

First Name: Phil  
Last Name: Birkhahn  
Email Address: pbirkhahn@outlook.com  
Affiliation: San Diego 350

Subject: FINISH CALTRANS RESEARCH Line-Haul and Passenger Trains

Comment: Public Meeting to Consider the Draft 2022 Climate Change Scoping Plan, June 23, 2022

June 23, 2022

by Phil Birkhahn, Co-Chair, Transportation Committee of San Diego 350

Change requested p. 58, "Freight and Passenger Rail, Line haul and passenger rail rely primarily on hydrogen fuel cell technology, and others primarily utilize electricity". CHANGE "Hydrogen" to "Battery electric or Hydrogen, depending on new analysis", not analysis done in 2016.

Change requested, Appendix C, p. 4, Table C-1, "Line haul and passenger rail rely primarily on hydrogen fuel cell technology, and others primarily utilize electricity". CHANGE "hydrogen" to "ZEV" in all four Scenarios.

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Someone sold CARB on hydrogen to power line-haul and passenger trains. So, CARB wrote hydrogen fuel-cell technology into its Draft 2022 Climate Change Scoping Plan. Once there it will be a coup for the vast hydrogen machine and very hard to get it out. The hydrogen salesman succeeded in closing CARB's mind to the better alternative of battery-powered line-haul and passenger trains.

What's going on here? Use of obsolete analysis of battery power by CARB. Probably a constant contact campaign by hydrogen advocates. Battery trains have no campaign, they rely on State engineers to get things right. Nowadays, does each technology require a multi-million-dollar public relations campaign and legislative strategy?

This comment is the fourth in my series of comments about Line-Haul and Passenger Trains in the Scoping Plan draft. The others are (Comment numbers to be added after final assignment by CARB):

BATTERY NOT HYDROGEN	Give Batteries a Fair Chance
OBSOLETE CARB ANALYSIS	Deeply Flawed Analysis Perpetuated
EUROTRAINS NOT RELEVANT	CARB Misinterprets the Use Profile of Battery Trains in Europe

Please refer to them if you have questions and send me your comments and any additional information you believe should be considered. Contact me for a consolidated version in PDF format if you like: it includes copies of most references.

Up to September of last year, Caltrans had a research program whose scope is to fairly assess battery and hydrogen powered trains and buses.

Caltrans Division of Research, Innovation and System Information, September 2021, Fuel Cell Electric Bus, Battery Electric Bus, and BATTERY ELECTRIC TRAIN Infrastructure: ZEV Center of Excellence Task 3299.

Oddly, they report no information about battery electric trains, although it is in the title. Instead, they are studying hydrogen trains, not in the title, in a pilot project.

An interim report was published:

Caltrans Research Report, May 2021, Fuel Cell Electric Bus, Battery Electric Bus, and Battery Electric Train Infrastructure, by Peter Benoliel, Ph.D. Candidate, Plug-in Hybrid & Electric Vehicle Research Center, Institute of Transportation Studies, University of California, Davis and Gil Tal, Director, Plug-in Hybrid & Electric Vehicle Research Center, Institute of Transportation Studies, University of California, Davis, p. 14, Zero-Emission Multiple Units.

At the time of the report, they had a pilot project in progress in San Bernardino to run a hydrogen fuel-cell multiple unit. They have no comparable pilot for battery-powered multiple-units or trains with a single locomotive. Those pilots must be completed before endorsement by CARB of any technology.

In other words, finish the Caltrans research with pilots of Battery Electric Trains.

Zero Emission Heavy Transportation (ZEHTRANS) also went astray. ZEHTRANS is a joint effort by state agencies including CARB, Caltrans, California Energy Commission and Go Biz, which has produced several slide shows about their decision process. Sadly, they offer no new information beyond CARB work in 2016 and shallow interpretation of specifications for battery and hydrogen powered trains offered in Europe. Please refer to my other official comments listed above for evaluation of the basis for ZEHTRANS presentations.

Vehicle specifications list range of the vehicle, and battery powered trains appear to come up short. That is only because such trains with their small batteries are for tracks with overhead electric cables alternating with unelectrified routes. The trains charge while running under cables and use the energy for unelectrified stretches.

Battery electric trains will have very long range once new designs with the skateboard battery layout of electric cars comes into use in railcars. Separately, other researchers at Lawrence Berkley National Laboratory and UC Berkley and Los Angeles took an analytical approach. They found long-range available with existing components, no waiting for the skateboard! For details, refer to my other comments.