Date of Hearing: July 12, 2023

ASSEMBLY COMMITTEE ON UTILITIES AND ENERGY
Eduardo Garcia, Chair
SB 493 (Min) – As Amended June 19, 2023

SENATE VOTE: 36-0

SUBJECT: Air pollution: alternative vehicles and electric and hydrogen infrastructure

SUMMARY: This bill requires the California Energy Commission (CEC) to assess the energy resources, including hydrogen fuel storage and transport, as well as electricity generation and infrastructure, needed to meet state goals to transition medium and heavy-duty vehicles to zero-emission vehicles (ZEVs), and it requires the California Air Resources Board (CARB) to use the CEC's assessment to create a strategic plan to achieve this transition.

EXISTING LAW:

1) Requires the CEC, working with CARB and the California Public Utilities Commission (CPUC) to conduct a bi-annual statewide assessment of the electric vehicle (EV) charging infrastructure needed to meet the state's goal to put at least five million ZEVs on California roads by 2030, and of reducing emissions of greenhouse gases (GHG) to 40% below 1990 levels by 2030. The assessment must consider all necessary charging infrastructure and all vehicle categories, road, highway, and offroad electrification, port and airport electrification. (Public Resources Code § 25229)

2) Requires the CEC to gather specified information about the deployment of ZEV fleets subject to CARB regulations to enable electric utilities to estimate increased electrical loads resulting from fleet transitions to ZEVs. (Public Resources Code § 25328)

3) Requires the CPUC to direct investor-owned utilities (IOUs) to file applications for investments to accelerate transportation electrification, reduce reliance on petroleum, and meet certain climate goals. The CPUC may approve or amend applications for transportation electrification investments. IOUs are authorized to recover reasonable costs for approved investments from ratepayers if they are consistent with certain requirements. (Public Utilities Code § 740.12(b))

4) Requires the CPUC to review data related to current and future transportation electrification adoption and charging infrastructure prior to allowing an IOU to collect new program costs from ratepayers. (Public Utilities Code § 740.12(c))

5) Requires each publicly owned utility (POU) with an annual electrical demand exceeding 700 gigawatt hours to adopt an integrated resources plan (IRP) to ensure it will meet climate goals for the electricity sector. The POU IRP must be updated at least once every five years and must address, among other things, how it will meet the need to electrify the state's vehicle fleet. (Public Utilities Code § 9621)

6) Requires the CPUC to establish EV-grid integration strategies for certain load-serving entities (LSEs). POUs must consider EV-grid integration strategies in their IRPs, and

community choice aggregators (CCA) must report specified information to the CPUC regarding EV-grid integration activities. (Public Utilities Code § 740.16)

7) Requires the CEC, in consultation with CARB and the CPUC, to prepare a statewide assessment of the fuel cell electric vehicle (FCEV) fueling infrastructure and fuel production needed to support the zero-emission trucks, buses, and off-road vehicles the state hopes to have on the roads. The initial assessment is due by December 31, 2023, and must be updated every two years until January 1, 2030. (Health & Safety Code § 43871)

8) Requires the assessment described above to consider all necessary fuel production and distribution infrastructure for all types of vehicles – including off-road electrification, port and airport electrification – and other programs to accelerate the adoption of FCEVs to meet the goals set out by Executive Order (EO) N-79-20. (Health & Safety § 43871)

9) Requires the CEC and CARB to jointly review and report annually on progress made toward establishing a hydrogen fueling network. (Health & Safety § 43018.9)

FISCAL EFFECT: According to the Senate Committee on Appropriations, the CEC estimates ongoing costs of about $170,000 per year to implement this bill, alongside unknown, potentially significant costs for CARB for the creation and implementation of a strategic plan.

BACKGROUND:

ZEVerything, ZEVerywhere, All At Once? – California's transportation sector is currently the largest source of GHG emissions in the state and, in the interest of meeting the state's emissions reduction targets, California has set a goal that 100% of new passenger vehicle sales will be ZEVs by 2035.[1] ZEV is an umbrella term encompassing battery electric vehicles (BEVs), plug-in hybrid electric vehicles, and hydrogen FCEVs. Meeting the state's ZEV goals will require a significant increase in the number of light-, medium-, and heavy-duty ZEVs on the road and a drastic increase in the infrastructure to support these vehicles. Cumulative sales of ZEVs in California recently reached 1.5 million, with ZEVs accounting for around 20% of new car sales in California in 2022. California accounted for 40% of overall ZEV sales nationwide in 2022.[2,3] The Legislature has remained largely technology neutral on ZEVs, funding vehicle incentives for both FCEVs and BEVs and their infrastructure, hydrogen fueling stations and EV charging stations, respectively.

Charging Forward – To support the rapid deployment of BEVs, in 2018 the governor set a goal of having 250,000 chargers, including 10,000 direct current fast chargers, operating in California

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[1] Executive Order N-79-20
[2] Office of Governor Gavin Newsom; "California Surpasses 1.5 Million ZEVs Goal Two Years Ahead of Schedule"; April 2023; https://www.gov.ca.gov/2023/04/21/california-surpasses-1-5-million-zevs-goal-two-years-ahead-of-schedule/
[3] Reuters; "California accounted for 40% of U.S. zero-emission vehicle sales in 2022"; January 2023; https://www.reuters.com/business/autos-transportation/california-accounted-40-us-zero-emission-vehicle-sales-2022-2023-01-23/

by 2025.[4] As of January 2021, California has installed more than 70,000 public and shared chargers, including nearly 6,000 direct current fast chargers (DCFC). The CEC found that an additional 123,000 are planned, approximately 3,600 of which are fast chargers, which leaves a gap of about 57,000 installations, from the goal of 250,000 chargers.[5] By 2030, the CEC projects over 700,000 public and shared private chargers will be needed to support the charging needs of 5 million BEVs, and nearly 1.2 million chargers would be required to support 8 million BEVs. An additional 157,000 chargers are needed to support 180,000 medium- and heavy-duty vehicles anticipated for 2030.

BEV infrastructure deployment incentives are generally aligned with BEV ownership. However, this can create a chicken-or-the-egg scenario, where the lack of BEV infrastructure in communities can influence those communities' residents to delay buying and using BEVs. While lower rates of BEV adoption in areas might discourage companies from deploying charging infrastructure, the lack of charging infrastructure in those communities contributes to "range anxiety," which leads drivers to avoid using and buying BEVs due to a fear of not having a reliable charging location. Range anxiety is particularly concerning for drivers who regularly drive longer-than-average distances, including those with long commutes, rideshare drivers, and Californians living in rural areas. These drivers' lack of reliable charging infrastructure can limit BEV adoption, which subsequently disincentivizes further BEV infrastructure deployment, perpetuating a vicious cycle.

Hydrogen Fuel Sells – While BEVs dominate the light-duty ZEV market, a significant number of medium- and heavy-duty manufacturers plan to transition fleets to FCEVs. FCEVs rely on hydrogen fueling stations, rather than charging stations, to operate. As of November 2022, California has 62 hydrogen refueling stations in operation, with estimates that that number will surpass 100 stations, a benchmark set by AB 8 (Perea, Chapter 401, Statutes of 2013), in 2024.[6] Loftier goals for hydrogen fueling infrastructure development have also been set, headlined by an executive order establishing a goal of reaching 200 operational hydrogen fueling stations by 2025.[7] The one-time appropriation through the California Budget Act of 2021 of $1.1 billion across three fiscal years for ZEV infrastructure across light-, medium-, and heavy-duty sectors is anticipated to help the state reach the 200-station goal. The hydrogen stations currently operating in California have excess fueling capacity that is nearly quadruple the current demand from the approximately 12,000 FCEVs in the state.[8] CEC estimates that a network of 200 hydrogen stations would be capable of supporting about 273,000 light-duty FCEVs.[9]

The CEC's CTP has been central in the development of hydrogen fueling infrastructure. The program provides funding for infrastructure and technologies that help the state transition to cleaner fuels and transportation. Under existing law, the CTP provides up to $100 million annually for clean transportation infrastructure and technology projects. The CEC identifies priorities for CTP funding through a regular investment plan and updates. In addition, CARB

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[4] Executive Order B-48-18
[5] CEC; "Electric Vehicle Charging Infrastructure Assessment - AB 2127"; July 2021
[6] CEC; "2022–2023 Investment Plan Update for the Clean Transportation Program"; January 2023
[7] Executive Order B-48-18
[8] CEC and CARB; "Joint Agency Staff Report on Assembly Bill 8: 2022 Annual Assessment of Time and Cost Needed to Attain 100 Hydrogen Refueling Stations in California"; December 2022
[9] CEC; "2022–2023 Investment Plan Update for the Clean Transportation Program"; January 2023

also administers funding for ZEV infrastructure and vehicles, and the CPUC oversees ratepayer investments in EV infrastructure deployed through load serving entities.

Despite considerable progress in hydrogen fueling buildout, the large amount of funding needed to open stations, permitting requirements, and construction times can create long lead times between the proposal of a hydrogen station and the opening of the station. Many hydrogen vehicle drivers have limited options for refueling, particularly in areas of California where fewer hydrogen stations have been built. While the lack of hydrogen refueling stations can discourage consumers from purchasing hydrogen vehicles, the lack of hydrogen vehicle purchases can lower market incentives for building additional hydrogen refueling stations.[10]

Megawatts and Molecules – BEVs and FCEVs are in some ways complementary and in other ways rely on similar resource pools. The CEC's assessments of the infrastructure needed to support the ZEV transition acknowledge that ZEV deployment will increase electric load, particularly in the electric service territories for Pacific Gas and Electric and Southern California Edison. Medium- and heavy-duty EVs have large batteries that can require extended periods of time and a substantial amount of electricity to charge. A standard Level 2 charger is rated for 22 kilowatts, meaning that a charging depot with ten Level 2 chargers, operating for 12 hours per day, would use 2640 kilowatt-hours per day, equivalent to the daily usage of 132 average homes.[11,12] Hydrogen fuel cell trucks can refuel more quickly than BEVs can charge; however, they require hydrogen to be produced, transported, and stored for refueling, with each step of that manufacturing and delivery chain requiring a substantial amount of energy to produce this hydrogen at market scale.

Medium- and heavy-duty vehicles are a significant source of California's emissions, and transitioning these vehicles to ZEVs could produce substantial GHG emissions reductions. Despite this potential, some stakeholders have expressed concerns that the underlying assumptions used in existing plans for the medium- and heavy-duty ZEV transition do not fully address the barriers to planning energy sector resources for the transition. Specifically, these stakeholders argue that existing state plans are not sufficiently detailed to address the specific challenges associated with electrifying or deploying hydrogen infrastructure to actually make medium- and heavy-duty fleet transitions achievable within CARB's timelines. Deployment of higher voltage chargers and increased production of hydrogen would rely in part on upgrades to the local utility distribution system and creating additional electric capacity. Some of these utility resources may require substantial advance planning, local engagement, CPUC approval, and permitting. In the event that these utility resources are not planned sufficiently far in advance of CARB's ZEV transition deadline, fleets may not be able to comply with CARB rules in a timely manner.

Barriers to Buildout – BEV charging station buildout may be stymied by ongoing energization issues occurring across the state. The demands for new service connections and/or upgrades to existing distribution lines have been increasing, especially as California advances policies to

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[10] CEC; "Hydrogen Refueling Stations in California"; https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics/hydrogen-refueling

[11] McKinsey & Company; "Why most eTrucks will choose overnight charging"; October 2020; https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/why-most-etrucks-will-choose-overnight-charging

[12] The Washington Post; "Electric vehicles can now power your home for three days"; February 2023; https://www.washingtonpost.com/climate-environment/2023/02/07/ev-battery-power-your-home/

deploy more infrastructure to charge electric vehicles, shift from natural gas to electricity in buildings, and increase the housing supply.[13] These projects all rely on access to the electrical grid and often require upgrades to the distribution system. Additionally, the COVID-19 pandemic has created supply shortages and challenges affecting many sectors of the economy, including limiting access to electrical equipment needed to connect new customers or expand energy load, such as transformers.[14] These factors have led to increasing reports of extensive delays in customer requests for energization, and much frustration from impacted communities, businesses, and elected officials.[15,16] The CPUC recently took action to address the delays in BEV charging station energization by issuing Resolution E-5247 in December 2022, which established an interim 125-business day average service energization timeline for projects taking service in IOU territories under the EV Infrastructure Rules, with some exceptions.

COMMENTS:

1) *Author's Statement.* According to the author, "Medium and heavy-duty vehicles contribute a disproportionately high share of the transportation sector's greenhouse gas emissions. The transition of medium and heavy-duty vehicles to zero-emission vehicles is critical to reach our climate targets. While the state is making great progress toward our climate goals, a big piece of the puzzle is missing…the necessary infrastructure to support these vehicles. This bill will ensure that agencies work together to facilitate the build out of critical infrastructure before ZEV fleets get on the road."

2) *Studying the Support System.* The assessment called for in this bill specifically asks the CEC to, on the hydrogen side, examine the production, storage, and transport facilities needed to support medium- and heavy-duty vehicles ZEVs, while on the electrical side, it asks the CEC to look at the infrastructure and electric generation needed to support medium- and heavy-duty ZEVs. It also, in both instances, requires the assessment to identify barriers to deploying this infrastructure and recommendations for addressing those barriers.

   One shortcoming of the assessment called for in this bill is that for hydrogen fueling stations, the CEC is asked to evaluate the end use refueling infrastructure while not specifically accounting for the electricity sector resources required to produce the hydrogen (e.g., electric generation, distribution and transmission upgrades, electrolyzer purchases and electric interconnection). These assumptions have raised concern among stakeholders regarding the continued availability of sufficient interconnection ability, energy capacity, and hydrogen production to effectively progress toward CARB's ZEV transition goals. However, the CEC is not prohibited from investigating the availability of electricity for hydrogen production and would be able to do so at the CEC's discretion.

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[13] California Energy Markets; "Interconnection Delays Disrupting Housing Markets, Causing 'Chaos'"; March 2023; https://www.newsdata.com/california_energy_markets/regional_roundup/interconnection-delays-disrupting-housing-markets-causing-chaos/article_a577776a-c4fc-11ed-9e15-5ffc130cbd98.html
[14] Bakersfield Californian; "Power connection work delays local development projects"; November 2022; https://www.bakersfield.com/news/power-connection-work-delays-local-development-projects/article_8bc9ed88-6d0f-11ed-b3ee-973f5213928a.html
[15] Fresno Bee; "California homes face PG&E delays for power connections. Frustrated leaders seek options"; October 2022; https://www.fresnobee.com/news/local/article267995517.html
[16] San Francisco Chronicle; "Big holdup for new Northern California housing? PG&E"; March 2023; https://www.sfchronicle.com/politics/article/california-housing-projects-pge-17828169.php

3) *Duty Free.* The bill uses the classifications heavy duty, medium duty, and off-road vehicles. However, there are instances in the bill in which individual vehicle categories are excluded. For instance, the EV infrastructure assessment described in 25229.(a) specifies heavy-duty and off-road vehicles, but does not mention medium-duty vehicles. The strategic plan in 43024.2.(a)(2)(C) identifies medium and heavy-duty vehicles but not off-road vehicles. These omissions may reflect existing frameworks for specific vehicle classifications established in executive orders or CARB regulations, but clearly demarcating the vehicle types referenced in this bill will be critical to ensuring effective implementation.

4) *Related Legislation.*

   AB 1504 (McCarty), would have required the CEC to, when conducting a biannual statewide assessment of BEV charging infrastructure, consider the charging infrastructure needed to support the levels of light- and heavy-duty BEV adoption required for the state to meet the goals of a specified executive order, a mobile source strategy, and achieving carbon neutrality as soon as possible and no later than 2045, among other provisions. Status: held in the Assembly Committee on Appropriations.

   AB 1580 (Juan Carillo), would require the CEC and the California Department of Transportation (CalTrans) to jointly develop California National Electric Vehicle Infrastructure Program Roadmap that is consistent with federal requirements and guidance provided by the federal National Electric Vehicle Infrastructure Formula. Status: held in the Assembly Committee on Appropriations.

   AB 1626 (McCarty), would have required the CEC to share total anticipated hydrogen fueling demand at the locations of vehicle fleets with developers of publicly available hydrogen fueling stations. Status: held in the Assembly Committee on Appropriations.

5) *Prior Legislation.*

   SB 1075 (Skinner), directed CARB, in consultation with CEC and CPUC, to provide recommendations on clean hydrogen production pathways, infrastructure, electrical usage, and cost benefit analysis. It also directed the CEC to study and model potential growth for hydrogen in decarbonizing the electrical and transportation sectors of the economy. Status: Chapter 363, Statutes of 2022.

   AB 2700 (McCarty), required the CEC to gather and report fleet data needed to support utilities' plans for grid reliability and enhanced vehicle electrification. The bill also requires utilities to report how distribution investments made, pursuant to the bill, support climate goals as part of specified filings with the CEC and CPUC. Status: Chapter 354, Statutes of 2022.

   SB 643 (Archuleta), requires CEC, in consultation with CARB and the PUC, to prepare a statewide assessment of the FCEV fueling infrastructure and fuel production needed to support the zero-emission trucks, buses, and off-road vehicles the state hopes to have on the roads. The initial assessment is due by December 31, 2023, and must be updated every two years until January 1, 2030. Status: Chapter 646, Statutes of 2021.

SB 44 (Skinner), requires CARB to update the 2016 mobile source strategy to include a comprehensive strategy for the deployment of medium- and heavy-duty vehicles in the state for the purpose of bringing the state into compliance with federal ambient air quality standards and reducing motor vehicle GHG emissions from the medium- and heavy-duty vehicle sector, as specified. Status: Chapter 297, Statutes of 2019.

SB 676 (Bradford), required the CPUC to establish EV-grid integration strategies for certain LSEs. The bill also required POUs to consider EV-grid integration strategies in their IRPs and required CCAs to report specified information to the CPUC regarding EV-grid integration activities. Status: Chapter 484, Statutes of 2019.

AB 2127 (Ting), required the CEC to conduct a statewide assessment every two years of EV charging infrastructure needed to support the levels of EV adoption required for the state to meet its goals of putting at least five million ZEVs on California roads by 2030, and of reducing GHG emissions to 40 percent below 1990 levels by 2030. Status: Chapter 365, Statutes of 2018.

AB 8 (Perea), required, among other things, that the CEC and CARB to jointly review and report annually on progress toward establishing a hydrogen fueling network. Status: Chapter 401, Statutes of 2013.

6) *Double Referral.* This bill was previously heard in the Assembly Committee on Transportation on July 5, 2023, where it passed with a 15-0-0 vote.

REGISTERED SUPPORT / OPPOSITION:

Support

Association of California Water Agencies (ACWA)
California Special Districts Association
California Trucking Association
Palmdale Water District
Port of Oakland

Support If Amended

Climate Action California

Opposition

None on file.

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