Valero's Comments on the Draft 2022 Scoping Plan Update

I. CARB Proposed Actions for Light-Duty Vehicles (LDV)

Scenario	Action
All Scenarios	• Light Duty Vehicle Fuel Economy Standards: Advanced Clean Cars I GHG standards for 2017-2025 model years, 2% annual fuel economy improvement for 2026-2035
Proposed Scenario	• 100% of LDV sales are ZEV by 2035 (Executive Order N-79-20)
Alternative Scenario 1	• 100% of LDV sales are ZEV by 2030; no plug-in hybrid vehicle (PHEV) sales after 2030 • Only ZEVs on the road by 2035, no PHEVs on the road by 2035
Alternative Scenario 2	• 100% of LDV sales are ZEV by 2030; no PHEV sales after 2035
Alternative Scenario 4	• 100% of LDV sales are ZEV by 2040 (AB 74 ITS Report)

A. CARB fails to objectively evaluate all potential mitigations for GHG emission reductions from LDV and to present a scenario that embodies the philosophy of "maximum technologically feasible and cost-effective reductions"

In the Draft Scoping Plan, CARB presents four scenarios for achieving CARB's 2030 greenhouse gas (GHG) reduction target and 2045 carbon neutrality target. CARB stresses a need to "deploy all viable tools" to address climate change, while at the same time focusing on "aggressive reduction of fossil fuels wherever they are currently used in California."[1] Liquid fuels have contributed significantly to California's success to-date in reducing GHG emissions from the transportation sector, and liquid fuels producers are continuing to innovate and reduce GHG emissions from their products. CARB nevertheless appears poised to abandon the market-based incentive approaches that have been successful in the context of the Low Carbon Fuel Standard (LCFS) and Cap-and-Trade programs in favor of dictating the modes of transportation that may be used. By phasing out the use of liquid fuels altogether rather than setting aggressive GHG reduction targets and creating a framework for different technologies to compete to achieve these goals, the Draft Scoping Plan update will reduce flexibility, cease to inspire technological innovation in carbon reduction measures, and constrain consumer choice, all while imposing tremendous costs.

On June 14, 2022, the U.S. Department of Energy (DOE) released the results of a six-year initiative that provides a national roadmap for alternative ways to reduce GHG emissions from the transportation sectors as electric vehicles slowly phase in.[2] This initiative involved approximately 140 experts including 100 from nine U.S. DOE laboratories, two representatives from CARB, and an additional 40 experts from industry and universities. The report states that "numerous breakthroughs" were made "with the potential to dramatically improve the performance of ICE vehicles" and that the researchers also "identified new low-emission, high-efficiency fuel-engine combinations for light-duty (LD), medium-duty (MD), and heavy-duty (HD) vehicles, using innovative methods and tools to expand understanding of combustion and fuel properties." Moreover, "findings reveal potential for dramatic improvements in vehicle fuel economy and increases in the use of domestically sourced bio-based fuel for transportation, along with steep emissions reductions. This, in turn, has the potential to create new jobs and keep energy dollars in the United States, while decreasing costs for consumers and commercial

[1] CARB, "2022 Draft Scoping Plan Update," Executive Summary

[2] U.S. DOE, Office of Energy Efficiency & Renewable Energy, "Co-Optimization of Fuels & Engines: The Road Ahead Toward a Net-Zero-Carbon Transportation Future" (June 14, 2022), https://www.energy.gov/eere/bioenergy/articles/co-optima-findings-impact-report

operators at the pump. But most importantly, it holds promise for making a meaningful difference in the fight against climate change." "All top-performing blendstock candidates were shown to reduce lifecycle GHG emissions by at least 50%," "have the potential to be produced at a commercial scale," "delivered reductions in harmful particulate criteria emissions," and further "enabled changes in engine operation that reduced nitrogen oxide production." Detailed results are documented in more than 250 peer-reviewed journal articles, conference papers, and technical reports.

AB 32 directs CARB to prepare and update a scoping plan to achieve the "maximum technologically feasible and cost-effective reductions in greenhouse gas emissions."[3] However, it appears that through policy bias, CARB has designed the four net-zero scenarios presented in the Draft Scoping Plan around Executive Order N-79-20, neglecting its statutory duty to objectively evaluate all available mitigations and to seriously consider feasibility and cost-effectiveness. As CARB openly describes its process for developing the Draft Scoping Plan, alternative scenarios were designed "that transition energy needs away from fossil fuels and achieve carbon neutrality no later than 2045."[4] CARB is almost entirely focused on electrification as the future of light-duty transportation, despite well-documented concerns regarding lifecycle GHG emission reductions, technological feasibility of widespread deployment, and cost effectiveness compared with other available technologies, to the detriment of California businesses, consumers and emissions.

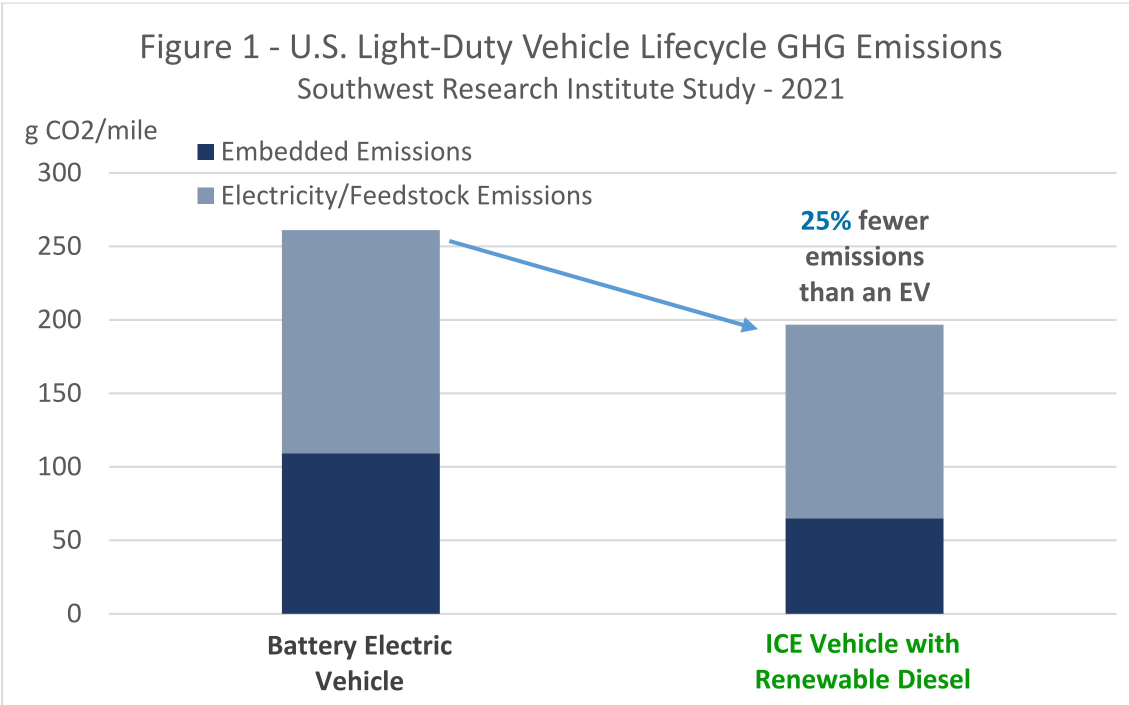
1. Maximum Reductions in Greenhouse Gas (GHG) Emissions

Throughout both the Draft Scoping Plan and CARB's existing regulations, CARB synonymously refers to battery electric vehicles (BEV), plug-in hybrid electric vehicles (PHEV) and fuel cell electric vehicles (FCEV) as "zero-emission vehicles" (ZEV). However, when considered on a full lifecycle basis, these vehicles are not zero-emission; in fact, they are not even the most effective technology available today to reduce GHG emissions from LDV.

CARB has long recognized that evaluating the lifecycle emissions of fuels is the most accurate way to measure and reduce GHG emissions, but has chosen to implement this powerful GHG measure selectively across the transportation sector. A lifecycle analyses conducted by Southwest Research Institute finds that GHG emissions from an LDV that runs on renewable diesel with a carbon intensity of 25 g/MJ results in 25% fewer lifecycle GHG emissions when compared to a BEV, as illustrated below in Figure 1. ***If CARB's true goal is to reduce GHG emissions rather than advance an agenda of electrification, then it must consider the full lifecycle impact of all available technologies.***

[3] CA HSC §38561(a)

[4] CARB Draft 2022 Scoping Plan Update, page 92



Additionally, there are emerging innovative approaches and new technologies to enable new modes of carbon reduction from fuels used in internal combustion engine vehicles (ICEV), such as carbon sequestration and on-board carbon dioxide (CO_2) capture.[5] It is unreasonable for CARB to foreclose any opportunity for such technologies to provide an alternative to the pathways proposed in the Draft Scoping Plan.

Finally, it should be noted that the proposed action in Alternative Scenario 1 to prohibit the use of ICEV and PHEV by 2035 would not contribute any GHG emission reductions, but rather further suggests that CARB's primary objective is on phasing out liquid fuels rather than mitigating climate change. Non-end-of-life vehicles of any powertrain would only be resold and driven elsewhere following removal from California, presumably in a location without as robust a market for low-carbon transportation fuels as California has.

2. Technological Feasibility

CARB fails to consider the potential climate, environmental, health and economic impacts that may result from CARB's actions if the goals under the Draft Scoping Plan prove to be unattainable. California has established itself as a global leader in climate action and has a history of "aiming high" with its climate goals, only to adjust or modify aspirational targets that were ultimately unachievable. In the past, numerous and robust contingencies were available to Californians, owing to the flexibilities and capabilities of the auto manufacturing, oil and gas extraction, refining, and renewable fuels industries, to ensure that Californians have always enjoyed security of access to personal mobility – i.e., dealer lots full of vehicles and gas stations with ample supplies of fuel. Now, CARB is closing the door on those industries, stripping them of their flexibilities and eliminating the contingencies that Californians have historically relied upon. Moreover, it is doing so in the midst of "unprecedented stress on California's energy system,"[6] record inflation, extraordinary supply chain disruptions, global uncertainty due to the lingering pandemic and the war in Ukraine, and critical concerns about the availability, cost and foreign dependence of minerals needed for EV batteries. As we have learned from the global energy crises caused by

[5] Southwest Research Institute, "A Gas Separation Membrane Highly Selective to CO2 in the Exhaust of Internal Combustion Engines," SAE 2019-01-2265 (2019), https://pubs.acs.org/doi/10.1021/acsenergylett.1c01426

[6] Memo from Ana Matosantos (California Cabinet Secretary) to Jennifer Granholm (U.S. Secretary of Energy) regarding "Request for clarification to the Guidance issued by DOE for the first round of the Civil Nuclear Credit Program application," (May 23, 2022) https://static.ewg.org/upload/pdf/calif_letter_to_DOE.pdf?_ga=2.66025198.19902243.1653860374-927036638.1653860374

the war in Ukraine, climate efforts unravel quickly when the public loses access to basic necessities such as heating, cooling, food, water and mobility. Given the questions raised below about California's ability to achieve the goals set forth in the Draft Scoping Plan, the actions that CARB is proposing put Californians at risk of just that.

CARB stresses in the Draft Scoping Plan the criticality of achieving net-zero GHG emissions by 2045. That same sense of urgency should compel CARB to critically evaluate the feasibility of its net-zero scenarios, the risks and potential impacts of its own actions, and contingencies that can help to ensure its success in achieving climate goals.

a) Charging Infrastructure

California recently surpassed the milestone of 1 million cumulative electric vehicles sales statewide.[7] As presented in Figures 2 to 5, under the Draft Scoping Plan, CARB projects to have 4.1-8.3 million plug-in electric vehicles (PEVs – sum of BEVs and PHEVs) on the road in California by 2030 and 9.0-28.6 million PEVs by 2035, depending on the selected scenario.[8] This growth is to be achieved by peak annual sales of up to 5.3 million PEVs (occurring in 2031 under Alternate Scenario 1). Alternative Scenario 1 would additionally involve the removal of all ICEV and PHEV by 2035, modeled by CARB as a mass removal of 21 million vehicles between 2030 and 2035.

CARB acknowledges in the Draft Scoping Plan that refueling infrastructure is a "crucial component of transforming transportation technology."[9] The California Energy Commission's (CEC) AB 2127 Report projects that nearly 1.2 million public and shared private chargers will be needed to support the roughly 8 million light-duty EV anticipated by 2030.[10] To maintain this ratio of chargers to LD EVs, California would need 3.5 million public and shared private chargers installed by 2035 to support the 23.6 million EV stocks projected by CARB under Alternate Scenario 1. By contrast, there are almost 80,000 public and shared private EV chargers installed across California today, growing at a rate of approximately 6,700 chargers per year.[11] ***Beginning today, California would need to increase the rate of public and shared private EV charger installations by more than 1,800% to reach 1.2 million chargers by 2030 and by more than 3,600% to reach 3.5 million chargers by 2035.*** Furthermore, it is estimated that the installation of charging infrastructure to support LD EV growth between 2021 and 2031 would require up to 62,400 job-years of dedicated workforce.[12] These figures do not include EV chargers installed in private residences or intended strictly for private use, where approximately 80% of EV charging occurs.[13] The demand for installation of private-use chargers will directly compete for resources with the need for installation of public and shared private EV chargers. There are not enough resources to satisfy this level of demand.

---

[7] Office of Governor Gavin Newsom, "California Leads the Nation's ZEV Market, Surpassing 1 Million Electric Vehicles Sold," February 25, 2022, https://www.gov.ca.gov/2022/02/25/california-leads-the-nations-zev-market-surpassing-1-million-electric-vehicles-sold/

[8] CARB Draft 2022 Scoping Plan Update, "AB 32 GH Inventory Sectors Modeling Data Spreadsheet," "LDV Stocks" tab

[9] CARB Draft 2022 Scoping Plan Update, page 150

[10] CEC, *Assembly Bill 2127 Electric Vehicle Charging Infrastructure Assessment Analyzing Charging Needs to Support ZEVs in 2030*, 19-AB-2127 at ii (July 14, 2021), https://www.energy.ca.gov/programs-and-topics/programs/electric-vehicle-charging-infrastructure-assessment-ab-2127

[11] Total number of public and shared private electric vehicles chargers – Level 1, Level 2 and DC fast chargers. CEC, Electric Vehicle Chargers in California, https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics/electric-vehicle (accessed June 8, 2022)

[12] Carr, Edward; Winebrake, James; Winebrake, Samuel, "Workforce Projections to Support Battery Electric Vehicle Charging Infrastructure Installation," June 8, 2021

[13] Valerrama, Patricia, Natural Resources Defense Council (NRDC), "Electric Vehicle Charging Basics," https://www.nrdc.org/experts/patricia-valderrama/electric-vehicle-charging-101#:~:text=Further%2C%20according%20to%20the%20US,set%20up%20their%20own%20chargers (July 10, 2019)

Figures 2-5: CARB Modeling of LDV Stocks and Sales

Figure 2: Alternate Scenario 1

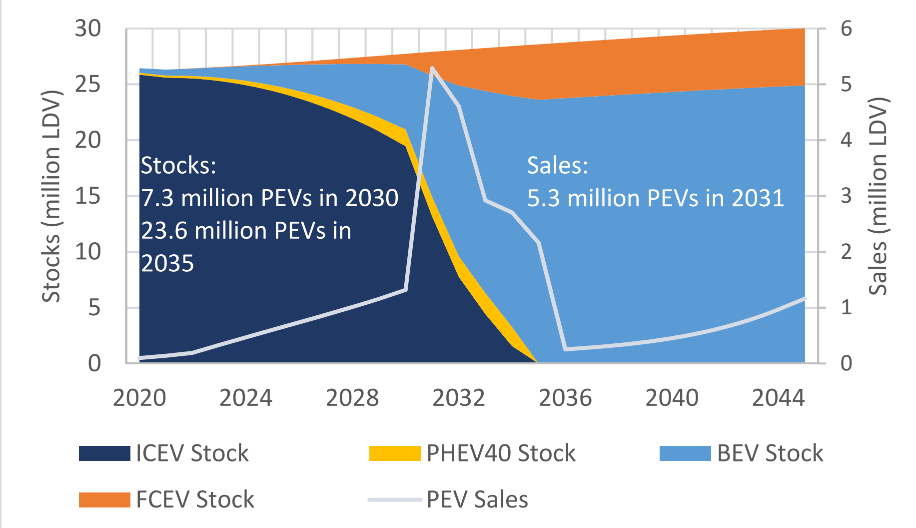


Figure 3: Alternate Scenario 2

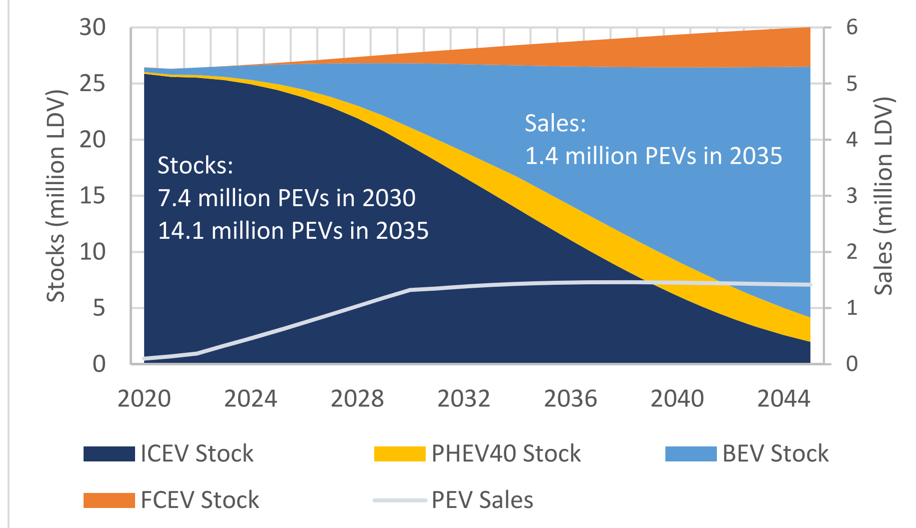


Figure 4: Proposed Scenario (Alternate Scenario 3)

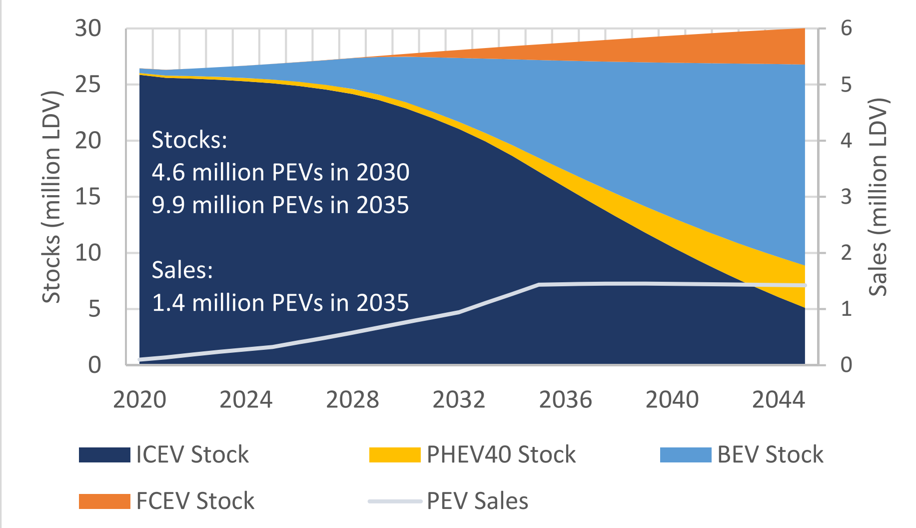
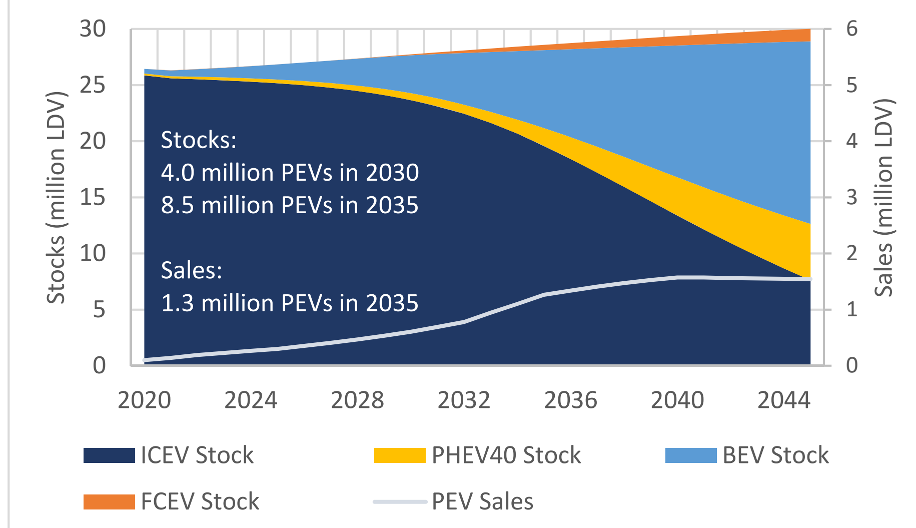


Figure 5: Alternate Scenario 4



Source: CARB Draft 2022 Scoping Plan Update, "AB 32 GH Inventory Sectors Modeling Data Spreadsheet"

While California has earmarked a certain amount of state funding to support this massive infrastructure buildout, the state maintains that "there is no one-size-fits-all charging solution" and places the onus on local communities to develop "EV community blueprints," amend local building codes, streamline local permitting ordinances, integrate charging infrastructure with publicly-owned utilities and develop the skilled workforce to support the state's transportation electrification goals.[14] All while moving at 1,800-3,600% of the current pace, and meanwhile, complying with the California Environmental Quality Act (CEQA).

Valero appreciates the need for urgency in addressing climate change, but there is a lack of structure in the approach that California is taking to build out EV charging infrastructure. In the absence of sufficient oversight and standards on the location, installation, operation and maintenance of ZEV charging infrastructure, California is already seeing wide disparities in charger availability, permitting timelines, reliability and costs. Several examples are provided below:

Firstly, low-income and disadvantaged communities do not enjoy the same access to ZEV infrastructure, exacerbating economic burdens for these vulnerable groups. The CEC's 2020 "SB 1000 Report on Equitable Distribution of Charging Infrastructure" found that public chargers are unevenly distributed across state air districts – the Report noted that relatively more chargers appear in census tracts with low population density and that low-income communities on average have the fewest public Level 2 and total chargers per capita.[15] Uneven access to ZEV charging infrastructure means that low-income and disadvantaged communities have some of the longest drive times from community centers to the nearest public DC fast charging station.[16] Longer drive times may create challenges for businesses located near or within these communities, potentially forcing them to relocate to areas with higher charger densities. ***If California cannot ensure that ZEV charging infrastructure is designed and executed in a way that secures operational feasibility for all communities in California, then a full, equitable transition to ZEVs is not a feasible solution.***

Secondly, the feasibility of achieving the growth in ZEV population projected by CARB is contingent on permitting for the installation of ZEV chargers, which is slow and inconsistent across California's 400 local jurisdictions. Permit timelines may range from as little as two weeks to as long as a year, also contributing to the lack of equitable access to charging infrastructure across the state. In 2020, the average permitting timeline for a DC fast charger in California was 77 business days, making California the second-slowest state in the nation to issue permits for installing ZEV charging infrastructure.[17] In its "2021 Annual Report to California Air Resources Board," Electrify America reported that the average permitting timeline had increased to 81 days.

---

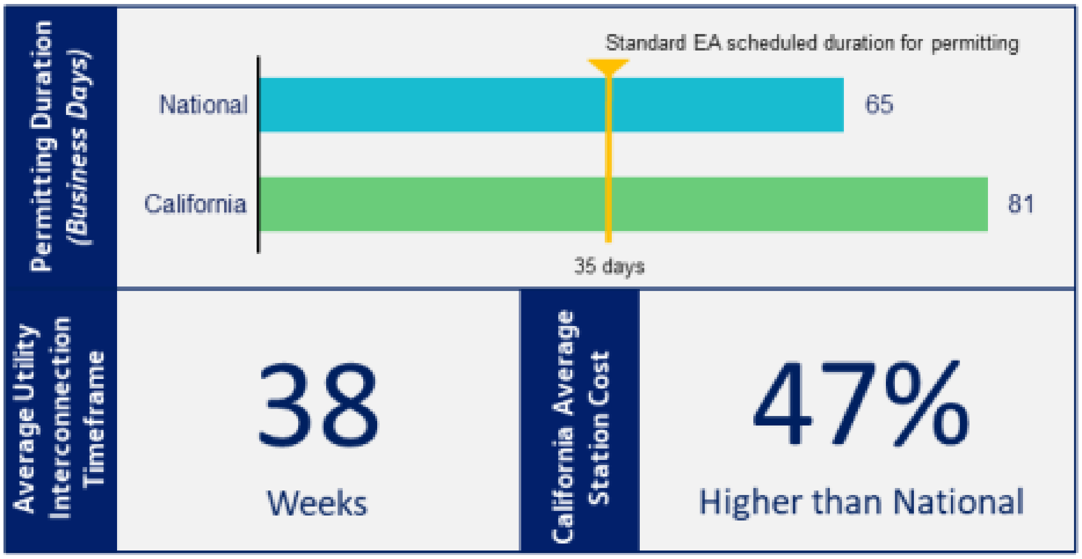
[14] CEC, *Assembly Bill 2127 Electric Vehicle Charging Infrastructure Assessment Analyzing Charging Needs to Support ZEVs in 2030*, 19-AB-2127 at 74-76 (July 14, 2021)

[15] SB 1000 Report on Equitable Distribution of Charging Infrastructure (Dec 2020).

[16] CEC, *2021–2023 Investment Plan Update for the Clean Transportation Program* (Dec. 17, 2021), https://www.energy.ca.gov/publications/2021/2021-2023-investment-plan-update-clean-transportation-program#:~:text=This%202021%E2%80%932023%20investment%20plan%20establishes%20funding%20allocations%20based%20on,by%20the%20COVID%2D19%20pandemic

[17] McCarthy, Elizabeth, "EV charger installations in California are bogged down by local permitting," Canary Media (May 24, 2021), https://www.canarymedia.com/articles/ev-charging/ev-charger-installations-in-california-are-bogged-down-by-local-permitting

Figure 6 – DC Fast Charger Permitting Timeline and Station Cost in California



Source: Electrify America "2021 Annual Report to California Air Resources Board" (Apr 30, 2022)

In 2015, California enacted a law (AB 1236) that established streamlined charging station permitting as a statewide imperative, yet "[u]nfortunately, due to lack of awareness, enforcement, and inconsistent application across the state, a wide variance in permitting processes persists."[18]

Thirdly, the feasibility of achieving the growth in ZEV population is further contingent on the process in place for the interconnection of DC fast chargers with local utilities, which is also slow, averaging 38 weeks (nearly 9 months) in California.[19] Electrify America reports to CARB that "California's utilities have not completed construction, inspection, and energization of the new utility service until, on average, 31 weeks, or approximately seven months, after Electrify America completed construction of its charging stations," further delaying the opening of charging stations to the public.[20]

Fourthly, reliability and operability of public ZEV chargers continue to pose challenges for California drivers and be factors in discontinuance among California ZEV owners.[21] In its February 2022 "Electric Vehicle Supply Equipment Standards Technology Review," CARB identifies "inoperable stations and payment issues" as the most frequently-cited challenges to EV drivers using public charging stations.[22] Indeed, a recent survey of EV service equipment operability found only 72.5% of open public DC fast chargers in the nine counties of the Greater Bay Area to be functional.[23]

CARB must acknowledge that the rate of ZEV adoption required to meet the goals of the Draft Scoping Plan is not feasible, owing to challenges of the pace that must be maintained to secure sufficient ZEV charging infrastructure, and there are few states, if any, that are more familiar than California with the risks and consequences that can arise from electrical infrastructure lacking in planning, maintenance and financing.

---

[18] https://businessportal.ca.gov/wp-content/uploads/2019/07/GoBIZ-EVCharging-Guidebook.pdf

[19] Electrify America, "2021 Annual Report to California Air Resources Board," April 30, 2022, page 8, https://media.electrifyamerica.com/assets/documents/original/790-Q32021ElectrifyAmericaReporttoCARBv2Public.pdf

[20] *Id*.

[21] Hardman, Scott and Tal, Gil, "Understanding discontinuance among California's electric vehicle owners," Nature Energy, April 26, 2021

[22] CARB "Electric Vehicle Supply Equipment Standards Technology Review," February 2022 (page 3)

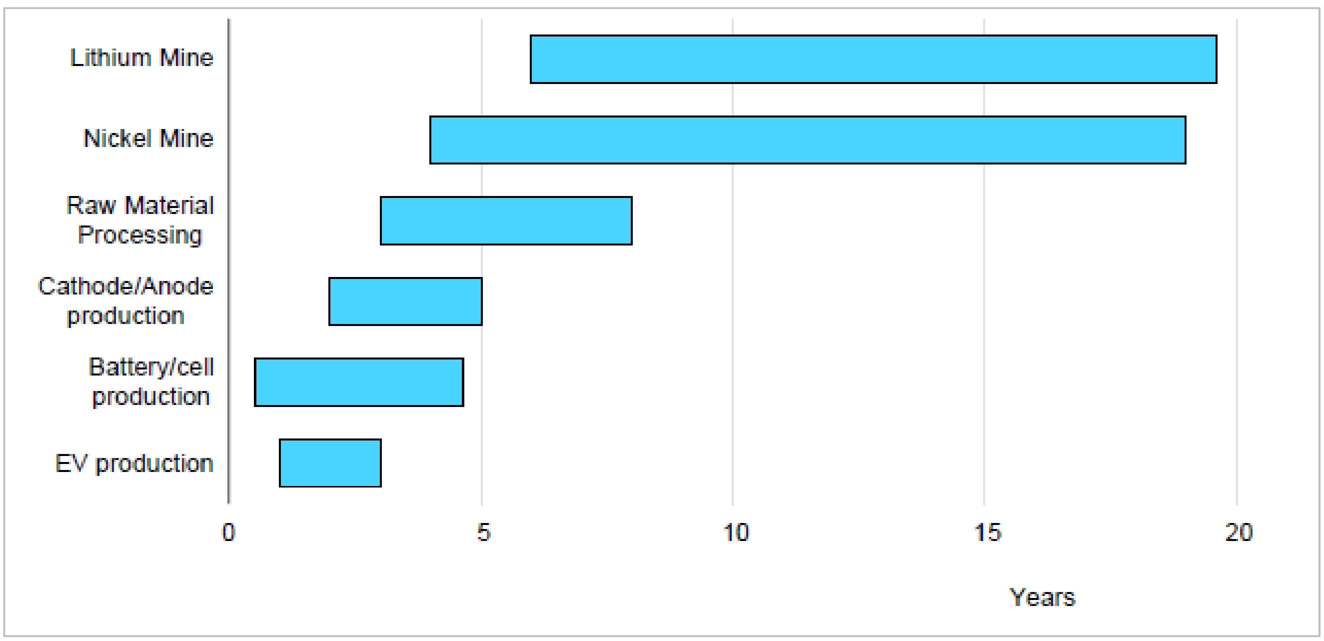
[23] Rempel, David; Cullen, Carleen; Matteson Bryan, Mary; and Vianna Cezar, Gustavo, "Reliability of Open Public Electric Vehicle Direct Current Fast Chargers," 2022

b) Raw Material and Supply Chain Constraints affecting ZEVs

CARB's modeling of LDV sales in the Draft Scoping Plan projects the growth in annual BEV and PHEV sales from approximately 140,000 in 2021 to 0.7-5.3 million in 2031, depending on the selected scenario. Yet CARB fails to acknowledge the threat that minerals availability poses to its transportation electrification goals, nor does it recommend any measures to mitigate raw material and supply chain constraints.

In the "Global EV Outlook 2022," the International Energy Association (IEA) focuses on the looming mineral supply constraints and the massive scale of expansion that is needed of the mining and battery production industries to support the pace of global electrification ambitions. The IEA projects that by 2030, the global demand of lithium is expected to increase by 6 times under the Announced Pledges Scenario (APS), "requiring the equivalent of 50 new average-sized mines" to satisfy the demand.[24] IEA further points out that the typical lead time for new lithium mines (i.e., from completion of the preliminary feasibility study to the start of production) is between 6 and 19 years (refer to Figure 7).[25] Beyond mineral extraction, the IEA anticipates that the APS will drive a tenfold increase in battery demand between 2021 and 2030, requiring an additional 90 gigafactories of 35 gigwatt-hour (GWh) annual production capacity.[26]

Figure 7 – Range of Typical Lead Time to Initial Production for Selected Steps in EV Battery Supply Chain



Source: IEA, "Global Electric Vehicle Outlook 2022 " (May 2022)

While evaluating steps to invoke the Defense Production Act, President Biden acknowledged "the United States depends on unreliable foreign sources for many of the strategic and critical materials necessary for the clean energy transition – such as lithium, nickel, cobalt, graphite, and manganese for large-capacity batteries. Demand for such materials is projected to increase exponentially as the world transitions to a clean energy economy."[27]

---

[24] IEA, "Global EV Outlook 2022" (May 2022), page 7

[25] *Id*, page 178

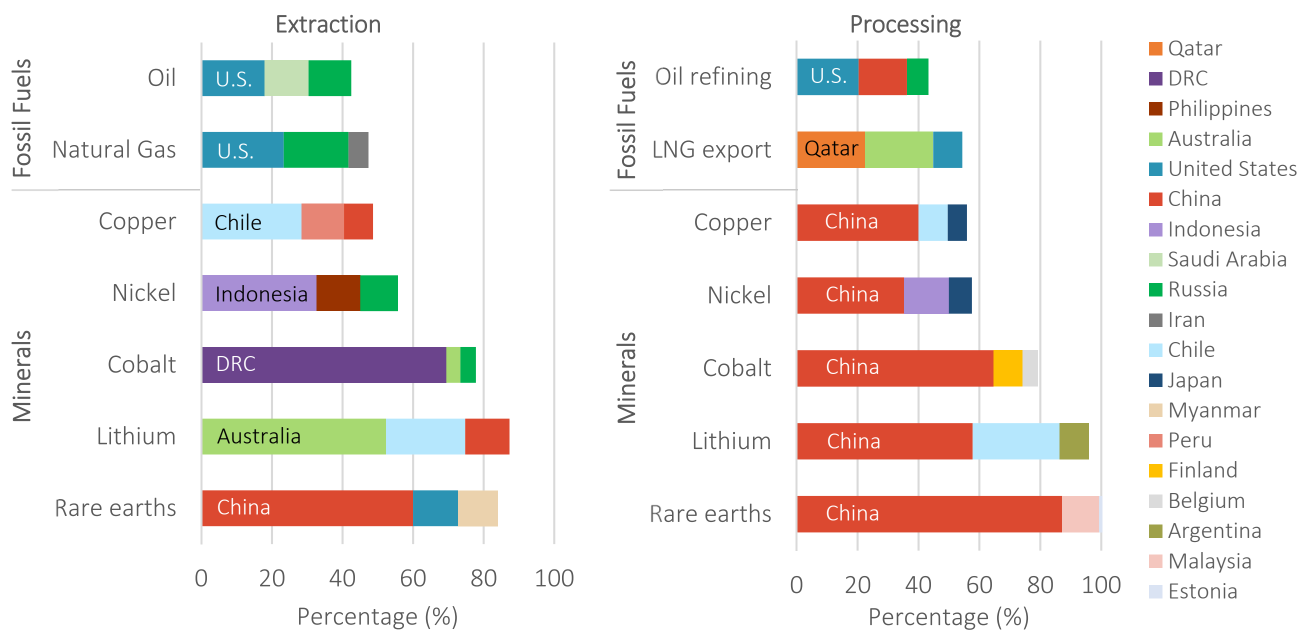
[26] *Id*, page 173

[27] President Biden, "Memorandum on Presidential Determination Pursuant to Section 303 of the Defense Production Act of 1950, as amended" (March 31, 2022), https://www.whitehouse.gov/briefing-room/presidential-actions/2022/03/31/memorandum-on-presidential-determination-pursuant-to-section-303-of-the-defense-production-act-of-1950-as-amended/

According to a February 2022 White House Fact Sheet, not only are these minerals critical to EV batteries, they are also "essential to our national security and economic prosperity."[28]

Further, the transportation sector will be in competition against the consumer-electronic and defense industries for the limited availability of critical minerals and metals, as these materials find widespread application not only in EV batteries and drivetrains, but in wind turbines, solar panels, consumer electronics, and U.S. military technology (e.g., the F-35 striker jet has about a ton of rare earth magnets alone).[29] Shortages of critical material jeopardize not only the clean energy economy, but the U.S. economy and national security as a whole.[30] And CARB has failed to consider the national security impact of this policy approach.

Figure 8: Share of Top Three Countries in Extraction and Processing of Selected Minerals (2019)



Source: IEA, *The Role of Critical Minerals in Clean Energy Transitions*, March 2022. Notes: The values for copper processing are for mineral refining operations.

However, in the Draft Scoping Plan CARB affords almost no consideration to minerals availability to support its transportation electrification goals, except to state that "the extremely small increase in [lithium] demand that could be associated with the 2022 Scoping Plan suggests that existing extraction facilities would be used. The development of new extraction facilities would not be required" (as well as similar statements for other critical minerals to EV batteries).[31] This myopic perspective fails to recognize CARB's actions as one piece of a much larger global initiative.

[28] Biden-Harris White House Administration Release, "FACT SHEET: Securing a Made in America Supply Chain for Critical Minerals" (February 22, 2022), https://www.whitehouse.gov/briefing-room/statements-releases/2022/02/22/fact-sheet-securing-a-made-in-america-supply-chain-for-critical-minerals/

[29] John Koetsier, "US Needs 10X More Rare Earth Metals to Hit Biden's Electric Vehicle Goals," Forbes (September 29, 2021).

[30] *Id. See also* John Koetsier, "US Needs 10x More Rare Earth Metals to Hit Biden's Electric Vehicle Goals," Forbes (September 29, 2021).

[31] CARB, "2022 Draft Scoping Plan Update," Appendix B – Draft Environmental Analysis, page 176.

Even today, instability in mineral costs, semiconductor shortages and supply chain issues are causing a great deal of uncertainty in the near- and long-term future availability of EVs.

- S&P Global reported in March 2022 that automakers do not have enough metal to meet demand for EVs, citing that "demand for lithium, cobalt and nickel outstripped supply in 2021, with market tightness likely to persist this decade as battery making ramps up" and further that "lithium-ion battery supply will be unable to keep up with demand in 2022 in part due to rising raw material prices."[32]

- Carlos Tavares, the CEO of Stellantis, has said he expects shortages of the batteries and raw materials needed to make EVs in the coming years. Specifically, Tavares expects a shortage of EV batteries by 2024-2025, followed by a lack of raw materials for the vehicles that will slow availability and adoption of EVs by 2027-2028.[33]

- Robert Scaringe, the CEO of Rivian Automotive Inc., has recently warned that the auto industry could soon face an upcoming shortage of battery supplies for EVs—a challenge he says could surpass the current computer-chip shortage. "Put very simply, all the world's cell production combined represents well under 10% of what we will need in 10 years," Mr. Scaringe said. "Meaning, 90% to 95% of the supply chain does not exist," he added.[34]

- In May 2022 at the Financial Times' eighth "Future of the Car" summit, CEO Elon Musk soft-pedaled Tesla's target of delivering 20 million EVs a year by 2030 as an "aspiration, not a promise," conceding that "we may stumble and not reach that goal," and "there are some raw material constraints that we see coming, in lithium production, probably in about three years, and in cathode production."[35] Volkswagen CEO Herbert Diess and Mercedes-Benz CEO Ola Kallenius expressed similar sentiments, with Diess suggesting that many are overly-optimistic about the rollout of EVs worldwide and referring to the prospect of meeting its own 2025 EV sales goals as "very, very tight."[36]

"While the world's leaders are busy boosting morale with their green energy promises, they are conveniently ignoring the trillion-ton elephant in the room: Carbon-free power and gasoline-free transportation cannot exist without mining an absurd amount of lithium. Right now, production is not even close to keeping up. We simply aren't pulling enough lithium out of the ground to match the projected demand."[37]

CARB must design scenarios in the Draft Scoping Plan that are achievable and technologically feasible, considering the raw material and supply chain constraints that auto manufacturers are already facing, the U.S.'s heavy reliance on "unreliable foreign sources" for critical minerals, semiconductors and EV battery production alike, and the significant lead time required to permit and construct new mines.

3. Cost-Effectiveness

Despite clear instruction in AB 32 to consider cost-effectiveness of alternatives in the Draft Scoping Plan, CARB presents only alternative scenarios that fit an agenda of transitioning away from fossil fuels and ICEV. The

---

[32] Erickson, Camile, S&P Global Market Intelligence, "Raw materials in short supply for EV makers struggling to meet customer demand" (March 29, 2022), https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/raw-materials-in-short-supply-for-ev-makers-struggling-to-meet-customer-demand-69458070
[33] https://www.cnbc.com/2022/05/24/stellantis-ceo-warns-of-ev-battery-shortage-lack-of-raw-materials.html
[34] https://www.wsj.com/articles/rivian-ceo-warns-of-looming-electric-vehicle-battery-shortage-11650276000
[35] https://www.ft.com/content/fbe8843e-1d2e-4a25-bce8-dcf77304fc37
[36] *Id*.
[37] Sweeney, Luke, "Lithium Outlook 2022: Bracing for the Next Big Shortage" (October 2021), https://www.energyandcapital.com/articles/lithium-outlook-2022-bracing-for-the-next-big-shortage/100234

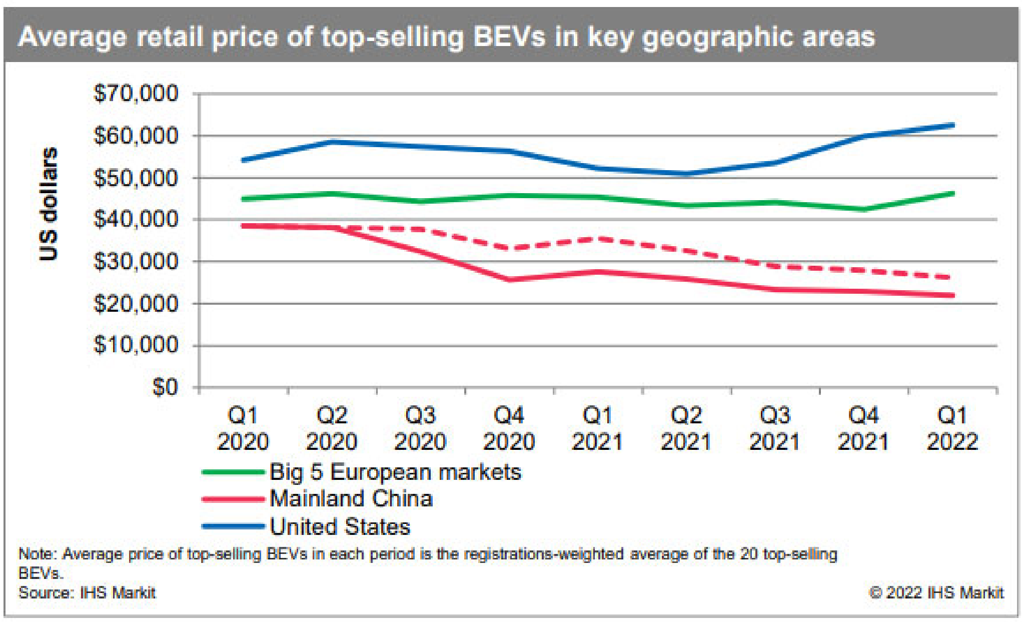
following sections demonstrate that existing transportation infrastructure coupled with low-carbon liquid fuels is a more cost-effective alternative than those presented by CARB in the Draft Scoping Plan.

a) Vehicle Purchase Price

A recent report by IHS Markit that evaluates evolving LDV retail prices across European, Chinese and U.S. markets shows that in the U.S., among the 20 top-selling BEV models, the average BEV price has increased by 15% from first quarter (1Q) 2020 to 1Q 2022 and is now more than $20,000 higher than the average price of the 20 top-selling ICEV's/ mild-hybrid electric vehicles (MHEVs).[38]

A major factor in rising EV prices has been the recent increase in the cost of key minerals for EV batteries, which can be attributed to a combination of rising demand, disrupted supply chains and concerns around tightening security.[39] A recent report from Wells Fargo projects that the spike in raw material prices could delay BEV-ICEV cost parity past 2030, with raw material costs having "doubled from $62/kWh to $119/kWh, making the sub-$100/kWh targets impossible with current nickel-based chemistries."[40]

Figure 9 – Average BEV Retail Prices in Key Regions

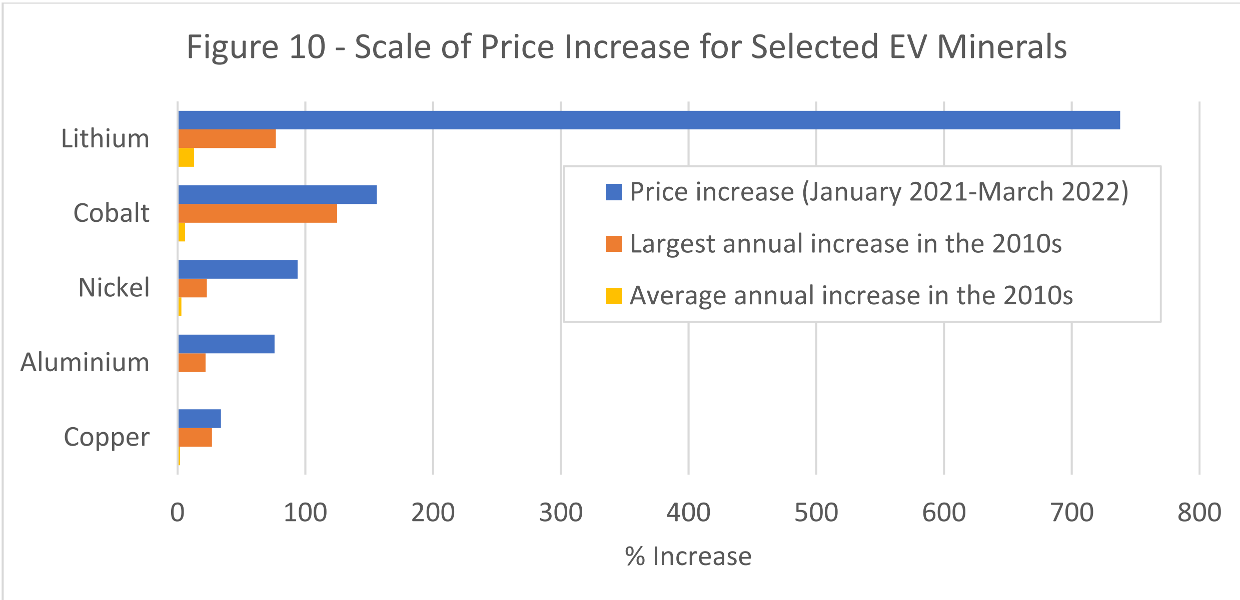


Source: IHS Markit, "Tracking BEV prices – How competitively-priced are BEVs in major global auto markets?" (May 2022)

[38] Auvudaiappan, Siva; Meininger, Thomas; and Meyer, Jeff, IHS Markit, "Tracking BEV prices – How competitively-priced are BEVs in major global auto markets?" (May 2022)

[39] Kim, Tae-Yoon, IEA, "Critical minerals threaten a decades-long trend of cost declines for clean energy technologies" (May 2022), https://www.iea.org/commentaries/critical-minerals-threaten-a-decades-long-trend-of-cost-declines-for-clean-energy-technologies

[40] Wells Fargo Equity Research "BEV Teardown Series: The Untold Electric Vehicle Crisis" (May 11, 2022)



Source: Kim, Tae-Yoon, IEA, "Critical minerals threaten a decades-long trend of cost declines for clean energy technologies" (May 2022)

b) Vehicle charging/ refueling

According to a 2021 Report from the California Public Utilities Commission (CPUC), "it is already cheaper to fuel a conventional internal combustion engine (ICE) vehicle than it is to charge an EV" in the San Diego Gas & Electric Co. (SDG&E) service area.[41] CEC Staff Analysis indicates that both commercial and residential electricity prices will continue to rise, reaching over $8/gasoline gallon equivalent (GGE) by 2026 for the residential sector and nearly $7/GGE for the commercial sector.[42]

This cost comparison is especially conspicuous for drivers that lack access to home charging infrastructure. Of the almost 80,000 public and shared private electric vehicle chargers installed in California, 90 percent are Level 2 chargers.[43] A driver of a 2021 Nissan Leaf would need over 6 hours of charge time to gain 120 miles of range at a Level 2 public charging station, at a cost between $15.78 and $29.54 ($0.13 and $0.25/mi, respectively), depending on time of use and location within California.[44, 45] At a gasoline price of $6 per gallon, the same driver would spend fewer than 5 minutes and $0.18/mi fueling a 2021 Toyota Corolla.[46] Even if public charging stations

---

[41] CPUC, Utility Costs and Affordability of the Grid of the Future: An Evaluation of Electric Costs, Rates, and Equity issues Pursuant to P.U. Code Section 913.1, at 116-117 (May 2021), https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/office-of-governmental-affairs-division/reports/2021/senate-bill-695-report-2021-and-en-banc-whitepaper_final_04302021.pdf

[42] CEC, "Presentation - Transportation Energy Demand Forecast," 21-IEPR-03 (Dec. 14, 2021), https://www.energy.ca.gov/event/workshop/2020-12/session-1-transportation-energy-demand-forecast-update-commissioner-workshop

[43] CEC, "Electric Vehicle Chargers in California," https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics/electric-vehicle (accessed June 8, 2022)

[44] 2021 Nissan Leaf with a 62 kWh battery pack and 0.31 kWh/mi power consumption, charging at a maximum rate of 6.6 kW from 20 percent to 80 percent of battery charge, with a 93 percent charge efficiency, per https://ecocostsavings.com/electric-car-kwh-per-mile-list/ and https://evocharge.com/resources/vehicle-charger-specs/

[45] Based on charging rates that vary from $0.29 to $0.66/kWh, depending on time of use and area of California, plus a $1.99 session fee and $3.00 reservation fee, per https://www.evgo.com/pricing/

[46] 2021 Toyota Corolla with a combined fuel economy of 33 miles per gallon, per https://www.fueleconomy.gov/feg/bymodel/2021_Toyota_Corolla.shtml

were readily available within disadvantaged communities, the cost and time burdens render electric vehicle ownership entirely impractical for communities that rely on Level 2 public chargers.

c) *Infrastructure*

In addition to the vehicle and charging/ fueling cost comparisons above, the electrification of the transportation sector modeled in the Draft Scoping Plan will require significant infrastructure buildout to both support increased electricity demand and to facilitate deployment of ZEVs. the CPUC estimates that meeting additional demand alone will require an investment of $49 billion in resource buildout.[47] None of this infrastructure investment is needed to support the continued use of ICEV with low-carbon liquid fuels.

B. *CARB fails to ensure that its activities do not disproportionately impact low-income communities*

In establishing GHG emission reduction limits and standards to achieve statewide GHG emission goals, AB 32 directs CARB to ensure that its activities do not disproportionately impact low-income communities.[48]

While CARB claims that operational savings will offset the incremental cost over the vehicle lifetime, the claim ignores the reality that many Californians currently are unable to afford the upfront costs of purchasing a ZEV in the first place. With the cost of transition minerals expected to escalate as a function of limited supply and increasing demand, the costs to manufacture and purchase ZEVs will likely rise, putting the cost of an EV further out of consumers' reach. The Draft Scoping Plan also glosses over the likelihood that many owners will lack access to residential charging, which will substantially increase their operating expenses. Consistent reliance on fast charging also will shorten battery life, resulting in a need to replace the battery and/or the vehicle more frequently.

Residential electricity prices in California are almost double the national average and are predicted to continue to rise.[49] This will affect the affordability of vehicle charging and could make EVs impractical, even with rebates and expanded charging infrastructure. Notably, these same communities are also less likely to have rooftop solar installations, which can significantly reduce the cost of electricity for homeowners.

Low-income and disadvantaged communities spend a disproportionate amount of their income on essential utilities, including electricity. The CPUC's 2019 Annual Affordability Report indicates that "13 percent of households in the state are located in areas where low-income households pay more than 15 percent of their disposable income on electricity service."[50] In addition, certain areas, including Los Angeles, Chico, parts of the San Joaquin Valley, and parts of the San Francisco Bay Area, spend significantly higher amounts, "indicating that low-income households in these areas spend a very large percentage of their non-disposable income on electricity."[51]

The Draft Scoping Plan will accelerate electrification of the transportation sector, requiring significant infrastructure buildout to both support increased electricity demand and to facilitate deployment of ZEVs. The CPUC estimates that meeting additional demand alone will require an investment of $49 billion in resource

---

[47] CPUC, "Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes," Decision No. 22-02-004 (Feb. 10, 2022), https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M451/K412/451412947.PDF

[48] CA HSC §38562(b)(2)

[49] In March 2022, the average residential electricity rate in California was $0.2671 per kilowatt-hour, versus a national average of $0.1447. US Energy Information Administration (EIA) *Electric Power Monthly* (March 2022), https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_6_a

[50] CPUC, 2019 ANNUAL AFFORDABILITY REPORT 11 (Apr. 2021), https://www.cpuc.ca.gov/-/media/cpuc-website/industries-and-topics/reports/2019-annual-affordability-report.pdf

[51] *Id.*

buildout, impacting electricity rates.[52] CEC Staff Analysis indicates that both commercial and residential electricity prices will continue to rise, reaching over $8/GGE by 2026 for the residential sector and nearly $7/GGE for the commercial sector.[53] In its Environmental and Social Justice Action Plan, the CPUC "acknowledges that increased rates place a large burden on ESJ communities," noting that "as California transitions to a cleaner grid, the risk of a smaller number of households, likely lower income households who cannot afford to upgrade their existing household appliances to energy efficient and/or all electric, becoming increasingly financially responsible for maintaining legacy infrastructure."[54] ***Before CARB finalizes the Draft Scoping Plan, the state must have comprehensive measures in place to protect low-income communities from carrying the primary burdens of climate change measures.***

C. CARB fails to evaluate and minimize leakage relating to mineral resources and EV battery manufacturing

In establishing GHG emission reduction limits and standards to achieve statewide GHG emission goals, AB 32 directs CARB to minimize leakage.[55] CARB cannot adequately evaluate or minimize GHG emission leakage without first considering the lifecycle GHG emissions of the transportation sector alternatives that it proposes.

Collectively, emissions from raw material extraction, battery manufacturing, battery recycling, and hazardous waste and water treatment that would occur outside of California must be weighed against the advantages that CARB considers EVs to offer in-state. These processes that are critical to the production of EVs have leakage impacts that are well within CARB's purview, but neglected by the Draft Scoping Plan. Significant GHGs are created as a result of energy-intensive mining and metal processing activities. Additionally, critical minerals necessary to support EV production require significant energy to produce, which, depending on the location of the operations, may be satisfied largely through coal power plants. With demand for critical minerals expected to grow, so will emissions. For example, lithium production has been moving from brine-based recovery (mostly in Chile) to concentrate production from hard rock (mostly in Australia), with emissions intensity three times higher than that of brine-based production.[56] In addition, mineral extraction involves extensive land-use changes, high-volumes of water[57], and massive amounts of waste generation, which includes wastes hazardous to human health. Mineral extraction entails other environmental impacts such as air pollution from particulate matter (e.g., mine dust), gaseous emissions, and noise pollution due to blasting and other transport activities. CARB has an obligation to consider the impact that their policies will have on mineral development practices—

---

[52] CPUC, Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes, Decision No. 22-02-004 (Feb. 10, 2022), https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M451/K412/451412947.PDF

[53] CEC, *Presentation - Transportation Energy Demand Forecast*, 21-IEPR-03 (Dec. 14, 2021), https://www.energy.ca.gov/event/workshop/2020-12/session-1-transportation-energy-demand-forecast-update-commissioner-workshop

[54] CPUC, *Draft Environmental & Social Justice Action Plan Version 2.0*, at 21 (Mar. 25, 2022), https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M465/K846/465846599.pdf

[55] CA HSC §38562(b)(2)

[56] Jarod C. Kelly, Michael Wang, Qiang Dai, Olumide Winjobi, "Energy, greenhouse gas, and water life cycle analysis of lithium carbonate and lithium hydroxide monohydrate from brine and ore resources and their use in lithium ion battery cathodes and lithium ion batteries," Resources, Conservation and Recycling, Volume 174, 2021, 105762, ISSN 0921-3449, https://doi.org/10.1016/j.resconrec.2021.105762. (https://www.sciencedirect.com/science/article/pii/S0921344921003712)

[57]It is estimated that 500,000 gallons of water is used to mine one metric ton of lithium. *See* Agusdinata, Datu Buyung; Liu, Wenjuan; Eakin, Hallie; Romero, Hugo (2018-11-27). "Socio-environmental impacts of lithium mineral extraction: towards a research agenda." Environmental Research Letters. 13 (12): 123001. Bibcode:2018ERL....13l3001B. doi:10.1088/1748-9326/aae9b1. ISSN 1748-9326.

especially where CARB's policies result in an increased reliance on mineral exports from countries with lesser environmental, corruption, and/or human rights standards than those in the United States.

The Draft Scoping Plan also does not include battery recycling in its analysis. EVs use a variety of recoverable materials, making large scale recycling programs complex but fundamental in order to manage valuable resources and abate mining emissions. Metals can be released from EV batteries that are improperly disposed, contaminating water, soil and ecosystems. To safeguard against pollution and reduce emissions in line with California's clean energy goals, CARB should consider options and emissions associated with EV disposal as well. In sum, policies developed pursuant to the Draft Scoping Plan should recognize an accurate emissions accounting framework so that California's emission reduction strategies can be effective and successful.

Additionally, CARB cannot overlook the increased potential for human rights and labor abuses resulting from the significant increase in demand for minerals necessary for large-scale forced electrification. According to the Environmental Protection Agency's (EPA) Toxic Release Inventory, metal mining ranks the highest of all U.S. industrial sectors in releases of toxic materials to the environment.[58] The environmental impacts of metal mining include the poisoning of water sources, the pollution and destruction of ecosystems and landscapes, and soil contamination, which are often long-lasting violations of Americans' right to a healthy environment that permits a life of dignity and wellbeing. Indigenous communities, rural communities, and women are disproportionately harmed by these impacts.[59] Human rights violations, labor abuses, and illegal activity that occur as a result of mining operation are longstanding and well-documented.[60]

[58] https://enviro.epa.gov/triexplorer/industry.html?pYear=2020&pLoc=2122&pParent=TRI&pDataSet=TRIQ1. *See also* https://www.minescanada.ca/sites/default/files/indigenous-gender-based-analysis-cmmp_.pdf

[59] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5429369/

[60] https://media.business-humanrights.org/media/documents/files/documents/BGR_MPFPR_2016_Human_Rights_Risks_in_Mining.pdf

II. CARB Proposed Actions for Medium-Duty/Heavy-Duty Vehicles (MD/HDV)

Scenario	Action
All Scenarios	• Truck Fuel Economy Standards: California Phase II GHG Standards
Proposed Scenario	• 100% of MD/HDV sales are ZEV by 2040 (AB 74 ITS Report)
Alternative Scenario 1	• 100% of MD/HDV sales are ZEV by 2030 • Only ZEVs on road by 2035; no PHEVs on road by 2035
Alternative Scenario 2	• 100% of MD/HDV sales are ZEV by 2035 • Only ZEVs on road by 2045; no PHEVs on road by 2045
Alternative Scenario 4	• 100% of MD/HDV sales are ZEV by 2045

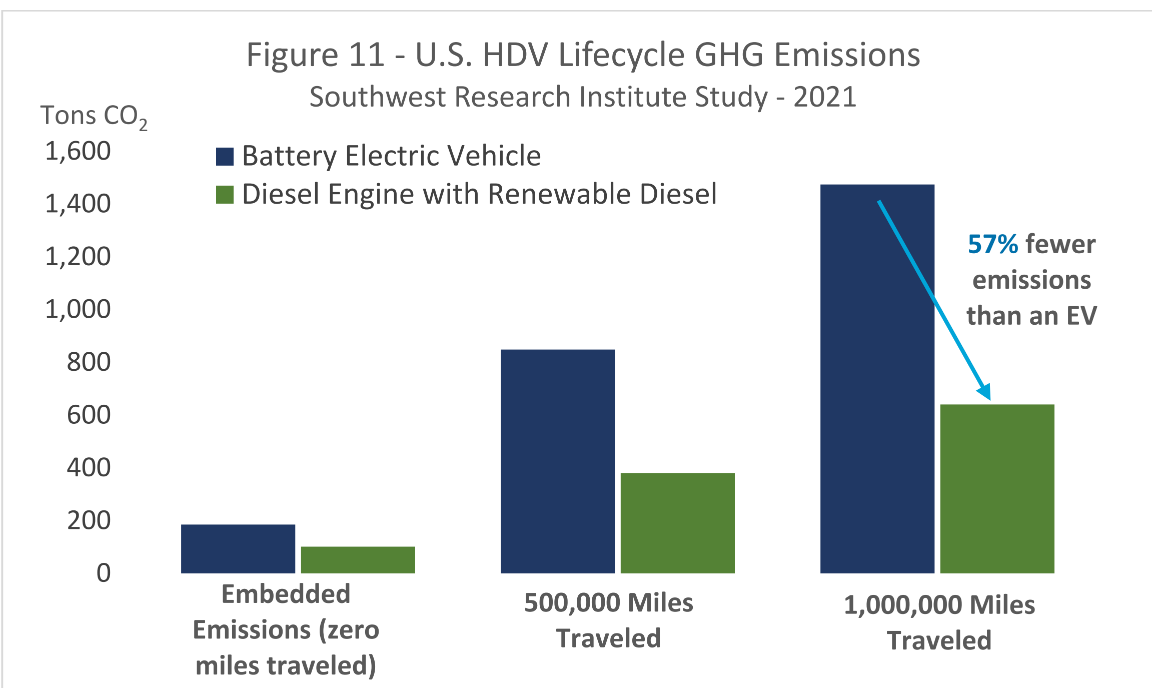
A. CARB fails to objectively evaluate all potential mitigations for GHG emission reductions from MD/HDV and to present a scenario that embodies the philosophy of "maximum technologically feasible and cost-effective reductions"

Valero's comments in Sections II.A are substantially similar to those in Section I.A and are incorporated herein by reference. Only new comments are provided in this Section.

1. Maximum Reductions in GHG Emissions

Similar to the comments presented in Section I.A., when considered on a full lifecycle basis, MD/HD ZEV are not zero-emission; in fact, they are not even the most effective technology available today to reduce GHG emissions from MD/HDV.

A lifecycle analysis conducted by Southwest Research Institute finds that GHG emissions from an HDV that runs on renewable diesel with a carbon intensity of 25 g/MJ results in 57% fewer lifecycle GHG emissions when compared to a BEV, as illustrated below. ***If CARB's true goal is to reduce GHG emissions rather than advance an agenda of electrification, then it must consider the full lifecycle impact of all available technologies.***



Additionally, considering both existing production capacity and announced projects, projected volumes of renewable diesel are enough to replace 100% of the California diesel market. Renewable diesel can also utilize existing infrastructure (*i.e.*, pipelines, terminals, and retail distribution supply chains), requiring far less investment when compared against EV charging and hydrogen fueling build-out. Renewable diesel can even be used a petroleum diesel substitute to address a number of hard to decarbonize market segments where BEV and FCEV technologies are similarly challenged (*i.e.*, rail, marine, construction/mining equipment, etc).

2. Technological Feasibility

a) Compatibility of Technology with Use

CARB's modeling in the Draft Scoping Plan indicates that there were 1.6 million MDVs and 290,000 HDVs registered in California in 2020. [61] As presented in Figures 12 to 15, under the Draft Scoping Plan, CARB projects to have 390,000 to 1.5 million MD/HD BEV and 130,000 to 600,000 MD/HD FCEV by in California by 2035, depending on the selected scenario.[62] By comparison, at the end of 2021, the total MD/HD ZEV population in California was 1,588, of which 33 were FCEVs.[63]

CARB projects that the future of medium-duty and bus transportation will be primarily made up of BEVs (80% BEV versus 20% FCEV), and that of heavy-duty transportation primarily of FCEVs (34% BEV versus 66% FCEV). [64]

The shortcoming of each the electric vehicle and fuel cell vehicle technologies is that neither one is compatible today with the full range of use, duty and demand posed by California's MD/HD transportation sectors, and therefore neither one is suitable to replace the ICEV and adequately serve the state's freight and transit needs. For example:

- The current BEV technology is not suitable for long-haul trucks. Considering the present lithium-ion battery technology, to achieve a range of 600 miles, a battery pack on a long-haul truck would need to store 1,200 kilowatt-hours (kWh) of energy, weigh 6,300 kilograms (13,900 pounds), have a volume of 2,700 liters (95 cubic feet), and cost about $180,000.[65]
    - Due to federal weight constraints for tractor trailers, a long-haul BEV truck would lose 20% of payload capacity compared with a diesel truck, reducing the available revenue per mile and increasing the number of trucks needed to avoid delay or interruption of California's statewide freight services.[66]
    - At a range of 150 miles, a long-haul BEV truck would need to stop three time to recharge over a 600-mile day. Even if a network of 350-kilowatt (kW) fast-chargers was widely available, charging time would reduce a driver's effective work day by over 2 hours, further requiring an increase in the number of trucks of to maintain the pace and demand of freight services.[67]
- The current FCEV technology facilitates larger and heavier vehicles due to its higher energy storage capacity than EVs, and it offers drivers a refueling experience much like conventional vehicles, with the fuel tank capable of being refilled in a matter of minutes. However, adoption of the technology and particularly

[61] CARB, "Draft 2022 Scoping Plan Update," "AB 32 GH Inventory Sectors Modeling Data Spreadsheet"
[62] *Id*.
[63] CEC, https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics/medium-and-heavy
[64] CARB, "Draft 2022 Scoping Plan Update," "AB 32 GH Inventory Sectors Modeling Data Spreadsheet"
[65] Assumes a battery pack energy density of 170 Wh/kg. Burke, Andrew, "Assessment of Requirements, Costs, and Benefits of Providing Charging Facilities for Battery-Electric Heavy-Duty Trucks at Safety Roadside Rest Areas: A Research Report from the National Center for Sustainable Transportation," (Feb 2022), page i.
[66] Based on a federal maximum loaded weight of 36,000 kg, on a tractor weighing 8,600 kg and compared to a tractor carrying 965 kilograms (300 gallons) of diesel fuel. *Id* at 4 and 15.
[67] Based on the Volvo Class 8 Box truck, having a range of 150 miles and an energy capacity of 1.75 kWh/mi. *Id* at 3.

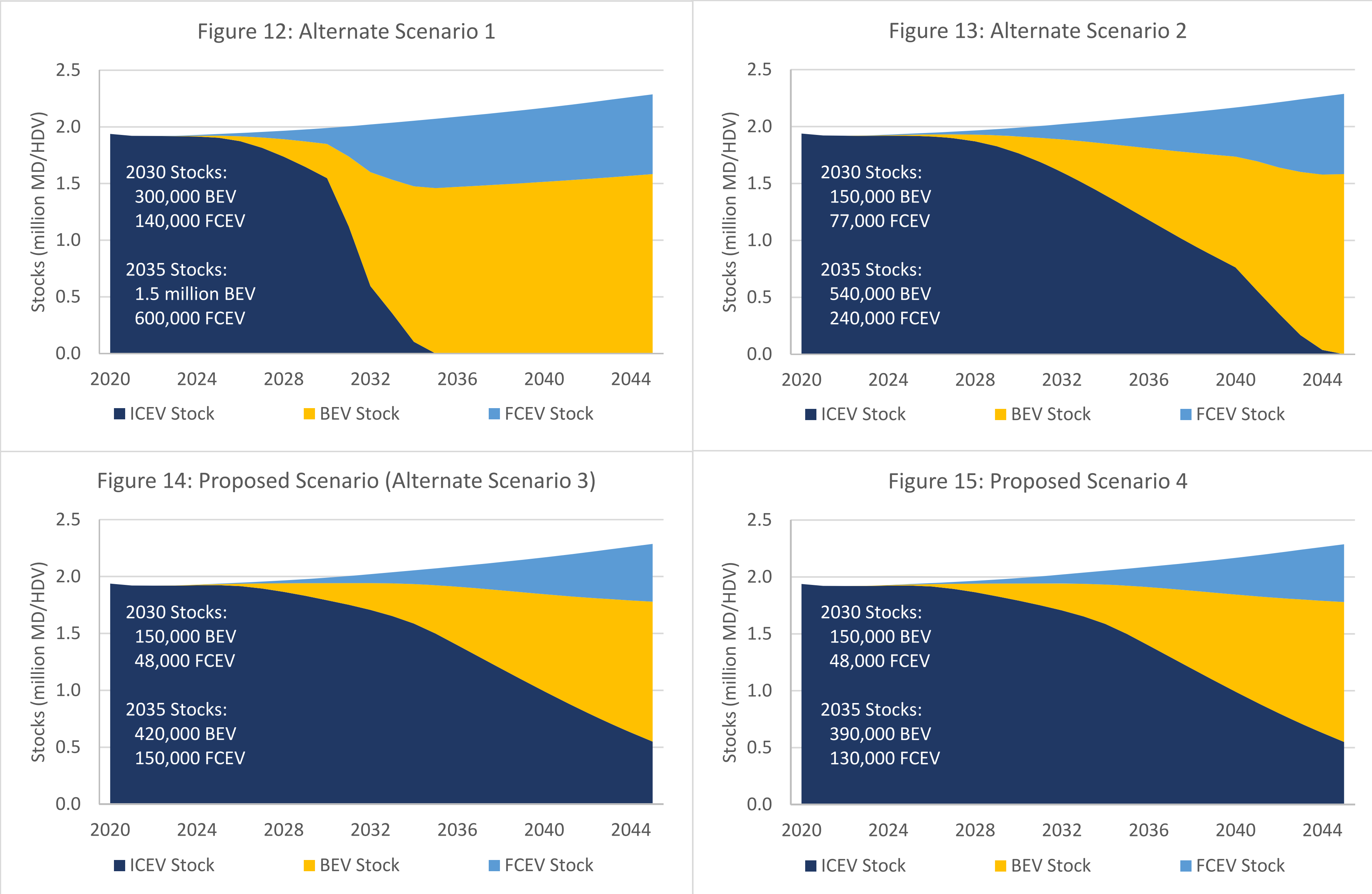
commitment to developing fueling infrastructure has been limited within the U.S. – currently the U.S. has 48 active FCEV hydrogen fueling stations, of which 47 are in California and 1 in Hawaii.[68] Any adoption of MD/HD FCEV in California would realistically be limited to use within California, and specifically to a limited range around the San Francisco, Los Angeles and Sacramento metropolitan areas (which account for 44 of the hydrogen charging stations in California).

The transition of a transportation system as large and complex as California's to a new technology is a massive undertaking, requiring the establishment of new manufacturing, assembly and supply chains; build-out of new charging/ fueling infrastructure; interface with public utilities; re-conception of fuel distribution logistics; and ultimate design of end-of-life resource recovery strategies. California is pursuing this undertaking not once, but twice, simultaneously, and with independent and unrelated technologies. Since neither technology is sufficient to fully replace the ICEV, the timing and degree of coordination between the deployment of each MD/HD EVs and FCEVs and the retirement of MD/HD ICEVs and associated infrastructure will be critical to the success of the transition. As described throughout this letter, many of the variables requiring careful coordination are outside of California's sphere of control, and great potential exists for the transition not to occur just as CARB plans it. CARB must consider the consequences of its actions on the statewide transportation sector, in the case that this transition does not proceed as planned.

For instance, while CARB appears to assume that facility operators will remain in business for exactly as much time as their product is needed, it is highly-unlikely that business operators will proceed in that fashion. Facility operations will be shutdown as operations become uneconomic, which may be a function of factors other than their demand (e.g., access to capital markets/ capital investments, inability to maintain or expand operations, inability to attract and retain workforce). As operations shutdown, there is a risk that some businesses will simply walk away from stranded assets, which may result in consequences such as blight from abandoned structures and potential adverse environmental consequences.

[68] U.S. DOE Alternative Fuels Data Center, Hydrogen Fueling Station Locations, https://afdc.energy.gov/fuels/hydrogen_locations.html#/analyze?region=US-CA&fuel=HY&country=US

Figures 12-15: CARB Modeling of MD/HDV Stocks



Source: CARB Draft 2022 Scoping Plan Update, "AB 32 GH Inventory Sectors Modeling Data Spreadsheet"

b) *Charging/ Fueling Infrastructure*

In addition to the 1.2 million chargers needed to support LD EV growth, CEC projects that an additional 157,000 chargers will be needed to support California's anticipated MD/HD EV population in 2030 – all of these will be DC fast chargers, representing another 9,100 additional job-years of dedicated workforce requirements,[69, 70] compounding the timeline feasibility challenges presented in Section I.A.2.a of this letter.

CEC further projects that the MD/HDV charging network will see loads "in excess of 2,000 MW around 5 p.m. on a typical workday," further exacerbating the existing gap between net peak energy demand and existing generation.[71]

c) *Raw Material and Supply Chain Constraints affecting ZEVs*

There is a mismatch between California's MD/HDV target and the availability of critical minerals essential to realizing its target.[72] Results have shown that "mass electrification of the heavy-duty segment on top of the light-duty segment would substantially increase the lithium demand and impose further strain on the global lithium supply."[73] The significant impact is attributed to the large single-vehicle battery capacity required by HDV and the expected battery replacement needed within the lifetime of HDV.[74] Specifically, "[t]he results suggest that global lithium resources will not be able to sustain simultaneous mass electrification of both the LDV and HDV segments."[75] Because the electrification in the LDV segment has already imposed significant strains on the global lithium supply, further mass electrification in the HDV segment, which is expected to increase the accumulated net demand by 29% to 53%, would come with risks.[76] Even if electric HDVs gain a technoeconomic advantage over other powertrain technologies and achieve market success in the short term, their long-term development is likely to face resource constraints with a reflected surge in lithium prices.[77] It is therefore "recommended that both the government and vehicle manufacturers should carefully consider the ambitious promotion of vehicle electrification in the heavy-duty segment."[78]

d) *Impacts to Cross-State Transport*

By imposing stringent restriction on freight vehicles travelling across state-lines, the Draft Scoping Plan restricts the movement of goods in the United States. Road freight plays a vital role in the economic growth of our country and is an important and ongoing component of the transportation planning processes in the United States as the interstate transport of goods impacts the national economy and qualify-of-life standards. Despite the nationwide impacts that California's MD/HDV benchmarks would have, the availability of out-of-state charging infrastructure and support for electric and fuel cell MD/HDVs outside of California is outside CARB's control or influence. CARB fails to assess or address impacts to its economy (and to the national economy) as a result of one state accelerating electric and fuel cell freight transport that would cease to be reliable or functional outside

---

[69] CEC, *Assembly Bill 2127 Electric Vehicle Charging Infrastructure Assessment Analyzing Charging Needs to Support ZEVs in 2030*, 19-AB-2127 at 1 and 6 (July 14, 2021), https://www.energy.ca.gov/programs-and-topics/programs/electric-vehicle-charging-infrastructure-assessment-ab-2127

[70] Carr, Edward; Winebrake, James; Winebrake, Samuel, "Workforce Projections to Support Battery Electric Vehicle Charging Infrastructure Installation," June 8, 2021

[71] *Id*, at 6.

[72] IEA, World Energy Outlook Special Report – The Role of Critical Minerals in Clean Energy Transitions (Revised March 2022), https://iea.blob.core.windows.net/assets/ffd2a83b-8c30-4e9d-980a-52b6d9a86fdc/TheRoleofCriticalMineralsinCleanEnergyTransitions.pdf.

[73] Hao, H., Geng, Y., Tate, J.E. *et al.* Impact of transport electrification on critical metal sustainability with a focus on the heavy-duty segment. *Nat Commun* 10, 5398 (2019). https://doi.org/10.1038/s41467-019-13400-1

[74] *Id.*

[75] *Id.*

[76] *Id.*

[77] *Id.*

[78] *Id.*

its geographically confined network of charging infrastructure and support systems. Likewise, the Draft Scoping Plan also cuts off California from the nation's longstanding good-transport network powered by diesel engines, which would be without fuel and a functional network of fueling stations if California meets its 2045 MD/HDV electrification goal. Executive Order-N-70-20 states that California should pursue 100% electrification of MD/HDV in the state "where feasible," yet the Draft Scoping Plan fails to provide explanation as to how any of its proposed scenarios for the MD/HDV segment are "feasible" or even remotely consistent with the economics and legalities underlying the interstate travel of consumer goods.

3. Cost-Effectiveness

The lack of cost-parity between conventional and emerging MD/HDV technologies is a significant barrier to California's ZEV mandate. The choice of commercial trucks and buses is driven by function and cost. Total costs of ownership of MD/HDVs includes both the capital expense to purchase the vehicle and operating costs either over the vehicle lifetime or ownership period. Electric and fuel cell MD/HDVs require higher upfront costs than diesel and gasoline counterparts.[79] Vehicle costs are often too high for the MD/HDV payback period (the length of time required for an investment to recover its upfront costs).[80] Battery packs for MD/HDVs must also be specifically suited for high lifetime mileage, deeper discharges per cycle, overall ruggedness, resistance to temperature extremes, and for production at low sales volumes. These characteristics push costs for MD/HDV battery packs toward the uppermost end of cost-range. The relatively high daily range needed by commercial vehicles results in battery costs that drive vehicle incremental costs as high as 50%–100% of the price of a conventional truck.[81]

In addition to requiring bigger batteries, batteries used for MD/HDVs are required to be different than those used in LDVs—merely scaling designs and technology from LDVs will be insufficient. The life expectancy of a heavy-duty truck is about fourteen years or 1 million miles, which is traveled over more demanding duty cycles.[82] MD/HDV components are required to be more durable, and MD/HDVs consume more energy and require more horsepower, with greater electrical power flowing to and from the battery. Because MD/HDV travel longer daily distances and have greater mile per energy demands than light-duty vehicles, greater battery capabilities and charging rates are needed on MD/HDV battery electric vehicles when compared to light-duty electric vehicles.[83]

Along with their higher upfront capital expenditure, electric MD/HDVs also must contend with electricity price projections, where utility demand charges are difficult to determine and electricity costs carry uncertainties such as whether there will be additional costs for trained personnel to operate a high-powered fast charging system.[84] According to an Atlas Public Policy report, "[r]elying on public charging networks to charge medium- and heavy-duty EVs was not a viable option due to the high cost of charging."[85] Further, 2020 market prices "were high enough that EVs were more expensive to fuel on a per-mile basis than their diesel counterparts."[86] The battery

---

[79] Nadel, S. (2019). Electrification in the transportation, buildings, and industrial sectors: A review of opportunities, barriers, and policies. Current sustainable/renewable energy reports., 6(4), 158-168, doi: 10.1007/s40518-019-00138-z, https://search.proquest.com/docview/2325699081.

[80] U.S. DOE, "Medium- and Heavy-Duty Vehicle Electrification: An Assessment of Technology and Knowledge Gaps," at 35 (December 2019), https://info.ornl.gov/sites/publications/Files/Pub136575.pdf/.

[81] *Id.* at 24

[82] *Id.*

[83] Forrest, K., Mac Kinnon, M., Tarroja, B., & Samuelsen, S. (2020). Estimating the technical feasibility of fuel cell and battery electric vehicles for the medium and heavy duty sectors in California. Applied 59 energy, 276, 115439, doi: 10.1016/j.apenergy.2020.115439 http://dx.doi.org/10.1016/j.apenergy.2020.115439.

[84] U.S. DOE, "Medium- and Heavy-Duty Vehicle Electrification: An Assessment of Technology and Knowledge Gaps" at 23 (December 2019).

[85] Satterfield, Charles and Nigro, Nick, "Assessing Financial Barriers to Adoption of Electric Trucks," (February 2020), https://atlaspolicy.com/wp-content/uploads/2020/02/Assessing-Financial-Barriers-to-Adoption-of-Electric-Trucks.pdf

[86] *Id.*

payback period is also highly sensitive to not only battery life and replacement, but electricity price as well. And commercial and industrial electricity rate structures are not aligned to MD/HDV charging needs. The substantial electricity demand requirements of MD/HDVs coupled with limited downtime to charge larger class vehicles greatly reduces any financial savings associated with electricity, if they exist at all, over diesel based on current rates.

The North American Council on Freight Efficiency (NACFE) assessed EV total costs of ownership from the fleet owner perspective for the U.S. MD market.[87] They concluded that, while electric trucks are a viable option in several operations, they are not the solution for every application and there are still a large number of unknowns. These uncertainties include economic, regulatory, and electric power issues, but key unknowns arise from the relative immaturity of the technology. Significantly, there is "insufficient field data to establish a baseline for comparison against alternative truck types," including maintenance and repair costs, battery and vehicle expected lifetime, and vehicle residual value.[88] Each unknown represents a risk for fleet owners.[89] Long term data has yet to confirm actual savings realized by medium and heavy-duty ZEVs.

MD/HD FCEVs are similarly less cost-effective than ICEV utilizing low-carbon liquid fuels or on-board carbon capture technology. Per CARB's own estimate, final capital costs for a hydrogen fuel cell Class 8 day cab tractor used in regional operation[90] were $629,189 in 2018 compared with $134,000 for an analogous diesel vehicle:[91]

Table 5: Capital costs for a tractor

Regional Tractor	2018	2024	2030
Diesel	$134,000	$144,101	$146,442
Battery-electric	$474,930	$232,155	$195,960
Hydrogen fuel cell	$629,189	$431,480	$227,570

In 2024, CARB estimates that a hydrogen fuel cell tractor truck will cost $431,480 compared to $144,101 for a new diesel tractor.[92] Consistent with CARB's estimates, the International Council on Clean Transportation (ICCT) recently forecast that composition costs for a hydrogen fuel cell tractor-truck in 2025 will exceed $400,000.[93] CARB has also recognized that operating costs for a regional-hydrogen tractor in 2024 will exceed those for tractor trucks powered by diesel or battery electric.[94]

Analysis from a Northwestern University research team has shown that cost-effective diesel tractors trucks combined with well-developed on-board carbon capture technologies offer a practical way to make large freight vehicles carbon neutral when running on fossil fuels and even carbon negative when running on biofuels.[95] Given

---

[87] https://nacfe.org/emerging-technology/medium-duty-electric-trucks-cost-of-ownership/
[88] *Id.*
[89] *See Id.*
[90] CARB, Appendix H: Draft Advanced Clean Trucks Total Cost of Ownership Discussion Document at 1 (October 22, 2019) https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2019/act2019/apph.pdf.
[91] *Id.* at 9.
[92] *Id.*
[93] Sharpe, Ben & Basama, Hussein, The International Council on Clean Transportation (ICCT) Working Paper 2022-09, "A meta-study of purchase costs for zero-emission trucks" at 12 (February 2022), https://theicct.org/wp-content/uploads/2022/02/purchase-cost-ze-trucks-feb22-1.pdf.
[94] *Id.* at 10.
[95] Schmauss, Travis A. & Barnett, Scott A, "Viability of Vehicles Utilizing On-Board CO_2 Capture," ACS Energy Letters 2021, 6, 8, 3180-3184 (August 18, 2021) https://doi.org/10.1021/acsenergylett.1c01426.

existing liquid fuel infrastructure, "rapid adoption of such vehicles should be possible and CO_2 emissions can be continuously decreased."[96]

By contrast, major hydrogen production and distribution infrastructure will need to be put in place before FCEV are even serviceable.[97] "[A]nalysis [also] suggests that the infrastructure for the hydrogen pathway is generally costlier than battery electric," with hydrogen transport facing "the largest cost-penalty in the near-term."[98] It is estimated that the capital cost for a single hydrogen filling station is $1.5 to $2.0 million.[99] Moreover, there are currently no hydrogen fuel cell tractor-trucks commercially available in North America or Europe to confirm their true cost or economic viability.[100]

B. CARB must consider current challenges to its existing MD/HD ZEV sales mandates in finalizing the proposed MD/HDV actions in the Draft Scoping Plan

Since the release of CARB's Draft Scoping Plan, the Truck and Engine Manufacturers Association (EMA) filed a lawsuit against CARB in federal court for moving too quickly in its implementation of the Heavy-Duty Omnibus rule and failing to provide the requisite four-year window for manufacturers to achieve compliance. In response, EPA is considering partially denying a Clean Air Act Waiver for the HD regulations, which "would void the first few years of the truck regulations."[101]

As the MD/HD sales mandates in the Draft Scoping Plan build upon existing regulations in the Advanced Clean Trucks rule, CARB must consider the EMA lawsuit and its potential implications to CARB's HD ZEV agenda when it finalizes the scenarios and actions in the 2022 Scoping Plan update.

---

[96] *Id.*
[97] *Id.*
[98] Hall, Dale and Lutsey, Nic, ICCT White Paper, "Estimating the Infrastructure Needs and Costs for the Launch of Zero-Emission Trucks" at 18 (August 2019). https://theicct.org/sites/default/files/publications/ICCT_EV_HDVs_Infrastructure_20190809.pdf
[99] For stations built between 2015 and 2017 for 400-500 kg/day. California Hydrogen Business Council, "Hydrogen FAQs," https://californiahydrogen.org/resources/hydrogen-faq/#:~:text=Capital%20costs%20in%20California%2C%20where,early%20(2013)%20market%20fueling., accessed June 23, 2022.
[100] Sharpe, Ben & Basama, Hussein, ICCT Working Paper 2022-09, "A meta-study of purchase costs for zero-emission trucks" at 12 (February 2022), https://theicct.org/wp-content/uploads/2022/02/purchase-cost-ze-trucks-feb22-1.pdf.
[101] Skibell, Arianna, E&E News, "EPA might deny Calif.'s clean truck waiver" (June 10, 2022)

III. CARB Proposed Actions for Aviation, Ocean-going Vessels, Cargo-Handling Equipment, Freight and Passenger Rail

As in the previous section, Valero's comments in Section III.A. are substantially similar to those in Sections I.A and II.A and are incorporated herein by reference. Only new comments are provided in this section.

A. With its proposed actions for the transportation sector, CARB fails to maintain technology and infrastructure compatibility with interstate and international aviation, marine and rail transport sectors, and also fails to consider the implications of isolating its freight and transit industries from the U.S. and global communities

California must maintain compatibility with the national and international modes of transport with which it interfaces. The Draft Scoping Plan's provisions restricting interstate and international freight traffic, aviation, marine transport and/or rail transportation have widespread economic implications for interstate commerce, policy consequences for energy independence and the national supply chain, as well as geopolitical risks too significant for California to singlehandedly control. Due to the interstate and international nature of travel inherent to aviation, marine, and rail transportation, deployment of battery electric and fuel cell electric technologies in these segments is premature. Cross-state transportation modes need to be consistent with other state practices, infrastructure, and support in order to be functional for long-distances. If not, California runs the risk of geographically isolating itself from freight and passenger traffic and burdening local ZEVs with out-of-state range anxiety. These transport segments are highly vulnerable to the lack of developed ZEV infrastructure outside of California, and excessive re-charging time inherent to cross country, long-distance travel. Because of these challenges, CARB's proposals will ultimately encourage out-of-state registrations and sales of legacy technology that then must travel to California, contributing to leakage and undermining the transparency and effectiveness of CARB's emission-reduction efforts. By contrast, renewable diesel—a drop-in fuel with extremely low carbon intensity that has played a significant role in meeting the declining carbon intensity targets under European policies and the California LCFS—would allow California to meet its environmental obligations without hindering economic growth and progress toward the state's clean energy future. Please also refer to Section VI, incorporated herein by reference, for additional comments regarding CARB's authority to control interstate and international transport.

IV. CARB Proposed Actions for Petroleum Refining

Scenario	Action
Proposed Scenario	• CCS on majority of petroleum refining operations by 2030 • Production reduced in line with petroleum demand
Alternative Scenario 1	• Phase out petroleum refining production by 2035 in line with petroleum demand
Alternative Scenario 2	• CCS on majority of petroleum refining operations by 2030 • Production reduced in line with petroleum demand *(same as Proposed Scenario)*
Alternative Scenario 4	• CCS on majority of petroleum refining operations by 2030 • Production reduced in line with petroleum demand *(same as Proposed Scenario)*

A. CARB's attempts to minimize leakage from the loss of in-state refining are insufficient

In each of the four scenarios presented in the Draft Scoping Plan, CARB models in-state petroleum refining operations as being reduced and ultimately phased out "in line with the reduction in demand for in-state on-road petroleum fuel."[102] CARB also states that "to avoid leakage, as called for in AB 32, and meet that remaining demand for petroleum fuel, a complete phaseout of oil and gas extraction and refining is not possible by 2045."[103]

In its plans to phase out petroleum refining operations, CARB must also recognize the logistical constraints that the loss of each refinery poses to in-state liquid fuel supply and distribution capabilities, as well as the potential for inefficient fuels distribution and increased GHG emissions as the remaining fuel producers attempt to continuing serving the needs of all of California's markets. For example, with insufficient flow California's pipeline networks would cease to function, having huge ramifications, including restricting a significant portion of Arizona's fuel supply and severely curtailing supply to Las Vegas and Reno, Nevada. There are also multiple military installations and inland airports that rely on pipeline supply of jet fuel. California lacks the refined product pipeline networks and rail connectivity for one refinery to interchangeably satisfy the markets previously served by another, and statewide distribution of liquid fuels by truck is counter to CARB's goals in the Scoping Plan. ***CARB has not carefully considered how to reliably and cost-effectively serve its transitioning transportation sector and maintain an efficient, effective and stable fuel supply for Californians.***

Aware of the significant ongoing demand for petroleum products, the Draft Scoping Plan's attempt to phase out critical refining production is irresponsible and threatens to leave millions of Californians without transportation fuel. Low-income rural areas will be particularly negatively impacted, as these areas are places where people already are more likely to drive longer distances in general, and likely to already have fewer gas stations when compared to urban areas. We strongly object to the Draft Scoping Plan's characterization of California's refineries as vestiges of a dispensable industry that are incompatible with its clean-energy future, and encourage California to support a more productive operating environment for the in-state energy providers Californians depend on.

[102] CARB, "Draft Scoping Plan" at page 78
[103] *Id*.

B. *CARB fails to recognize and mitigate the full breadth of impacts of phasing out in-state petroleum refining operations*

CARB's modeling suggests that the contributions of in-state petroleum refining are limited to on-road liquid fuels, and in doing so, fails to consider the full breadth of products made from petroleum that are consumed every day in California. A partial list of more than 6,000 products made from oil and gas is provided in Table 1.

CARB fails to consider in the Draft Scoping Plan how it will source asphalt to pave its roads, tires to support its electrified transportation sector, and a multitude of other consumer products and pharmaceuticals that are integral to day-to-day life of Californians, after in-state petroleum refining has been phased out. California current imports about 30 percent of the asphalt used in-state, which is primarily supplied by rail. The loss of in-state asphalt production would force rail transport of higher volumes and from further distances, driving up costs and GHG emissions. If California's asphalt needs were to exceed the potential for railed supplies, incremental asphalt would need to be imported by marine vessel, likely from Asia. The Draft Scoping Plan neither accounts for the GHG burdens being outsourced by CARB's policies nor the logistics-related increases in GHG emissions.

Table 1 – Partial list of Products made from Oil and Natural Gas[104]

Adhesives	Deodorant	Kayaks	Safety glasses
Air mattresses	Detergents	Laptops	Shampoo
Ammonia	Dice	Life jackets	Shaving cream
Antifreeze	Dishwashing liquid	Light-weight aircraft	Shoe polish
Antihistamines	Dog collars	Lipstick	Shoes/ sandals
Antiseptics	Drinking cups	Loudspeakers	Shower curtains
Artificial limbs	Dyes	Lubricants	Skateboards
Artificial turf	Electric blankets	Luggage	Skis
Asphalt	Electrical tape	Model cars	Soap dishes
Aspirin	Enamel	Mops	Soft contact lenses
Awnings	Epoxy paint	Motorcycle helmets	Solvents
Backpacks	Eyeglasses	Movie film	Spacesuits
Balloons	Fan belts	Nail polish	Sports car bodies
Ballpoint pens	Faucet washers	Noise insulation	Sunglasses
Bandages	Fertilizers	Nylon rope	Surf boards
Beach umbrellas	Fishing boots	Oil filters	Swimming pools
Boats	Fishing lures	Packaging	Synthetic rubber
Cameras	Floor wax	Paint brushes	Tennis rackets
Candies and gum	Food preservatives	Paint rollers	Tents
Candles	Footballs	Pajamas	Tires
Car battery cases	Glue	Panty hose	Tool boxes
Car enamel	Glycerin	Parachutes	Tool racks
Caulking	Golf bags	Perfumes	Toothbrushes
CD's and DVD's	Golf balls	Permanent press	Toothpaste
Cell phones	Guitar strings	Petroleum jelly	Transparent tape
Clothes/clothing	Hair coloring	Pharmaceuticals	Trash bags
Clothesline	Hair curlers	Pillows	Truck and automotive parts
Coffee makers	Hand lotion	Plastic toys	Tubing
Cold cream	Hearing aids	Plastics	TV cabinets
Combs	Heart valves	Plywood adhesive	Umbrellas

[104] U.S. DOE, "Products Made from Oil and Natural Gas," https://www.energy.gov/sites/prod/files/2019/11/f68/Products%20Made%20From%20Oil%20and%20Natural%20Gas%20Infographic.pdf

Computer keyboards	House paint	Propane	Unbreakable dishes
Computer monitors	Hula hoops	Purses	Upholstery
Cortisone	Ice chests	Refrigerants	Vaporizers
Crayons	Ice cube trays	Refrigerator linings	Vinyl flooring
Credit cards	Ink	Roller skate wheels	Vitamin capsules
Curtains	Insect repellent	Roofing	Water pipes
Dashboards	Insecticides	Rubber cement	Wind turbine blades
Denture adhesives	Insulation	Rubbing alcohol	Yarn
Dentures	iPad/ iPhone		

This list from the U.S. DOE makes clear that "car battery cases," "car enamel" and "automotive parts" are "products made from oil and natural gas." Petroleum products have been key components of EV innovation, making vehicles lighter and more efficient through the application of plastics, engineered polymers, and fiber-reinforced composites integral to EV design.[105] EVs need petrochemicals, and they will continue to play a critical role in further reducing the weight of EVs, which will help increase their range.[106] The Draft Scoping Plan should not only account for leakage associated with the production of petrochemicals necessary to produce EVs, but also analyze the impact discontinued oil and refining production in-state will have on California's ability to encourage EV production to scale with its proposals.

C. *California must remove road-blocks to support large-scale deployment of CCS*

Under the Proposed Scenario and Alternate Scenarios 2 and 4 of the Draft Scoping Plan, CARB expects the "majority of petroleum refining operations" to have implemented carbon capture and sequestration (CCS) by 2030. The Federal government recognizes the need for long term financial support for CCS, so its 45Q Income Tax Credit[107] has a 12-year life. Given CARB's outlook for refining operations, it may be difficult for a refinery to justify a large capital investment in CCS.

CCS is an important climate change mitigation strategy that will play a critical role in meeting the state's and nation's climate-related targets. If California is committed to achieving large-scale deployment of CCS in such an aggressive timeline, it must support industry in removing a number of obstacles that exist today:

a) Class VI Well Permitting – California has not been delegated authority by EPA to permit Class VI wells and therefore has no ability to influence the associated permitting timeline. California should undertake the necessary efforts to secure primacy over the permitting of Class VI wells.

b) Eminent Domain – Deployment of CCS in California will require the construction of pipelines capable of gathering and transporting carbon dioxide (CO_2) from points of capture to points of sequestration. To facilitate the construction of the requisite pipeline network, California should consider enacting provisions that authorize the use of eminent domain for CO_2 pipelines.

c) Pore Space Rights – California law remains unsettled on the issue of pore space rights. California should consider enacting provisions that clearly define ownership rights for pore space that is necessary for carbon sequestration (underway as Senate Bill 1101). California should also consider mechanisms to unitize the pore space associated with geologic sequestration sites.

---

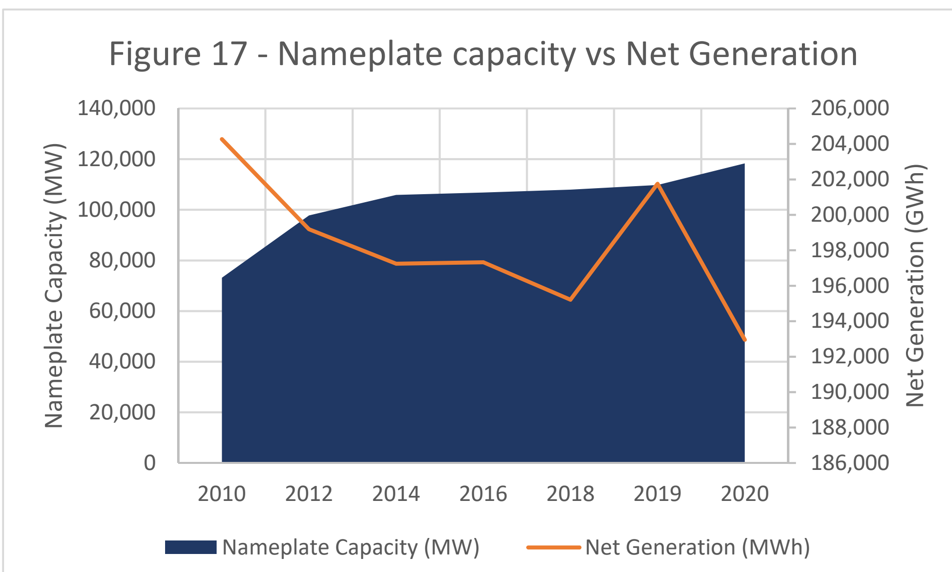
[105] https://www.visualcapitalist.com/how-much-oil-electric-vehicle/
[106] *Id.*
[107] Section 45Q of the Internal Revenue Code offers a tax credit that varies per dollar amount for each metric ton of carbon captured and sequestered, depending on the timing and type of project.

V. CARB's Proposed Actions for Electricity Generation

Scenario	Action
Proposed Scenario	• Electric sector GHG target of 38 MMTCO2e in 2030 and 31 MMTCO2e in 2045 • Retail sales load coverage • Same generation resources as Alternative 2
Alternative Scenario 1	• Electric sector GHG target of 23 MMTCO2e in 2030 and 0 MMTCO2e in 2035 • Total load coverage • Excludes combustion-based generation resources regardless of fuel; hydrogen fuel cells provide firm capacity
Alternative Scenario 2	• Electric sector GHG target of 30 MMTCO2e in 2030 and 30 MMTCO2e in 2035 • Retail sales load coverage • Includes Renewables Portfolio Standard (RPS)-eligible and zero-carbon generation resources (see Appendix H (AB 32 GHG Inventory Sector Modeling))
Alternative Scenario 4	• Electric sector GHG target of 38 MMTCO2e in 2030 and 30 MMTCO2e in 2045 • Retail sales load coverage • Same generation resources as Alternative 2

A. CARB fails to consider grid reliability impacts from its net-zero scenarios

Over the past decade, California's electricity generation resource mix has transitioned through the retirement of coal power plants and investment in wind, solar and other renewable sources. Over 2010-2020, the state's total generating capacity has increased by 60%, while net generation has decreased by 5% over the same period (refer to Figure 17). Meanwhile, the state's electrical power grid performance has worsened in each of the three reliability metrics tracked by EIA (refer to Table 2).



Source: EPA eGRID 2010, 2012, 2014, 2016, 2018, 2019 and 2020 data

Table 2 – California Electrical Power Reliability Metrics

Metric	Description	3-year Average (2013-2015)	3-year Average (2018-2015)	% Change
System Average Interruption Duration Index (SAIDI)	Describes the duration of the average customer interruption	108.7	350.0	222%
System Average Interruption Frequency Index (SAIFI)	Describes how often the average customer experiences an interruption	0.9	1.1	23%
Customer Average Interruption Duration Index (CAIDI)	Describes the average time required to restore service	122.1	306.1	151%

Source: EIA State Electricity Profiles – California Electricity Profile 2020

Already today, California relies on imported electricity to satisfy 30% of its net electricity demands.[108] Governor Newsom's proposed budget includes funding for a strategic reliability reserve to support reliability when the grid is most stressed, which will consist of new emergency generation projects, contracts to temporarily extend resources planned for retirement, and additional contracts for imports. Even with the adoption of the proposed strategic reliability reserve, and not considering impacts of extreme events and further delays in projects coming on-line, the Governor's office is projecting a gap between net peak energy demand and existing generation (including procured projects) of 1,800 megawatts, putting Californians at an increased risk out outages this summer .[109]

Despite the state's electrical generation resource mix is becoming more intermittent in nature and less reliable, CARB has designed scenarios in the Draft Scoping Plan that will increase annual electricity demand by 160,000-230,000 GWh by 2045, depending on the selected scenario, representing an 80-120% increase over the statewide 2020 net electricity generation.[110, 111]

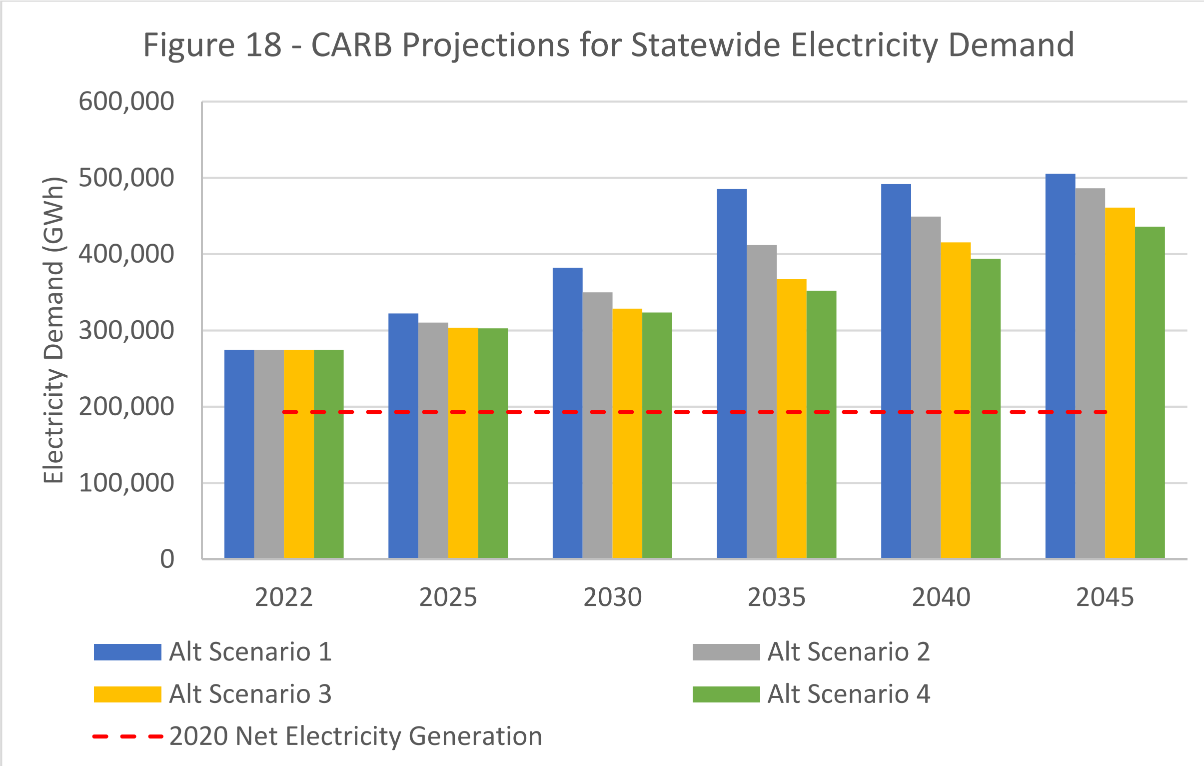
---

108 EIA State Electricity Profiles – California Electricity Profile 2020, https://www.eia.gov/electricity/state/california/

109 Memo from Ana Matosantos (California Cabinet Secretary) to Jennifer Granholm (Secretary of Energy) regarding "Request for clarification to the Guidance issued by DOE for the first round of the Civil Nuclear Credit Program application" (May 23, 2022), https://static.ewg.org/upload/pdf/calif_letter_to_DOE.pdf?_ga=2.66025198.19902243.1653860374-927036638.1653860374

110 CARB, "Draft 2022 Scoping Plan Update," "AB 32 GH Inventory Sectors Modeling Data Spreadsheet," "Energy Demand" tab, https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents

111 2020 Statewide net electricity generation of 193,000 GWh. EIA State Electricity Profiles – California Electricity Profile 2020, https://www.eia.gov/electricity/state/california/



For the transportation sector alone, CARB projects that the Draft Scoping Plan will increase annual electricity demand by 90,000 to 108,000 GWh over 2022 levels by 2045, depending on the selected scenario, representing approximately 50% of the statewide 2020 net electricity generation.[112]

Recognizing the magnitude of all these challenges, CARB must consider the reality that near-complete electrification of the transportation sector, near-complete electrification of residential energy use, and retirement of fossil-fuel fired electricity generating facilities will not likely be achieved wholly within California's borders, and yet, CARB fails to account for GHG emissions that would be "outsourced" to other states and countries to support California's climate goals.

For individuals and communities that lack back-up power resources, a loss of electricity in an all-electric-vehicle world means a loss of personal mobility and an inability to get to and from work or school, secure food and obtain medical attention. CARB also must consider the potential that it will prove infeasible to safely and reliably satisfy the projected electricity demands under the Draft Scoping Plan, and must evaluate and present the impacts of the proposed economy-wide electrification in a reality of constrained electricity supply.

[112] CARB, "Draft 2022 Scoping Plan Update," "AB 32 GH Inventory Sectors Modeling Data Spreadsheet," "Energy Demand" tab, https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents

VI. Legal Insert

Although the Scoping Plan lacks the force of law on its own merits, this Plan establishes the Board's policy direction to staff that will guide future rulemaking actions. It is crucial that the policy directives guiding these future rulemaking actions be supported by state and federal law in order to avoid inefficient expenditure of time and resources, or worse, misleading the public by setting unrealistic expectations regarding outcomes that are not within the State's authority to mandate. The Draft Scoping Plan update acknowledges that the scenarios and measures contemplated are extraordinary, yet there seems to be little or no legal analysis to confirm that the novel approaches and requirements recommended under the plan are within CARB's authority and do not offend principles of State or Federal law.

The draft Scoping Plan Update proposes to eliminate an entire industrial sector by implementing measures intended to shut down oil production, petroleum pipelines and terminals, refineries, renewable fuels, tanker trucks, oil change shops, fuel service stations, and numerous other service providers and businesses that rely on or supply these businesses. The prescriptive measures necessary to force these outcomes will necessarily impair liberty interests protected under the California Constitution.

Further, the Draft Scoping Plan update raises significant concerns over the vested economic interests of a variety of California businesses. California courts have held that businesses have "the right to continue operating an established business in which [he has] made a substantial investment."[113] Vested rights are rights that are "already possessed" or "legitimately acquired."[114] California courts have recognized both vested rights in economic interests (ability to continue operation of a business) and the vested rights doctrine as it relates to land use development (ability to develop land in accordance with a valid government authorization).[115] In addition, where the real property is legitimately acquired, the business activity is "undertaken in accordance with applicable statutory mandates," and the right has a "potentially massive economic aspect," then, "[c]ertainly, a fundamental vested right is at issue."[116] When these types of rights are at stake, they are considered too important to be relegated to "exclusive administrative extinction."[117] Courts have been careful to require more than economic burden by way of increasing the cost of doing business and instead have looked to protect economic interests where a company will be driven out of business or "forced to operate at a loss and close."[118] The draft Scoping Plan would deprive a multitude of established large and small businesses of this right.

Similarly, the Takings Clause of the Fifth Amendment, made applicable to the states through the Fourteenth Amendment, provides, "[N]or shall private property be taken for public use, without just compensation." Here, the draft Scoping Plan Update explicitly seeks to eliminate the production and use of fossil fuels, which will have ripple effects on individuals and businesses up and down the entire supply chain. The shutting down of these

---

[113] *Id.* at 1529.

[114] *Harlow v. Carleson,* 16 Cal. 3d 731, 735 (1976).

[115] *Goat Hill Tavern v. City of Costa Mesa*, 6 Cal. App. 4th 1519, 1526 (1992).

[116] *The Termo Co. v. Luther*, 169 Cal. App. 4th 394, 407–08 (2008) (Finding a fundamental vested right where the Director of Conservation ordered the plugging of 28 oil wells that had been lawfully in operation for over 20 years).

[117] *Id.* at 406 (citing *Goat Hill Tavern*, 6 Cal. App. 4th at 1526).

[118] *Mobil Oil Corp. v. Superior Court*, 59 Cal. App. 3d 293, 305 (1976) (Determining a fundamental vested right was not impacted because "[w]e are not presented with the enforcement of a rule which effectively drives the Oil Companies out of business. At most it puts an economic burden on them increasing the cost of doing business"); *Standard Oil Co. v. Feldstein*, 105 Cal. App. 3d 590, 604 (1980) (Concluding that the action did not impact a fundamental vested right because "[t]here is no contention that Standard will be driven to financial ruin by the action of the District; there is not even a contention that this particular facility will be forced to operate at a loss and close."); *San Marcos Mobilehome Park Owners' Ass'n v. City of San Marcos*, 192 Cal. App. 3d 1492, 1502 (Holding that "there is no contention, nor does the evidence suggest, that if the Commission denied the requested rent increases, the park owners would be in such an unfavorable economic position they would go out of business.").

businesses will have a potentially massive economic impact and therefore represents an unconstitutional deprivation of vested rights under California law as well as an unconstitutional taking under the U.S. Constitution.

Furthermore, CARB should consider whether the measures called for in the Draft Scoping Plan revisions conflict with or are otherwise preempted by the statutory mandates of federal legislation such as the Energy Policy and Conservation Act (EPCA); the federal Clean Air Act; the Energy Independence and Security Act (EISA), including the Renewable Fuel Standard (RFS). For example, because the measures called for in the draft Scoping Plan update would dramatically decrease the volumes of renewable fuel used for transportation, these measures frustrate Federal mandates under the Renewable Fuel Standard. Congress created the RFS to "move the United States toward greater energy independence and to reduce greenhouse gas emissions."[119] Congress intended the program "to be a 'market forcing policy' that would create 'demand pressure to <u>increase</u> consumption' of renewable fuel."[120] Because Congress directed EPA to comply with the RFS, EPA cannot promote the substantial or exclusive use of a technology (electrification) that will frustrate its goals.

Similarly, the federal government has already established emission standards for numerous sectors that the draft Scoping Plan focuses on, including the vehicle, aviation, marine, and rail sectors. Because EPA's standards preempt any state-specific standards for these sectors, CARB generally cannot establish more restrictive standards than the federal standards. In light of this, CARB should take care not to base its Scoping Plan goals on legal authority it does not possess. For example:

- Federal aviation emission regulations preempt state regulations. Much of the aviation industry is inherently interstate and international, making this sector particularly appropriate for the federal government to regulate. As such, 42 U.S.C. § 7573 preempts states from adopting or enforcing "any standard respecting emissions of any air pollutant from any aircraft or engine thereof unless such standard is identical" to EPA's standards. On January 11, 2021, the EPA adopted new GHG emission standards that apply to apply to civil subsonic jet airplanes and larger civil subsonic propeller-driven airplanes.[121] Notably, the standards are equivalent to the airplane carbon dioxide standards adopted by the International Civil Aviation Organization in 2017.[122] In the preamble to the final rule, EPA notes, "These standards will ensure control of GHG emissions, maintain international uniformity of airplane standards, and allow U.S. manufacturers of covered airplanes to remain competitive in the global marketplace."[123] Thus, CARB's draft Scoping Plan should account for emission reductions in the aviation industry due to compliance with the new federal GHG emissions standards for airplanes, but should not presume that CARB can impose more restrictive emission standards than exist at the federal level.

- Federal marine emission regulations preempt state regulations. Similar to the aviation industry, much of the marine industry is international, making federal regulation rather than state regulation particularly appropriate. The Clean Air Act gives the federal government authority to regulate nonroad engines, including engines for marine vessel engines.[124] California can seek authorization from EPA to adopt regulations addressing emissions from nonroad engines including marine engines, but such authority is not guaranteed, nor is it unfettered.[125] The authorization process, similar to a waiver for motor vehicle standards, requires California standards to meet certain criteria in order for preemption to be waived. The

---

[119] *Americans for Clean Energy v. EPA*, 864 F.3d 691, 696 (D.C. Cir. 2017).
[120] *Id*. at 705 (quoting Final Rule, 80 Fed. Reg. at 77,423) (emphasis added).
[121] Control of Air Pollution From Airplanes and Airplane Engines: GHG Emission Standards and Test Procedures, 86 Fed. Reg. 2136 (Jan. 11, 2021).
[122] *Id.* at 2137.
[123] *Id.* at 2138.
[124] *See* 42 U.S.C. § 7547.
[125] 42 U.S.C. § 7543(e)(2).

federal government has already set standards in this space that especially affects interstate and international commerce as well as international agreements. In particular, EPA finalized emission standards for marine diesel engines below 30 liters per cylinder displacement and for marine spark-ignition engines in 2008.[126] The Agency then finalized emissions standards for marine diesel engines at or above 30 liters per cylinder displacement (known as Category 3 marine engines) in 2010.[127] Like the aviation emission standards, the emission standards for Category 3 marine engines reflect standards set forth in an international agreement—in this case, the amendments to Annex VI to the International Convention for the Prevention of Pollution from Ships.[128] Rather than rely on uncertain authority, California should rely on the certainty of the already-promulgated federal regulations.

- Federal rail emission regulations preempt state regulations. The rail industry is also primarily an interstate and international industry, making it better suited for federal than the state emission regulation. Congress recognized this and granted EPA the sole authority for promulgating emissions standards for "new locomotives and new engines used in locomotives."[129] In particular, 42 U.S.C. § 7543(e)(1) establishes that "[n]o State or any political subdivision thereof shall adopt or attempt to enforce any standard or other requirement relating to the control of emissions from . . . [n]ew locomotives or new engines used in locomotives." Accordingly, California is expressly preempted from adopting emission standards related to new locomotives/engines. In 2008, EPA established emission standards that apply to all types of locomotives, including line-haul, switch, and passenger.[130] Therefore, CARB's Scoping Plan goals should not depend on establishing emission standards for locomotives more restrictive than the current federal standards.

Finally, the Draft Scoping Plan revisions call for measures that may violate other Constitutional provisions. These include, but likely are not limited to, the dormant Commerce Clause, which prohibits state regulations that improperly discriminate against out-of-state commercial interests or that unduly burden interstate commerce as well as the dormant foreign affairs preemption doctrine under the Supremacy Clause, which preempts state laws that intrude on the exclusive federal power to conduct foreign affairs,[131] and the equal sovereignty doctrine.

Although detailed legal analysis can and should be conducted in support of the specific rulemaking actions undertaken consistent with the Scoping Plan, that does not relieve CARB of the obligation to conduct sufficient analysis to determine that the measures recommended in the Scoping Plan are likely to withstand legal scrutiny. Because the measures called for under the Draft Scoping Plan update are unprecedented in their scope and reach, CARB should pause to conduct sufficient legal review to confirm that the recommended actions are authorized under state law and that they are not preempted or precluded as a matter of Federal law before establishing direction for further rulemaking.

---

[126] Control of Emissions of Air Pollution From Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder, 88 Fed. Reg. 25,098 (May 6, 2008); Control of Emissions From Nonroad Spark-Ignition Engines and Equipment, 73 Fed. Reg. 59,034 (Oct. 8, 2008).

[127] Control of Emissions From New Marine Compression-Ignition Engines at or Above 30 Liters per Cylinder, 83 Fed. Reg. 22,896 (Apr. 30, 2010).

[128] *Id.* at 22,896.

[129] 42 U.S.C. § 7547(a)(5).

[130] Control of Emissions of Air Pollution From Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder, 88 Fed. Reg. 25,098 (May 6, 2008).

[131] *See Movsesian v. Victoria Versicherung AG*, 670 F.3d 1067 (9th Cir. 2012).