CALIFORNIA HYDROGEN BUSINESS COUNCIL

Hydrogen Means Business in California!

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Shirin Barfjani
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California Air Resources Board
1001 I Street
Sacramento, CA 95812-2815

July 27, 2018

RE: Innovative Clean Transit Regulation Concept

Dear Ms. Barfjani:

The CHBC[i] would like to express our support for the proposed ICT regulations. If enacted, we envision these regulations will provide our industry with clear opportunities for deployment of fuel cell electric buses (FCEBs), hydrogen fueling equipment & additional demand for hydrogen fueling. It will enable investments to meet market demand and reduce cost of zero-emission buses like FCEBs, for fleet operators.

Before providing additional detail, we'd like to elaborate that even today, FCEBs can replace 95% of the diesel fleet of a transit agency, as AC Transit's ZEB assessment from June 27 has shown[ii]. FCEBs have similar or better performance compared to diesel, long range, short refueling, and can and have been placed in operation for nearly a decade at AC Transit, SunLine Transit, and more recently OCTA.

Specifically, we would like to call out our support for several aspects of the proposed ICT Regulation proposal below:

1) The CHBC supports higher bonus credit given for FCEBs (compared to Battery Electric Buses, or BEBs) deployed before deadline, as this would recognize the higher initial cost to deploy fuel cell electric buses including hydrogen infrastructure. This would provide critical to support early adopters.

2) The CHBC also recommends preserving the restrictions on combustion vehicles from qualifying for ICT goals and encourages conversion of renewable liquid and gaseous hydrocarbon fuels to zero-emission hydrogen. Conversion to hydrogen eliminates emissions at the tailpipe and completely eliminates criteria air pollutant emissions, maximizing reduction in criteria pollutants in the neighborhoods served by transit buses.

3) Higher upfront cost for FCEBs allows for lower cost at larger scale at a later time. Overall, all zero-emission vehicles, including fuel cell electric buses, will continue to improve in performance and decrease in cost, especially with increasing adoption among transit agencies at larger scale. As their costs begin to approach low-emissions combustion vehicles', the cost for charging and fueling these vehicles will remain an obstacle, at least as

challenging as procuring and operating these vehicles, unless significant efforts are made now to nurture this infrastructure.

As many transit agencies are learning, all-electric vehicles can present infrastructure challenges when deployed at scale, whether their batteries are charged by the grid or refueled by hydrogen fuel cells. In the case of grid-charged battery electric vehicles, all of their motive power must come from the utility grid. As BEV fleet sizes increase, however, the power demand and charging time limitations increase the demand on the utility distribution grid, and can require costly transformer, feeder or even substation upgrades, and time intensive assessment, planning and installation.

The scale of this issue is deserving of its own careful planning. If grid-charging approaches are used exclusively for transportation electrification, and if full electrification of transportation is California's goal, it may require doubling the size of California's electrical energy generation.

Hydrogen-powered fleets, in contrast, can be expensive for small numbers of vehicles when there is not existing fueling infrastructure. However, as fleet sizes increase, the relative per-vehicle cost for hydrogen production and distribution rapidly decreases, particularly with centralized renewable hydrogen production. Gaseous or liquid fueling dispensers for large fleets can be installed in space-constrained facilities, without experiencing the costs and lengthy delays from engaging in public works outside of the transit agency. When deployed at scale, hydrogen infrastructure begins to resemble the liquid and gas fuel infrastructure that transit agencies have adapted to over the past several decades.

Unfortunately, the initial investments made by transit agencies to support their zero emissions fleets can be quite substantial, whether charging or hydrogen fueling, and reversing course should either technology fail to meet performance expectations could be very costly, and may endanger California's zero emissions efforts.

We, therefore, propose the following modifications to the proposed regulation to maximize the successful transition to zero emissions transit by 2040:

- Transit agencies (initially large ones) should be required to develop a ZEB plan, in which they assess and plan the build-out of utility generation, distribution and transmission infrastructure to suit the transit agency procurement plans, as submitted by the transit agencies for the 2020 deadline. These assessments would include consideration of ALL new transportation and industrial electrification efforts and their required generation and T&D capacities, quantifying the utility-related costs. An analysis of ratepayer cost should be included in the plan to provide cost transparency and resiliency impacts and costs must also be assessed.
- Equivalently, all hydrogen-powered vehicle procurement plans must show cost, time and environmental impact assessments for build-out of hydrogen production, distribution and dispensing.
- ARB should establish a deadline for the completion of these ZEB and fuel infrastructure plans in concert with procurement plans by 2023.

Thank you for your attention.

Emanuel Wagner
Deputy Director
California Hydrogen Business Council

[i] The CHBC is a California industry trade association with a mission 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 of the CHBC include Advanced Emission Control Solutions, Air Liquide Advanced Technologies U.S., Airthium, Alameda-Contra Costa Transit District (AC Transit), American Honda Motor Company, Anaerobe Systems, Arriba Energy, Ballard Power Systems, Bay Area Air Quality Management District, Beijing SinoHytec, Black & Veatch, BMW of North America, California Performance Engineering, Cambridge LCF Group, Center for Transportation and the Environment (CTE), CNG Cylinders International, Community Environmental Services, CP Industries, DasH2energy, Eco Energy International, ElDorado National – California, Energy Independence Now (EIN), EPC - Engineering, Procurement & Construction, Ergostech Renewal Energy Solution, EWII Fuel Cells, First Element Fuel, FuelCell Energy, GenCell, General Motors, Geoffrey Budd G&SB Consulting Ltd, Giner ELX, Gladstein, Neandross & Associates, Greenlight Innovation, GTA, H2B2, H2Safe, H2SG Energy Pte, H2Tech Systems, Hitachi Zosen Inova ETOGAS GmbH, HODPros, Hydrogenics, Hydrogenious Technologies, Hydrogen Law, HydrogenXT, HyET - Hydrogen Efficiency Technologies, Hyundai Motor Company, ITM Power, Ivys, Johnson Matthey Fuel Cells, Kontak, KORE Infrastructure, Life Cycle Associates, Linde North America, Longitude 122 West, Loop Energy, Luxfer/GTM Technologies, McPhy Energy, Millennium Reign Energy, Montreux Energy, National Renewable Energy Laboratory (NREL), Natural Gas Fueling Solutions – NGFS, Natural Hydrogen Energy, Nel Hydrogen, New Flyer of America, Next Hydrogen, Noyes Law Corporation, Nuvera Fuel Cells, Pacific Gas and Electric Company - PG&E, PDC Machines, Planet Hydrogen, Plug Power, Port of Long Beach, PowerHouse Energy, Powertech Labs, Primidea Building Solutions, Proton OnSite, RG Associates, Rio Hondo College, Rix Industries, Sacramento Municipal Utility District (SMUD), SAFCell, Schatz Energy Research Center (SERC), Sheldon Research and Consulting, Solar Wind Storage, South Coast Air Quality Management District, Southern California Gas Company, Sumitomo Corporation of Americas, Sunline Transit Agency, T2M Global, Tatsuno North America, The Leighty Foundation, TLM Petro Labor Force, Toyota Motor Sales, True Zero, United Hydrogen Group, US Hybrid, Verde, Vinjamuri Innovations, Volute, WireTough Cylinders, Zero Carbon Energy Solutions.

[ii] http://www.actransit.org/wp-content/uploads/board_memos/18-134%20ZEB%20Assessment.pdf