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California Hydrogen Coalition SB 643 Comments

Additional submitted attachment is included below.

November 1, 2023

Re: SB 643 Staff Report

On behalf of the California Hydrogen Coalition, we thank the California Energy Commission (CEC) for the time and effort taken to develop the initial Senate Bill 643 (Archuleta, Chapter 646, Statutes 2021) Report. We look forward to continued development of an implementable strategy to deploy the necessary production and refueling infrastructure to support hydrogen end-uses across the energy, transportation, and off-road segments of California's decarbonizing economy. Hydrogen has the potential to increase the cost-effectiveness, productivity, reliability, and resiliency of California's key economic sectors by allowing a deeper penetration of renewable energy throughout the economy through the production, distribution and utilization of carbon free molecular energy that helps manage the intermittency of renewable electricity.

Refueling Infrastructure – *"…Skate to where the puck is going." Wayne Gretzky*

The ambition necessary to achieve the regulatory obligations in Advanced Clean Cars II, Innovative Clean Transit, Advanced Clean Trucks, and Advanced Clean Fleets requires a revolution of our current fossil-based transportation sector. Hydrogen and fuel cells provide a significant opportunity to decarbonize without disrupting consumer or commercial behavior. Currently, fuel-cell technology is outpacing the hydrogen refueling station (HRS) equipment in terms of reliability which is a limiting factor in the deployment of FCEVs. Despite these challenges, next generation equipment is being deployed which provides better reliability, capacity, and uptime than the first generation and pilot HRS that dominate California's HRS network today.

The SB 643 report identifies the significant ambition and binding regulatory action California has taken to decarbonize our transportation sector across all vehicle classes. The report describes several scenarios, which take different approaches providing a range of potential station numbers. The distinction between these reports is important to contextualize as the SB 643 report is intended to provide similar direction to CEC as the AB 2127 (Ting, Chapter 365, Statutes 2018) report to help determine the scale and pace of HRS buildout.

Market Segments

Within the on-road transportation sector there are only a few types of fueling stations that personal and commercial vehicles access for gasoline and diesel. To transition these segments of the market to zero-emission vehicles, replicating this experience will help increase the comfort of drivers and businesses. Vehicle weight classes dictate some of this behavior and is most easily segmented between light-duty and heavy-duty with distinct differences in not only the footprint, capacity, and location but also the flow rates which will necessitate a different hydrogen nozzle. Medium-duty, depending on vocation and use, will need to have a widespread refueling network as this vehicle class behaves much like the LD market. In most instances these vehicles are commuting and working in urban and suburban communities as a nature of the vocation of the owner or business.

The fact that California's largest population of medium duty (MD) vehicles (class 5 and below pickups and vans) utilize the light duty (LD) refueling infrastructure today indicates we can without regret focus on two sets of infrastructure. Publicly available retail stations that meet SAE J2601-1 Category D should become a requirement for unencumbered and returned AB 8 (Perea, Chapter 401, Statutes 2013) monies and AB 126 (Reyes, Chapter 319, Statutes 2023) funding going forward. This will provide OEMs who have announced the intent to bring MD fuel cell electric trucks and vans with the confidence that a HRS network that can serve their vehicles will be available for their customers. Additionally, this protocol will require a more robust station that provides reliability for Californians that want to adopt FCEVs for personal vehicles. It is not uncommon to see class 2b-5 pickups, motor trucks or vans refueling at retail refueling stations today so pairing the largest segment of MD with LD will ultimately help both segments grow while reducing the risk of California's investment in HRS.

Heavy duty (HD) and heavy MD that return to base often have private refueling behind the fence. In these early stages of transition as a principle, public funds should go to public stations. The SB 671 report distinctly looks at the goods movement needs and is a good model for that segment of the H/MD market. Furthermore, a different fueling protocol, SAE J2601-5, with a higher flow rate is expected by the end of the year, thus setting LD and MD apart from HD and heavy-MD. Publicly accessible HD depot stations with the appropriate footprint along goods movement corridors identified in the SB 671 report and ARCH$_2$ES will help with the early adoption of these larger trucks and ACF compliance.

We believe the concept of viable network that the California Transportation Commission (CTC) introduced in the SB 671 report should be explored for MD/LD retail stations and HD/MD depot stations We also recommend "connector" mixed used stations along our major transportation corridors to allow free movement regardless or vehicle weight class throughout the state.

Clean Hydrogen Production

The color wheel of hydrogen continues to expand but the Federal Government and hydrogen industry is largely focused on carbon intensity as the standard for hydrogen production. In California, there are multiple definitions in statute which should be simplified to two, renewable and clean, in similar fashion to the highline terms for the Renewable Portfolio Standard.

"[H]ydrogen derived from water using eligible renewable energy resources, as defined in Section 399.12 of the Public Utilities Code, or produced from these eligible renewable energy resources…" as described in Section 25664 of the Public Resource Code is a simple and elegant way to define renewable hydrogen. Additionally, adding the "renewable hydrogen" to the list of resources listed in Section 25741(a)(1) would provide the buttressed policy framework of California's Renewable Portfolio Standard to create consistency with one of California's landmark climate change policies. The "clean hydrogen" definition from Federal legislation will help ensure that we do not leave money on the table by excluding potential pathways or innovations that may help us achieve carbon neutrality.

Discussion Topics

- *What are some assumptions the CEC could use to inform refueling station requirements by 2030, 2035 and beyond? (Capacity of station, mixed-use concept, fuel delivery methods, etc.).*

Capacity – The scenario assumptions do not account for long lead time or capital costs so the network we build today needs to be suited for tomorrow. CARB has previewed adding HD Hydrogen Refueling

Credits based on a 6,000 kg capacity station. This is a reasonable minimum, but we expect developers to build larger stations as they gain experience with the market. Similarly, the pairing of MD with LD should focus on stations with a capacity greater than 1,000 kg that meet SAE J2601-1 Category D. Larger stations also provide a buffer for the network while we scale new hydrogen production.

Mixed-Use – We believe these stations are important along our freeway corridors. However, mixed use stations should not be the primary focus of CEC's grants as they tend to cost roughly the same as building a retail station and a depot station combined.

Fuel Delivery – The early station network was predominantly gaseous fuel provided by a single hydrogen producer. Since then, other producers have added gaseous capability to their traditionally liquid hydrogen focused facilities. ARCH$_2$ES focuses on liquid delivery but we should not exclude any delivery mechanism at this early stage in the market and allow developers to seek the most effective and efficient station designs.

Utilization – The CEC has adjusted their traditional 100% utilization rate down to 80%. We suggest looking at traditional fueling station utilization rates to determine what an equitable utilization rate is going forward. Based on NREL data provided in the 2022 IEPR, Direct Current Fast Chargers and Level 2 Chargers are utilized at less than 11%. There does appear to be an unrealistic expectation of HRS utilization when compared to charging and we would like to work with CEC staff to determine what a reasonable daily utilization rate should be as we grow the network capacity to support vehicle deliveries. Fundamentally, the network must outpace the vehicles to assure businesses and drivers that there are enough locations to meet their individual use cases.

- *What are the greatest challenges faced by infrastructure developers? How could they be addressed, within the next year, 5 years, 10 years?*

COVID-19, supply chain disruption, and inflation caused significant issues with GFO-19-602 station development that developers are still working their way out of. CEC's grant for in-state HRS equipment manufacturing should help. Interest rates have further compounded these conditions by making the cost of capital significantly more expensive.

Permitting – Station permitting has gotten better due to SB 1291 (Archuleta, Chapter 373, Statutes 2022), but the industry continues to encounter delays and opposition to new renewable and decarbonized hydrogen production projects. California lawmakers have made a concerted effort to move legislation to expedite permitting and judicial review of wind and solar projects but renewable hydrogen, along with other tools of carbon neutrality, like transmission and distribution lines, should likely receive similar expediting. The slow pace of permit approvals has delayed much needed renewable hydrogen supply to meet the pace and scale of the regulatory requirements in transportation and energy.

LCFS – CEC grants were adjusted down to reflect the benefits of CARB's LCFS capacity credits. Current LCFS prices are approximately 2-3 times less than 2 years ago. This has had a significant impact on the economics of station operations and the value of incentives for this nascent market.

Distribution – Unlike electricity, natural gas, and other fuels, the hydrogen distribution system needs planning and resources to scale. The merchant hydrogen market of traditional off takers is mature, but transportation and energy markets will require new infrastructure to ensure reliability of supply and

improve the supply chain. Planning, permitting, and scaling demand to build this distribution network is important.

Refueling Equipment – We believe the next generation of equipment and future iterations will meet the needs of the market, however, maintaining the current network has presented challenges. This is not unique to hydrogen refueling as the uptime of chargers is presenting a similar story. California needs to maintain its focus and push new equipment into the market that can resolve the reliability issues and displace the heavy demand for the oldest HRS in the network.

- *Do you have suggestions on how the CEC can provide relevant information and create an ongoing platform to help inform developers and fleet owners in their decision making?*

CARB similarly talks about infrastructure readiness for ACF which creates confusion between incentives for infrastructure and vehicles. To that end, CalSTA's SB 671 concept of a central delivery team could be very helpful in bridging the different programs to allow developers and fleets to work with a single entity.

Conclusion

While the CEC has identified the important investments of the State and Federal governments, the scale of these investments is still small compared to the annual and historic investments in other renewable and clean energy supported in California. While we have been working to decarbonize the grid through the Renewable Portfolio Standard for over 20 years and through energy efficiency for much longer, we cannot assume that deep decarbonization is a forgone conclusion. With almost 34,000,000 registered vehicles on our roads and waterways and a large segment of off-road mobile sources in need of decarbonization, our progress towards achieving carbon neutrality in our mobile sectors has barely begun.

We look forward to working with the CEC on future iterations of this report and to design funding opportunities that will attract investment to help achieve our statewide goals.

Sincerely,

/s/

Teresa Cooke
Executive Director
California Hydrogen Coalition