February 26, 2024

The Honorable Janet Yellen
Secretary of the Treasury
U.S. Department of the Treasury
1500 Pennsylvania Avenue NW
Washington, DC 20220

Subject: Support for the US Department of the Treasury's proposed guidelines for hydrogen production tax credits (45V)

Dear Secretary Yellen,

Californias for Electric Rail writes in support of proposed guidelines for 45V tax credits for hydrogen production. Guidelines must require additionality, geographic deliverability, and time matching for clean energy procurement and consider both direct and indirect emissions. These three pillars are necessary to ensure that growth in hydrogen production actually results in emissions reductions.

In California, transit agencies have increasingly pursued hydrogen powered vehicles, driven in part by federal investment increasing interest in hydrogen fuel and often paid for using green energy funds. It is imperative that these expensive investments in zero emission technology actually reduce emissions compared to the status quo, particularly given the vehicle miles traveled-inducing potential of switching to less reliable new technology. For example, Sunline Transit in Riverside County has seen a 20% reduction in bus service[1] due to mechanical issues with hydrogen powered buses. Reduced or unreliable transit service can induce more driving, increasing CO_2 emissions, so new zero emissions transit vehicles must be truly zero emission to produce emissions reductions.

Hydrogen production via electrolysis is currently not very efficient. In transportation, for instance, hydrogen vehicles have a well to wheel efficiency 3x lower than wired electric systems (e.g. overhead catenary for trains and buses)[2]. Hydrogen produced from electrolysis using electricity derived from fossil fuels can have up to 5x the CO2 emission intensity of hydrogen from steam methane reformation[3]. Without requirements that hydrogen production be tied to new renewable energy in space and time, hydrogen produced from grid electricity could prolong the life of natural gas plants. A recent study shows

[1] Paul Albani-Burgio, "For Months, Bus Fueling Problems Have Left SunLine Routes Cancelled and Riders Waiting," The Desert Sun, November 3, 2023, https://www.desertsun.com/story/news/local/2023/11/03/why-bus-routes-around-palm-springs-have-been-cancelled-for-months/71442818007/.
[2] Reinhard Christeller, "Hydrogen - but Not in Transport," *Urban Transport Magazine*, June 28, 2023, https://www.urban-transport-magazine.com/en/hydrogen-but-not-in-transport/.
[3] Dan Esposito, Eric Gimon, and Mike O'Boyle, "Smart Design of 45V Hydrogen Production Tax Credit Will Reduce Emissions and Grow the Industry" (Energy Innovation, April 2023), https://energyinnovation.org/wp-content/uploads/2023/04/Smart-Design-Of-45V-Hydrogen-Production-Tax-Credit-Will-Reduce-Emissions-And-Grow-The-Industry.pdf.

that, without additionality and considering indirect effects, electrolytic hydrogen powered buses could have similar or higher global warming potential to diesel buses.[4]

Green hydrogen is important to the climate transition, but it is not so vital that emissions reductions should be sacrificed to develop the industry. In transportation, the largest source of greenhouse gases in the United States[5], hydrogen is not necessary for emissions reduction as other viable technologies exist. Electrified rail with overhead catenary wire, which is zero emission at point of source and can be sourced from 100% renewable electricity, is a mature technology that has existed for decades. China, Japan, France, and Italy have the majority of their nation's rail electrified, while India is on track to electrify 100% of its network by the end of the year, having already electrified over 67,547 mi of tracks[6]. Wired electric rail is also used extensively in the Northeast Corridor of the United States, and is continuing to grow, with Caltrain's new electrified service set to open at the end of 2024. In contrast, hydrogen rail is much less developed, having yet to carry passengers in North America, and German experiments in hydrogen rail systems have found them to have sub-par cost and performance relative to electric trains.[7] Wired electric freight trains are widely used for long-haul transport of freight over land; for instance, the electrified 5,758 mile Trans-Siberian Railway in Russia transports 144 million tons of freight annually.[8] Additionally, the state of California has over 750,000 electric cars on the road, compared to less than 12,000 hydrogen fuel cell cars,[9] and this number will likely grow as charging networks improve and more models become available. While hydrogen may be necessary for some transportation sectors that currently lack mature zero-emissions alternatives such as shipping, the majority of transport emissions, from cars, trucks, and rail, can be eliminated without hydrogen using existing technology.

Please continue to prioritize emissions reductions in your guidelines for 45V hydrogen tax credits, and ensure that additionality, geographic deliverability, and time matching as well as indirect effects remain in the guidelines for clean hydrogen.

Sincerely,

Adriana Rizzo

Californians for Electric Rail

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[4] Tianyi Sun et al., "Climate Impacts of Hydrogen and Methane Emissions Can Considerably Reduce the Climate Benefits across Key Hydrogen Use Cases and Time Scales," *Environmental Science & Technology*, February 21, 2024, https://doi.org/10.1021/acs.est.3c09030.

[5] Ben King, Michael Gaffney, and Alfredo Rivera, "Preliminary US Greenhouse Gas Emissions Estimates for 2023," *Rhodium Group* (blog), January 10, 2024, https://rhg.com/research/us-greenhouse-gas-emissions-2023/.

[6] Nick Ferris, "How India Made 45% of Its Rail Network Electric in Just Five Years," *Energy Monitor*, February 2, 2024, https://www.energymonitor.ai/tech/electrification/how-india-made-45-of-its-railway-network-electric-in-just-five-years/.

[7] Ananya Bhattacharya, "The Dream of the First Hydrogen Rail Network Has Died a Quick Death," Quartz, August 7, 2023, https://qz.com/the-dream-of-the-first-hydrogen-rail-network-has-died-a-1850712386.

[8] Oleksander Baktrak, "Carrying Capacity of BAM and Transsib Reached 144 Million Tons," *Railway Supply* (blog), March 10, 2021, https://www.railway.supply/en/carrying-capacity-of-bam-and-transsib-reached-144-million-tons/.

[9] California Energy Commission, "Light-Duty Vehicle Population in California," California Energy Commission (California Energy Commission), accessed February 26, 2024, https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics/light-duty-vehicle.