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California Hydrogen Business Council Comments on the IEPR Volume 1 Update – Transportation

January 20, 2021

I. Introduction

The California Hydrogen Business Council (CHBC)[1] supports the conclusions in the Draft 2020 Integrated Energy Policy Report (IEPR) Update, Volume I (Draft Report), and appreciates the opportunity to comment on the Draft Report. The CHBC agrees with the California Energy Commission (CEC) that hydrogen and fuel cell technology have an important role to play in decarbonizing and reducing harmful emissions from the transportation sector. We also agree that the cross-sector benefits of hydrogen extend well beyond transportation (i.e. power generation, long term energy storage, decarbonization of the gas grid and hard to decarbonize sectors of heavy industry). We concur that hydrogen stands to play an increasingly important role in developing a sustainable, zero emission, decarbonized economy in the years to come both here in California, United States, and across the globe. Finally, we agree with the recommendations made in the Draft Report with respect to hydrogen and fuel cell technology and submit the following comments, summarized below and elaborated on in the Comments section, to express our support and offer further refinement.

1. **The CHBC supports the state's efforts to achieve a zero-emissions transportation system that includes both hydrogen fuel cell electric and battery electric vehicles.**

2. **The CHBC supports the CEC's recommendation that California must do more to engage and understand the local mobility and clean transportation needs of low-income and disadvantaged communities throughout the state and tailor state programs to meet those needs. We believe California should pay particular attention in this effort by examining ways in which these communities can be well served by FCEVs and hydrogen refueling stations (HRS) that utilize existing**

[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. Members are listed here: www.californiahydrogen.org/aboutus/chbc-members/

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retail transportation refueling centers, provide convenient refueling access to residents that do not have garage parking, and offer the added range and faster refueling times associated with FCEVs.

3. **The CHBC supports continued state investment in ZEV infrastructure with a focus on leveraging "private investment" to achieve the goal of a self-sustaining (non-subsidized) market, which hydrogen refueling station (HRS) developers have demonstrated and opined can create a self-sustaining zero-emission market sooner, and more cost effectively than the current high-volume deployments of publicly funded EV charging stations. The CHBC encourages the CEC to work with our members and other industry partners to conduct further study to assess and quantify these benefits.**

4. **The CHBC supports the CEC's recommendation to continue investments in fuel cell electric vehicles (FCEVs), hydrogen refueling infrastructure, and green hydrogen production with increasing attention to the MHD (medium and heavy duty), and off-road sectors.**

5. **The CHBC supports the recommendation that the CEC should conduct further research into best practices for producing hydrogen in ways that reduce greenhouse gas emissions and integrate well with the operation of California's electricity and gas grids. Improved access to low-cost renewable power resulting from changes in electric market design to facilitate the production, storage and distribution of green electrolytic hydrogen across all sectors, not just transportation, will unlock many of the cross-sector benefits highlighted on this report.**

II. Comments

1. **The CHBC supports the state's efforts to achieve a zero-emissions transportation system that includes both fuel cell electric and battery electric vehicles.**

The CHBC agrees that transitioning to a ZEV future will improve public health, reduce transportation costs for Californians, expand economic development and create jobs. We agree that with the right planning and a state-wide strategy for a sustainable hydrogen economy, Californians can realize the benefits of clean renewable hydrogen in the transportation sector through a cleaner and more reliable

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power grid, a decarbonized gas system and in the state's heavy industries. Hydrogen uniquely can serve to decarbonize and reduce emissions across all these sectors of the economy and bring lower costs with economies of scale.

2. **The CHBC supports the CEC's recommendation that California must do more to engage and understand the local mobility and clean transportation needs of low-income and disadvantaged communities throughout the state and tailor state programs to meet those needs. We believe California should pay particular attention in this effort by examining ways in which these communities can be well served by FCEVs and hydrogen refueling stations (HRS) that utilize existing retail transportation refueling centers, provide convenient refueling access to residents that do not have garage parking, and offer the added range and faster refueling times associated with FCEVs.**

The CHBC supports California continuing to emphasize access to clean mobility options to ensure low-income and disadvantaged communities benefit from this transition. Understanding the local mobility options of disadvantaged communities is an important facet of such policy. To date, the state has largely focused on EV charging as the zero-emission solution to the light duty vehicle (LDV) transportation market. While battery electric vehicles (BEVs) contribute to the solution for light duty zero-emissions mobility, they will not serve the needs of all customers. FCEVs can be a better fit for consumers who cannot easily plug in at home, require longer range vehicles and / or who cannot accommodate long refueling periods. Understanding the characteristics of disadvantaged communities in these contexts is important and should be well understood. Further study of centralized, fast refueling at existing neighborhood locations that also provide other services and economic benefits to these communities should be performed in conjunction with stakeholders to better understand their needs.

3. **The CHBC supports continued state investment in ZEV infrastructure with a focus on leveraging "private investment" to achieve the goal of a self-sustaining (non-subsidized) market, which hydrogen refueling station (HRS) developers have demonstrated and opined can create a self-sustaining zero-emission market sooner, and more cost effectively than the current high-volume deployments of publicly funded EV charging stations. The CHBC encourages the CEC to**

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work with our members and other industry partners to conduct further study to assess and quantify these benefits.

In its 2019 Annual Hydrogen Evaluation, the California Air Resources Board (CARB) estimates that state aid to co-fund the light-duty retail hydrogen network to the point of self-sufficiency will be approximately 6%, with 94% of network investments will be covered by private industry.[2] Future self-sufficiency studies may provide added value in estimating investment needs for other vehicle classes as well as ZEV fuels. Further, in its 2020 update, CARB finds that the light-duty FCEV market may soon accelerate out of the earliest market development phase and that the shift to broader consumer adoption is tied to expanded and accelerated station network deployment[3]. The CHBC cannot overstate the importance of continued retail hydrogen refueling station (HRS) funding while leveraging private capital markets to provide confidence to both car manufacturers and customers in the stability of the FCEV market, which will be key to enabling FCEVs to play their important role in helping California meet its GHG and air quality goals for the transportation sector.

4. **The CHBC supports the CEC's recommendation to continue investments in fuel cell electric vehicles (FCEVs), hydrogen refueling infrastructure, and green hydrogen production with increasing attention to the MHD (medium and heavy duty), and off-road sectors.**

Assuming continued state investment with a focus to leverage private investment in light duty HRS, the CHBC agrees with the Draft Report's recommendation that the MHD on-road, transit and off-road market segments are particularly well suited for hydrogen and fuel cell technology. The energy density offered by using hydrogen and FCEV technology in these market segments provides added range and less costly on-board energy storage systems for energy intensive transportation modes. Given these properties, we agree with the CEC's recommendation that hydrogen fuel cell technology offers advantages over battery-electric technology.

The CEC also calls out the potential "stacking benefit" of enabling the production scale up of fuel cell stacks that can be used across a wide range of vehicle classes. This improves the cost of manufacturing

[2] 2019 Annual Evaluation of Fuel Cell Electric Vehicle Deployment & Hydrogen Fuel Station Network Development (ca.gov) pg. xvi
[3] 2020 Annual Evaluation of Fuel Cell Electric Vehicle Deployment & Hydrogen Fuel Station Network Development (ca.gov), pg. xiv

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and leads to a lower cost reduction trajectory for FCEVs. The example provided in the Draft report cites Toyota's HD Class 8 semitruck running in the Ports of Los Angeles and Long Beach using two fuel cell stacks also used to power the Toyota Mirai. The CHBC agrees that the use of the same or similar stacks across vehicle classes leverages economies of scale and will contribute to faster cost declines than would otherwise be expected. Another benefit of growing the MHD FCEV market segments (trucks and buses) is an accelerated demand for hydrogen, due to the higher usage of fuel due to more energy intensive operational cycles. This will consequently lead to a scale up of green hydrogen production capacity with a corresponding dispensed fuel cost improvement benefitting all FCEV classes using clean hydrogen fuel. We encourage the CEC to explore these benefits in more detail to better asses the learning curve and market potential of stacking FC technology.

5. **The CHBC supports the recommendation that the CEC should conduct further research into best practices for producing hydrogen in ways that reduce greenhouse gas emissions and integrate well with the operation of California's electricity and gas grids. Improved access to low-cost renewable power to facilitate the production, storage and distribution of green electrolytic hydrogen across all sectors, not just transportation, will unlock many of the cross-sector benefits highlighted on this report.**

The CHBC agrees with the Draft Report's call for the state to explore broad opportunities for hydrogen beyond transportation. Hydrogen and fuel cell technology can and should be used in a variety of applications to assist California is achieving its climate change and decarbonization goals. The Draft Report correctly explains that hydrogen can provide particularly important long-term and seasonal energy storage systems in an energy system increasingly reliant on variable renewable sources like solar and wind. The Draft Report also rightly points out that hydrogen can also help decarbonize especially hard to abate applications, such as the state's gas system, heavy industry, and heavy-duty freight transportation.

The CHBC would also point out that the production of hydrogen from renewable resources (i.e. wind and solar) is an important, if not key element in advancing the production of hydrogen as a clean energy carrier. Putting in place policies that enable the production of low-cost green electrolytic hydrogen will increase market scale and bring the benefits of hydrogen as a clean energy carrier to

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the state sooner rather than later. Under current market conditions, access to low-cost electricity to produce green hydrogen is challenging. The CHBC recommends CEC in partnership with the CPUC and CAL-ISO evaluate changes to current market structures, such as wholesale market access and/or specific utility rates that recognize the flexibility of electrolytic hydrogen production facilities, that will enable the production of lower cost green hydrogen while contributing to grid reliability and renewable integration. Examples of these contributions include electrolytic hydrogen production facilities' capabilities to provide demand response resource adequacy capacity; flexible and dispatchable operations that can be price responsive to absorb excess renewables during over-generation periods and curtailing during peak demand periods; and providing ancillary services to help maintain reliability on the grid. By recognizing and monetizing the value that these production facilities can provide to the grid, the state will encourage additional revenue streams for production facilities, which will reduce the delivered cost of hydrogen to more rapidly enable end-use cases such as transportation and back-up generation within the next few years, while paving a path towards other use cases such as long-term energy storage, wholesale power generation, and heavy industry. The CHBC agrees that integrating across sectors, including providing access to low-cost power for the production of green hydrogen, will greatly assist hydrogen to achieve economies of scale, lower costs for consumers and provide decarbonization benefits and air quality benefits to not only transportation but also other sectors of the state's economy. We encourage aggressive action by the CEC, and where applicable in conjunction with related state agencies, to implement enabling policies that will unlock cross sector benefits and help the state achieve its climate, air quality and clean energy goals.

III. Conclusion

The CHBC appreciates your consideration of these comments and looks forward to working with you on achieving California's ambitious zero emissions vehicle goals.

Regards,

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