

June 28, 2018

Mary Nichols, Chair
California Air Resources Board
1001 "I" Street
Sacramento, CA 95814

Subject: Innovative Clean Transit Regulation

Dear Chair Nichols, Ms. Barfjani, and Members of the Air Resources Board:

Ballard Power Systems commends the California Air Resources Board (CARB) on its efforts for the Innovative Clean Transit (ICT) regulation, and for CARB's global leadership in air quality and zero-emissions transportation. Ballard has powered zero-emissions fuel cell buses in California for almost 20 years, supported significantly by the efforts of CARB. The proposed Innovative Clean Transit (ICT) regulation is a continuation of CARB's world-leading policy work. Your organization's openness to input from the public, transit agencies and industry is greatly appreciated.

We support the proposed ICT, and we propose adjustments to the proposed regulation to insure its success and smooth evolution. Zero emission vehicles will continue to improve in performance and decrease in cost. As their costs begin to approach low-emissions combustion vehicles, **the cost for charging and fueling these vehicles will remain as an obstacle** at least as challenging as procuring and operating these vehicles unless significant efforts are made now to nurture this infrastructure.

All electric vehicles present infrastructure challenges when deployed at scale, whether their batteries are charged by the grid or charged by hydrogen fuel cells. In the case of grid-charged battery electric vehicles, all of their motive power must come from the utility, unless the fleet operator also has the real estate and siting required for local PV or wind generation. For small fleet deployments, such as a transit agency's first ZEB fleet purchase, this can be a low cost option. As BEV fleet sizes increase, however, the power demand and charging time limitations increase the burden on the utility distribution grid, requiring costly transformer, feeder or even substation upgrades, and several years of assessment, planning and installation.

The scale of this issue should not be underestimated, and 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 will require **doubling** the size of California's electrical energy generation. This new generation must be from all renewable sources, with commensurate doubling of capacity for the transmission and distribution infrastructure in California's grid.

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:

ASSESS COSTS AND BENEFITS OF INFRASTRUCTURE ALTERNATIVES

- Maintain 2020 deadline for large transit agency procurement plans
- Work with the CPUC to ensure that cost, time and environmental impact assessments are completed for 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, designating ratepayer costs and utility investor costs. 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.
- Establish a deadline for these fuel infrastructure plans be finalized in concert with procurement plans by 2023.

REDUCE EMISSIONS FROM FUEL SOURCES AHEAD OF VEHICLE PROCUREMENT

- Prioritize carbon reduction of transportation fuel ahead of implementing the vehicles that use the fuel:
 - Set more aggressive targets for **renewable grid power for battery charging**, motivating power purchase agreements from renewable power and building new solar and wind generation.
 - Set more aggressive **renewable content targets for hydrogen fuel**, motivating electrolytic hydrogen production from dedicated PV and wind and from reformation of renewable natural gas and other renewable hydrocarbon streams.
- **Set a goal of 100% renewable content for ZEB charging power and hydrogen fuel by 2023.**

PRIORITIZE, MAINTAIN FLEXIBILITY, MAXIMIZE IMPACT

- **Prioritize initial ZEB transition funding to the largest transit agencies**, to expedite resolution of infrastructure issues, and to shield smaller agencies from the higher costs of low volume procurement.
- As suggested in the California Transit Associations alternative plan, **prioritize deployments in disadvantaged communities**, and set **statewide procurement targets** rather than per-agency percentages to allow maximum growth flexibility.
- Provide ZEB credit for zero-emission shuttle buses and cut-aways but do not count them in the total number of ZEB's required until multiple offerings are available which qualify for FTA funding (i.e. have passed Altoona testing.)
- Preserve the restriction on combustion vehicles from qualifying for ICT goals, and encourage conversion of renewable liquid and gaseous hydrocarbon fuels to hydrogen. Conversion to hydrogen eliminates emissions at the tailpipe and completely eliminates criteria air pollutant emissions, maximizing reduction in criterion pollutants in the neighborhoods served by transit buses.
- Support of CTA's proposed program monitoring plan, starting in 2023 and repeating every 2 years thereafter.

We believe that a well-reasoned and deliberate power infrastructure strategy can provide a strong foundation to build California's zero emission fleets upon, and that the voices of the transit agencies themselves must help lead this effort. This will require a truly historic coordinated effort between CARB, the CEC, the CPUC and all stakeholders in zero emissions transit. Ballard looks forward to providing support for this effort, and technology to drive it forward.

Sincerely,

Tim Sasseen
Business Development Manager, California
Ballard Power Systems