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Subject: EUROTAINS NOT RELEVANT: Line-Haul and Passenger Trains

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

June 21, 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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CARB and other agencies misinterpreted light and medium rail service in Europe when they concluded that hydrogen trains can go farther in our regional service than battery-powered trains. Europe's hydrogen trains are DESIGNED to go farther. They are for routes that are not, or mostly not, electrified.

With some redesign, battery electric trains could incorporate the skateboard design of batteries under the full length of floor. As is standard for most electric vehicles. Hundreds and hundreds of miles of battery range without recharging would be achieved. Healthy competition between hydrogen and battery trains would result.

In Europe, many passenger routes are not electrified but incorporate several sections of fully electrified track used by electrified routes. Routes that alternate electrified and non-electrified are now served with diesel multi-units. The battery trains on offer so far are intended to replace the diesel units by taking advantage of the charging opportunity to be ready for the next track section that is not electrified.

The minimal battery capacity is intended to charge and discharge many times per day. If the battery provides 60 miles of range, it must cycle a minimum of 10 times per day to match a 600-mile range hydrogen train.

The battery cited for one train is lithium titanate, which is like a hybrid car battery that charges and discharges many times each day, year after year. The downside is that it is nearly twice as heavy as batteries in electric cars for the same capacity. LFP batteries might be a better option.

California tracks are not electrified, so the train to take out of Europe at first appears to be the hydrogen train. If CARB had dug deeper, they would have found that our freight and passenger service can probably be served just as well by battery trains. It's just a road not taken by Europe.

Luckily, all California commuter and regional rail uses single diesel-electric locomotives pulling six passenger cars, plus or minus. They all can be retrofitted by simply adding a boxcar of batteries instead of waiting for passenger coaches to be redesigned. The boxcar also would have power conditioning electronics to serve the exact power requirement of the electric locomotives.

Deploying battery electric trains in California would be substantially cheaper than hydrogen trains, so we could do more sooner to reduce GHG emissions.

After a respectful interval the diesel engines could be removed, or downsized. Then the saved weight capacity could be filled with yet more batteries!

Let's go. Full speed ahead with battery electric commuter and regional rail!