DOCKETED	
Docket Number:	22-ALT-01
Project Title:	2022-2023 Investment Plan Update for the Clean Transportation Program
TN #:	242894
Document Title:	Sierra Club California - Comments on Clean Transportation Investment Plan
Description:	N/A
Filer:	System
Organization:	Sierra Club of California
Submitter Role:	Public
Submission Date:	4/29/2022 2:18:02 PM
Docketed Date:	4/29/2022

Comment Received From: Katherine Garcia
Submitted On: 4/29/2022
Docket Number: 22-ALT-01

Sierra Club California Comments on Clean Transportation Investment Plan

Additional submitted attachment is included below.

April 29, 2022

Docket: 22-ALT-01
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

RE: Sierra Club California Comments on the 2022-2023 Investment Plan Update for the Clean Transportation Program

Dear Commissioners and Staff:

On behalf of Sierra Club California and its members and supporters in California, I appreciate the opportunity to provide comments on the California Energy Commission's (CEC) 2022-2023 Investment Plan Update for the Clean Transportation Program.

Thank you for your work to advance clean transportation in California and for creating a template for the rest of the country. We are submitting the following comments to ensure that the Clean Transportation Program prioritizes investments that help all Californians breathe cleaner air and live in a more sustainable environment.

I. Light-duty vehicle deployment projections and charging infrastructure goals.

We recommend that the CEC use a forecast of 3 million light-duty vehicles for 2025 (instead of 1.5 million), a forecast of 406,000 chargers needed to support those (instead of 250,000) and adjust the Investment Plan to support the additional 156,000 chargers by 2025 beginning in 2023.

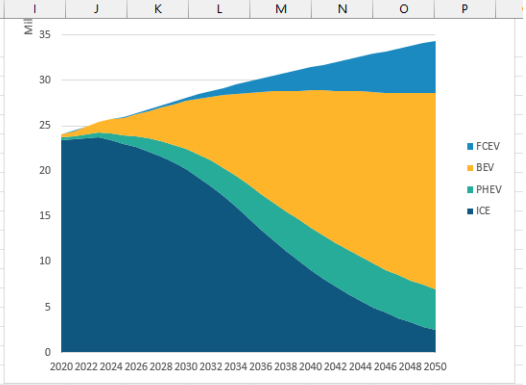
The CECs AB 2127 report references an electric vehicle service equipment (EVSE) goal of 250,000 chargers including 10,000 direct current fast chargers (DCFCs) that needs to be reached by 2025. These assumptions are also included in the 2022-2023 Investment Plan report. This goal was part of Governor Brown's B-48-18 EO (2018) intended to support a target of 1.5 million LD EVs on the road by 2025. Since then, Governor Newsom's N-79-20 EO (2020) supersedes that target and it states, "The Energy Commission, in consultation with the State Air Resources Board and the Public Utilities Commission, *shall update the biennial statewide assessment of zero-emission vehicle infrastructure required by Assembly Bill 2127 to support the levels of electric vehicle adoption required by this Order*." [*Emphasis added*]

(Further, AB 2127 states that, "25229. (a) The commission, working with the State Air Resources Board and the Public Utilities Commission, shall prepare a statewide assessment of the electric vehicle charging infrastructure needed to support the levels of electric vehicle adoption required for the state to meet its goals of putting at least five million zero-emission vehicles on California roads by 2030, and of reducing GHG emissions to 40 percent below 1990 levels by 2030." So AB 2127 doesn't require 5 million vehicles by 2030 it only requires **at least** 5 million and this law does not constrain the CEC from setting higher levels of projected vehicles or higher numbers of chargers to meet this need and in fact the higher numbers are now necessary to meet the goals in Governor Newsom's N-79-20 EO.)

CARB's recently approved Mobile Source Strategy (MSS) estimates that we must deploy 3 million light-duty EVs by 2025 (see Exhibit 1) and 8 million by 2030 to come close to achieving the Governor's goal of 100% zero-emission light-duty vehicle sales by 2035. (Actually, even these estimates would still only result in 85% of LD passenger cars being ZEVs and PHEVs by 2045.)

Exhibit 1 – CARB's Mobile Source Strategy – Light Duty Vehicle Population by Fuel Type 2-11-21

Row Labels	ICE	PHEV	BEV	FCEV	Grand Total	Tota PHEV, Bev & FCEV	Delta Y 2 Y
2020	23,450,335	250,524	393,403	8,009	24,102,271	651,936	
2021	23,518,714	329,121	564,734	13,941	24,426,510	907,796	255,860
2022	23,617,933	443,359	809,490	24,352	24,895,133	1,277,200	369,404
2023	23,686,371	590,993	1,128,984	40,575	25,446,922	1,760,552	483,352
2024	23,432,400	761,836	1,508,573	63,317	25,766,126	2,333,726	573,174
2025	22,994,584	953,419	1,947,604	93,726	25,989,332	2,994,748	661,022
2026	22,621,303	1,173,434	2,466,828	134,094	26,395,658		
2027	22,166,314	1,414,566	3,057,035	185,483	26,823,397		
2028	21,625,739	1,675,079	3,720,271	249,571	27,270,659		
2029	20,971,899	1,950,694	4,453,231	327,768	27,703,592		
2030	20,217,217	2,239,547	5,257,270	421,803	28,135,837		
2031	19,315,325	2,531,155	6,114,608	534,737	28,495,825		
2032	18,316,989	2,826,987	7,033,346	669,735	28,847,058		
2033	17,227,855	3,123,910	8,011,687	829,048	29,192,501		
2034	16,047,188	3,418,750	9,047,061	1,014,869	29,527,868		
2035	14,780,775	3,708,143	10,136,519	1,229,450	29,854,887		
2036	13,543,106	3,968,731	11,204,315	1,461,134	30,177,287		



Further, there is a disconnect in how the CEC is presenting this information. According to CARB's MSS, we expect that there will be 8 million LD EVs in the state by 2030, which will require 1.2 million chargers. Alternatively, when the CEC references the 2025 requirements, it references 1.5 million vehicles (and 250,000 chargers) from Gov. Brown's Executive Order rather than 3 million from the MSS. The CEC should be referencing both numbers consistently from CARB's MSS.

Table C-3 from the CEC's AB 2127 report (Exhibit 2 shown below) shows that in order to support the 3 million ZEVs on the roads in 2025, there will need to be between 378,306 and 433,062 or an average of about 406,000 chargers. This is 156,000 more chargers than the 250,000 currently being planned for 2025. Without sufficient charging infrastructure in place by 2025 it will not meet the needs by then and it will be very difficult to achieve 1.2 million by 2030. Further, the exhibit below forecasts a need of about 323,000 chargers needed by 2023.

Exhibit 2 – Table C-3 from the appendix in the AB 2127 report.

Table C-3: Annual Statewide EVI-Pro 2 Results for the IEPR Aggressive Forecast (5 Million ZEVs by 2030)

Year	MUDs (Level 1+2)		Work (Level 2)		Public (Level 2)		Public (DCFC)		Total Chargers	
	Low	High	Low	High	Low	High	Low	High	Low	High
2020	64,243	96,056	31,087	31,878	59,499	60,711	3,723	3,850	158,551	192,494
2021	71,891	106,419	44,065	45,141	81,442	83,065	5,297	5,467	202,694	240,092
2022	80,897	119,894	57,110	58,375	101,253	103,165	6,476	6,675	245,735	288,109
2023	87,778	130,166	75,263	76,796	128,814	131,127	7,943	8,177	299,798	346,266
2024	93,696	139,017	90,588	92,343	152,421	155,078	7,767	7,997	344,471	394,434
2025	102,554	152,280	102,022	103,950	164,356	167,190	9,374	9,642	378,306	433,062
2026	117,978	175,244	117,504	119,660	186,487	189,639	10,461	10,754	432,430	495,297
2027	133,257	197,996	136,052	138,478	211,393	214,907	12,565	12,908	493,267	564,288
2028	148,610	220,869	152,316	154,980	233,521	237,353	14,441	14,828	548,888	628,031
2029	164,107	243,960	172,689	175,649	260,197	264,419	16,416	16,849	613,409	700,876
2030	179,973	267,620	186,403	189,564	275,613	280,059	17,476	17,934	659,464	755,177

Source: CEC and National Renewable Energy Laboratory

1.5 million EVs by 2025 is now an unrealistically and severely low estimate considering actual EV growth in the state. According to the CEC's Dashboard for Vehicles and EVSE[1], as of the end of 2021, the state reached cumulative sales of 1,054,095 ZEVs. In 2021, we added 250,279 ZEVs, a 72% increase of 105,180 over 2020's 145,099 ZEVs for the year. Market share increased dramatically from 7.9 % in 2020 to 12.4% in 2021.[2] And now at the end of Q1, 2022, the CEC is reporting 81,289 or 16.32% ZEV market share.

Rapid increases in LD ZEV adoption are also occurring globally, in Europe and domestically. Battery electric vehicles plus plug-in hybrids claimed about 9% of the global new-car market, up from 4.1% in 2020 and 2.5% in 2019, according to the IEA.

In Europe, more than 2 million plug-in vehicles were sold in 2021, with the 2021 PEV market share ending at 19%. "This is a significant departure from the 11% of 2020, and a far cry from the 3.6% of 2019".[3] In December 2021, plug-ins were 90% of the market share in Norway.[4]

In the US, plug-in vehicles market share increased from 1.4% in 2019 to 1.8% in 2020 to 4.8% in 2021.[5]

In summary, the rate of growth globally, in Europe, domestically and in California are all increasing at

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[1] https://tableau.cnra.ca.gov/t/CNRA_CEC/views/DMVDataPortal_15986380698710/SALES_Dashboard?%3AshowAppBanner=false&%3Adisplay_count=n&%3AshowVizHome=n&%3Aorigin=viz_share_link&%3AisGuestRedirectFromVizportal=y&%3Aembed=y

[2] Q4_market-share_v2-1.pdf (veloz.org)

[3] https://cleantechnica.com/2022/01/30/29-of-cars-sold-in-europe-were-plugin-electric-vehicles-in-december/

[4] Norway Sets Plug-In Car Sales Record For The End Of The Year 2021 (insideevs.com)

[5] US: Plug-in Cars Sales Approached 5% Market Share (Q4 2021) (insideevs.com)

very high rates – at least 50% year over year. We can expect California's rate of ZEV adoption and market share to also continue to grow significantly.

We strongly recommend that the CEC use CARB's MSS projected 3 million EVs as the assumption for 2025 and that it use the 400,000 chargers as listed in the CEC's AB 2127 report needed for this level of BEVs. We recommend that these assumptions be updated in the draft 2022-2023 Investment Plan Update for the Clean Transportation Program report and that the CEC look at how to adjust funding to better meet this need based on these updated assumptions.

Failure to realistically estimate ZEV populations by 2025 and the resulting significant underbuilding of EVSE could have a catastrophic impact on ZEV adoption and could fuel fears of EVSE insufficiency slowing down EV adoption for many years to come. However, taking these corrective actions now could support California's leading the nation in how to successfully plan for and implement charging infrastructure to support the rapidly growing EV populations.

II. Medium and heavy-duty vehicle corridor charging infrastructure.

We recommend that the CEC prepare a statewide map and plan showing approximately where there needs to be charging plazas along major and secondary corridors to support the parking, dwell time and high-power charging needs of MHD trucks. This could then serve as a template for which projects will gain public funding to build and operate these for example through the EnergIIZE program as well as where private EVSPs should build this infrastructure. This plan should take into account all sources of funding including Federal funding from the Investment and Infrastructure Jobs Act's charging infrastructure funds.

III. Hydrogen Refueling.

a. **We recommend that the CEC, working in conjunction with CARB, should update the regulations that set the minimum renewable content for hydrogen used for transportation fuel from 40% to a level similar to that for electricity to 100% by no later than 2035 and with annual interim targets beginning in 2024**.

   While both BEVs and FCEVs are zero emission vehicles at the tailpipe, the well to tank renewable content of these fuels can have a significant impact on how truly green these vehicles are on a well to wheels basis. Please see "Hydrogen: Future of Clean Energy or a False Solution?" [6] We know that the electricity grid is on a trajectory to achieve 100% renewable generation by no later than 2045 with an interim target of 60% renewables by 2030. California's zero GHG generation could easily exceed 80% in 2030 when factoring in hydropower (10%) and displaced utility generation due to behind-the-meter solar PV systems (10%+). Further, in a letter to CARB dated July 9, 2021, the Governor stated "Today, I am requesting that the Air Resources Board evaluate how to achieve carbon neutrality no later than 2035 as part of its 2022 Climate Change Scoping Plan. …This work can identify a

[6] Sierra Club blog: Hydrogen: Future of Clean Energy or a False Solution? https://www.sierraclub.org/articles/2022/01/hydrogen-future-clean-energy-or-false-solution

pathway for achieving carbon neutrality a full decade earlier than the existing target of 2045, which is also being assessed in the Scoping Plan."

For hydrogen, SB 1505 (Lowenthal, 2006) requires that "…on a statewide basis, no less than 33.3 percent of the hydrogen produced for, or dispensed by, fueling stations that receive state funds be made from eligible renewable energy resources…" Hydrogen produced by renewables is known as "green hydrogen." Recently a new requirement was implemented calling for new hydrogen fueling stations to only dispense fuel with at least a 40% renewable content. Beyond SB 1505 and this update, no requirement exists for the amount of green hydrogen to increase over time like there is for electricity.

CARB has the authority and responsibility to increase this requirement. "It is further the intent of the Legislature that the state board consider including in a future revision of the California Hydrogen Highway Blueprint Plan a study to determine the necessary steps to maximize the production of hydrogen fuel made from eligible renewable resources."

"The state board, in consultation with other relevant agencies as appropriate, shall review the renewable resource requirements…) every four years and shall increase the renewable resource percentage requirements if it determines that it is technologically feasible to do so and will not substantially hinder the development of hydrogen as a transportation fuel in a manner that is consistent with this section."

We recognize there are some industry efforts to increase green hydrogen production, but California lacks needed upgraded regulatory requirements. Since California is investing millions of dollars in hydrogen fueling stations, CARB must require an increasing amount of renewable content in hydrogen fuel, ultimately rising to 100% green hydrogen to achieve the GHG and criteria pollution emissions reductions on its substantial investment that it should receive.

It should be noted that there are available funds available to California from the Fueling Infrastructure portion of the Federal Investment in Infrastructure and Jobs ACT requiring green hydrogen. Our requirements should be made more stringent while taking into consideration what will be required to be to eligible for these federal funds.

We recommend that the CEC work with CARB to have them set new increasing green hydrogen content standards that match those required for electricity with an interim required target by 2030. To arrive at this target, they should include consideration for the 60% RPS requirement from SB 350 2015, + the projected amount of generation from carbon free hydro power + the projected amount of behind the meter renewable generation that is not otherwise included in the RPS by 2030. We believe that having a regulatory requirement that sets a trajectory for increasing the renewable content of hydrogen fuel should be a requirement before further long-term investment in hydrogen fueling infrastructure. CARB should seek to monitor and appropriately regulate the transportation and distribution of hydrogen fuel to minimize emissions throughout the supply chain. Finally, we recommend that the CEC include a plan to accomplish these objectives in its next IEPR report and Annual Evaluation of Fuel Cell Electric Vehicle Deployment & Hydrogen Fuel Station Network Development report.

b. We recommend that the CEC complete a comprehensive from the ground up reassessment of the State's investment in hydrogen fueling infrastructure to ensure that the state is realizing a reasonable reduction in emissions per amount invested. And that for all the funding invested, they are directed towards the applications that have the best business case and will result in the greatest emissions reductions.

The CEC should undertake a new project to reassess its overall strategy on FCEVs for light duty and MHD transportation in order to adjust its funding plan in terms of volume and distribution to ensure that the state is making the best use of its limited resources to promote zero emission transportation.

An article entitled "New study finds hydrogen unlikely to play major role in road transport, even for heavy trucks."[7] notes that "at the beginning of 2021, there were about 25,000 hydrogen fuel-cell cars on the road [globally], two FCEV models available to purchase (the Toyota Mirai and Hyundai Nexo), and about 540 hydrogen filling stations in operation around the world. "In contrast, by the beginning of 2022, there are likely to be about 15 million battery-electric and plug-in hybrid vehicles on the road across the world. Almost all manufacturers now sell such vehicles, with more than 350 models available globally.

"Hydrogen will play a vital role in industry, shipping and synthetic aviation fuels. But for road transport, we cannot wait for hydrogen technology to catch up, and our focus now should be on battery-electric vehicles in both passenger and freight transport," writes Dr. Patrick Plötz, of the Fraunhofer Institute for Systems and Innovation Research (ISI). "The window of opportunity to establish a relevant market share for hydrogen cars is as good as closed."

Recent technological developments have eliminated the main arguments in favor of FCEVs—longer range and shorter refueling times. "When battery-electric vehicles had limited ranges of under 150 km, and charging took a few hours, there was an important and large market segment for fuel cell vehicles: long-distance travel," says Dr. Plötz. "But battery-electric vehicles now offer about 400 km real-world range, and the newest generation uses 800 V batteries, which can be charged for a range of 200 km in about 15 minutes."

The CEC would be wise to reassess its strategy in light of this reality. Several parties who provided comments at a recent workshop on possible fueling infrastructure funding concepts suggested that the CEC's funding distribution should change from the current 30% for hydrogen fueling compared to 70% electrical fueling to change to 50/50. We strongly oppose that recommendation.

One party suggested that available CEC funds for hydrogen fueling should be shifted to focus on fueling for MHD FCEVs where the most interest and best business case is. We believe that

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[7] Charged EVs. New study finds hydrogen "unlikely to play major role in road transport, even for heavy trucks" https://chargedevs.com/newswire/new-study-finds-hydrogen-unlikely-to-play-major-role-in-road-transport-even-for-heavy-trucks

would be a better use of the CEC's funds available for hydrogen fueling. We would recommend that the CEC focus on siting new hydrogen fueling stations such that they would create a statewide network to meet the needs of MHD FCEVs. But again, in light of essentially very low market uptake of FCEV light duty vehicles, the CEC should re-evaluate its strategy on investing funds in siting infrastructure for this sector. Some of these funds might also be put to better use for Multi-Unit Dwelling EVSE implementations where there is a great need and insufficient funds.

Where it is appropriate to continue investing in hydrogen fueling infrastructure, we recommend that the CEC consider also funding on-site electrolyzer generation for 100% renewable fuel generation where feasible and to eliminate GHG emissions that may otherwise be produced in transporting the hydrogen fuel from the production site to the fueling station.

We believe that the state may be overbuilding hydrogen fueling infrastructure and not making efficient or wise use of all these public funds.

According to the 2022-2023 Investment report, "The CEC projects that these 200 stations will have the capability to support to refuel about 290,000 fuel cell electric vehicles (FCEVs). The current fuel cell vehicle population was approximately 7,129 in 2021. The auto industry estimates that the population could increase to 61,100 by the end of 2027. Station capacity is not expected to be a barrier to near- term deployment."

The auto industry forecasts for fuel cell vehicle growth may well be very optimistic given past trends. Given a choice to buy an electric vehicle there are no significant advantages for hydrogen fueled vehicles compared with the paucity or reliability of hydrogen fueling stations even when the publicly funded 200 stations are completed.

To illustrate the enormously expensive cost of hydrogen fueling stations per user vehicle consider the following.

- Electric Chargers - The CEC has invested $254.51 million in 15,154 public chargers now supporting over 1,050,000 plug-in electric vehicles or a cost per charger of $24/ EV.

- FCEV Hydrogen Fueling stations - The state has spent $166 million on hydrogen fuel cell fueling stations or $2,329 / fuel cell EV or nearly 100 times the investment compared with plug-in electric vehicles.

- "With the addition of stations from GFO-19-602, the state anticipates having hydrogen refueling capability to serve up to 290,000 light-duty FCEVs, *which is more than four times the project demand for 2027.* [Emphasis added]"

- We believe that the state is overbuilding hydrogen fueling stations.

- We can also calculate the cost with the projected 61,000 FCEVs by 2027. At $20 million /year of additional investment, that would make a total investment of $266

million by then. So the cost / FCEV (61,000) would be $435 / FCEV or 17 times the cost for a plug-in electric vehicle.

We also believe that meeting the charging needs of plug-in electric vehicles has leveraged much more private capital to fund the development of publicly available and private chargers than is proportionately the case for Hydrogen Fueling stations. This is most likely due to the risk of underutilization and economic failure by potential commercial developers.

We recommend that the CEC (or CARB) also calculate the mmt/CO2 per dollar of public investments in EV charging infrastructure compared to a similar calculation per dollar of investment in hydrogen fueling station infrastructure. We believe the result will further corroborate the massive difference in investment efficiency between these two technologies in reducing emissions.

To be clear, we think the jury is still out for MHD long haul FCEV applications. Knowing that hydrogen is expensive and we will likely have a limited amount of it, it is more prudent for the state to prioritize other applications such as to potentially stabilize the grid as a long term storage tool and for difficult-to-decarbonize industrial applications.

Thank you for the opportunity to provide comments on the Investment Plan Update for the Clean Transportation Program.

Sincerely,

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Ray Pingle
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Katherine Garcia
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