

**From:** Emanuel Wagner (Californiahydrogen.org)

**Sent:** Thursday, April 19, 2018 3:45 PM

**To:** 'Wade, Samuel@ARB' <[Samuel.Wade@arb.ca.gov](mailto:Samuel.Wade@arb.ca.gov)>

**Cc:** Jeff Serfass (Californiahydrogen.org) <[jserfass@californiahydrogen.org](mailto:jserfass@californiahydrogen.org)>; 'Jeffrey G. Reed' <[jgr@apep.uci.edu](mailto:jgr@apep.uci.edu)>; Lorraine Paskett <[lorrainepaskett@cambridgelcf.com](mailto:lorrainepaskett@cambridgelcf.com)>;

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**Subject:** CHBC Comments on LCFS on FCEB EER Calculations

Hi Sam,

Please find attached comments of the CHBC on the LCFS for ARB's consideration. Please let me know if I should submit these comments publically through the ARB website, and where to best do so.

Thank you for all your and your team's fantastic work, and your support for our technology!

Best,

**Emanuel Wagner**

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April 19, 2018

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**RE: CHBC Comments on the Proposed Amendments to the Low Carbon Fuel Standard Regulation and to the Regulation on Commercialization of Alternative Diesel Fuels**

Dear Mr. Wade,

The CHBC appreciates the great work of the Air Board’s (ARB’s) staff to continue to improve the Low Carbon Fuels Program (LCFS). The California Hydrogen Business Council (CHBC) would like to suggest a change to the LCFS Program to increase the adoption of renewable and zero carbon fuels like hydrogen to meet California’s climate and emission reduction goals.

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 CHBC recommends that ARB recognize a fuel cell battery hybrid electric bus (FCEB) as a battery electric bus (BEB) with the same EER value relative to diesel. FCEB propulsion is provided by an electric motor with energy coming from a battery, exactly like a BEB with the same efficiency. Therefore the EER should be calculated based on the bus energy consumption in kWh/mile like any other electric bus (using Altoona test data) and not based on hydrogen consumption.

The efficiency of the fuel cell module to convert hydrogen into electricity should be part of the electricity generation, transportation and charging efficiency.

The fuel cell module on board the bus is a battery charger; it should therefore be considered as an alternative way to charge batteries like on route opportunity charger or plug-in at a depot. Consequently, it should not be considered as part of the vehicle efficiency calculation but should be part of the charging system of the vehicle.

We appreciate your time and consideration of our comments, and are available to provide further detail, if requested.

Thank you.

Sincerely,



Emanuel Wagner

Assistant Director

California Hydrogen Business Council

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<sup>i</sup> 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.