporate into its solicitation concepts. For example:

1. Cost and performance tracking and forecasting of renewable hydrogen production facilities, as well as supply chain infrastructure, ought to be supported to guide investor and policy-maker decisions.
2. Global and California-specific demand forecasting is needed to anchor technology forecasts and investment planning.
3. The value of sector coupling enabled by renewable hydrogen between the transportation, electric and natural gas systems needs to be quantified.

² <https://hydrogencouncil.com/en/cost-reduction-study-announcement/>

³ <https://www.bloomberg.com/news/articles/2019-08-21/cost-of-hydrogen-from-renewables-to-plummet-next-decade-bnef>



4. Optimal electric and gas rate structures and market designs as they relate to renewable hydrogen must be developed and implemented.
5. Full-scale commercial demonstration is needed of high-impact-potential technologies across the production and supply chain, particularly those supporting production and storage at scale.
6. There needs to be stakeholder research and engagement in the unique context of California policy environment and its position as a global early adopter of hydrogen solutions, which is becoming increasingly needed in California to implement several state laws and policies.
7. Air quality and community impacts of implementing renewable hydrogen ought to be studied.

C. Support for renewable hydrogen aligns with several state laws and policies that also ought to be kept in view while developing upcoming EPIC programs.

California has passed several pieces of legislation that explicitly support hydrogen or will require low and zero carbon hydrogen to implement. For example:

AB 8 calls for funding to support 100 hydrogen fueling stations by 2020, and the Governor's Executive Order B-48-18 on Zero Emissions Vehicles raises that goal to 200 stations by 2025, and the public-private California Fuel Cell Partnership has called for 1,000 by 2030.

SB 1369 calls upon agencies to consider green electrolytic hydrogen for storage and other beneficial uses.

SB 1383 mandates reduction of short-lived climate pollutants, and the Energy Commission has



acknowledged in recent Integrated Energy Policy Reports⁴ that this will take a broad range of renewable gas, including renewable hydrogen.

SB 1505 requires a third of hydrogen for transportation be renewable, a goal the industry quickly surpassed.⁵

SB 100 is increasingly seen as likely to require hydrogen as a zero carbon long duration storage and generation resource to achieve the mandated target of 100% renewable and zero carbon retail electricity sales by 2045. Legislators signaled they agree with this view in introducing SB 1122 earlier this year.

D. Zero carbon hydrogen also is needed to achieve zero greenhouse gas, zero criteria pollutant multi-day back up generation and microgrid power, which can uniquely be accomplished at mass scale by using green electrolytic hydrogen in fuel cells.

As California copes with the increasing threat of catastrophic wildfire and other disasters that interrupt energy services, long duration back up generation and microgrids are becoming a high priority. Currently these solutions are relying on fossil fuels, which hamper California's efforts to reduce greenhouse gas emissions and clean the air. To ensure that safety and reliable energy service also aligns with protecting the environment and public health, California must support multi-day storage and power generation solutions that use low and zero carbon fuel in fuel cells, which emit zero criteria air pollutants or toxics. Fuel cells that use zero carbon hydrogen present the most promising pathway to achieve this at scale. Hydrogen fuel cells are a proven technology that have been used in the field for many years, for example as backup generation for cell phone towers. The EPIC program ought to support pilot programs to research and develop deploying

⁴ See 2019 IEPR, pp. 45, 253-254, 286; 2017 IEPR 284-285

⁵ Renewable hydrogen content has currently reached 39 percent, according to the Energy Commission's *Draft Staff Report-2020-2023 Investment Plan Update for the Clean Transportation Program* (p. 47) <https://www.energy.ca.gov/programs-and-topics/programs/clean-transportation-program/2020-2021-investment-plan-update>



low and zero carbon hydrogen in fuel cell projects for backup generation and microgrids to help remove cost barriers and enable economies of scale.

E. The EPIC program also ought to consider supporting research and development to produce renewable hydrogen from biowaste feedstock, including but not necessarily limited to gasifying woody biomass, in order to cost effectively achieve California’s carbon neutrality and negative carbon emissions goal.

Renewable hydrogen can be produced via organic waste pathways, and the EPIC program ought to support emerging technologies that enable this. For example, Lawrence Livermore National Laboratory (LLNL) recently reported that gasifying woody biomass to produce hydrogen is the most cost effective way to reduce greenhouse gases and achieve California’s negative carbon emissions goal.⁶ It also carries the added benefit of mitigating wildfire risk by removing and repurposing flammable wood waste. This technology, however, is not yet commercially available, and therefore, we believe is among the pathways the EPIC program ought to support, in order to ensure technology and market maturity.

III. Conclusion

Given the essential roles hydrogen is likely to play, the timing is right for EPIC to fulfill its research mandate by funding hydrogen demonstrations. This will be essential to help California be ready to address the many challenges hydrogen can address, such as the imminent high-penetration of renewables and the need for cost-effective, widely deployed seasonal storage, clean wildfire and disaster resiliency solutions, industrial decarbonization technologies, and long-distance zero emissions transportation where plugging in is not easily feasible, fast

⁶ <https://www.llnl.gov/news/new-lab-report-outlines-ways-california-could-reach-goal-becoming-carbon-neutral-2045>



Main Office: 18847 Via Sereno
Yorba Linda, CA 92886

DC Office: 1211 Connecticut Ave NW, Ste 650
Washington, DC 20036

Phone: (310) 455-6095 | Fax: (202) 223-5537
info@californiahydrogen.org | www.californiahydrogen.org

refueling is required, or heavy loads are being carried. We thank you for your consideration of these comments and welcome your contacting us with any questions.

Best regards,

A handwritten signature in blue ink, appearing to read 'Emanuel Wagner', with a long horizontal flourish extending to the right.

Emanuel Wagner
Deputy Director
California Hydrogen Business Council