

**Appendix C: Updated Long-Term Plan for Light-Duty Zero-Emission
Vehicle Market, Light-Duty Vehicle Purchase Incentives, Clean
Mobility Investments, and Outreach**

**As required by Senate Bill 1275 and the Supplemental Report of the
2018-19 Budget Act**

This page intentionally left blank.

Introduction 4
 Overview 4
Part 1: Light-Duty Zero-Emission Vehicle Market Update and Light-Duty Vehicle
Purchase Incentives 5
 Light-Duty Zero-Emission Vehicle Market and Technology Assessment 5
 A Sustainable Light-Duty Zero-Emission Vehicle Market 16
 Evaluation of Program Funding Needs (Three Year Need) 50
 Long-Term Vision for CARB Light-Duty Vehicle Purchase Incentive Programs 60
 Conclusions 62

Introduction

Overview

Since the introduction of the first Light-Duty Long-Term Plan in fiscal year (FY) 2016-17, the zero-emission vehicle (ZEV) market has grown tremendously. Various events over the last few years, including the ongoing effects of the California Air Resources Board's (CARB) many years of ZEV and other automobile air pollution regulations, the introduction of new vehicles (there are now over 100 electric vehicle models in the U.S.), and clean mobility programs, have improved the ZEV market landscape. Moreover, under the direction of Governor Newsom's Executive Order N-79-20, CARB's pending proposal to greatly increase the stringency of its ZEV program, requiring 100% ZEV sales by 2035, will further stabilize the market. However, the global health and economic crisis disrupted the new vehicle market as a whole in 2020 with effects still felt today. Major changes were made to light-duty incentive programs in FY 2022-23 in order to address the challenges of the ZEV market. Along with improved incentive programs, continuing regulatory efforts will enhance project sustainability to better foster market growth, especially in harder to reach market segments.

Complementary to the Light-Duty Long-Term Plan, starting with the FY 2014-15 Funding Plan, CARB has established several clean mobility projects. During these initial years, staff and project grantees learned several lessons learned and overcame a variety of implementation challenges. This year's update to the long-term plan provides updates on the light-duty ZEV market and projected three-year funding needs for light-duty incentive programs.

CARB's priorities for these investments include continued facilitation of coordination across projects, increased community engagement and participation, ensuring best practices and lessons learned are shared, and helping projects expand on larger scales. CARB continues to assess clean mobility projects to identify strategies for project sustainability and independent operations with the goal that projects can continue operating in communities without the dependence on future Low Carbon Transportation funding.

Statutory Goals and Requirements

SB 1275 (De León, Chapter 530, Statute of 2014) established the Charge Ahead California Initiative with the goals of placing one million zero-emission and near zero-emission vehicles in California by 2023 to establish a self-sustaining market and increasing access to these vehicles for lower-income consumers and consumers in disadvantaged communities. Among other requirements, SB 1275 required CARB to include a long-term plan for the Clean Vehicle Rebate Project (CVRP) and related programs in the FY 2016-17 Funding Plan and to update the plan every three years. The plan must include: a three-year forecast of funding needs to support the goals of

technology advancement, market readiness and consumer acceptance of advanced vehicle technologies, a market and technology assessment for each funded vehicle technology, and an assessment of when a self-sustaining market is expected and how existing incentives may be modified to recognize expected changes in future market conditions.

In addition, the Supplemental Report to the 2018-19 Budget Act requires CARB to annually update the CVRP forecast until January 1, 2030, and include as part of its forecast the total State rebate investment necessary to facilitate reaching the goal of placing in service at least five million ZEVs by January 1, 2030, including:

- Models of the impacts of various rebate scenarios' ability to maximize the effectiveness of the rebates provided based on relevant data.
- Annual recommendations for changes to the project structure and various rebate levels based on market demand to reach the 2030 goal, including the project's income eligibility requirements to target moderate and low-income customers.
- Projected sales figures of electric vehicles.
- Impacts of federal policy changes on the adoption of electric vehicles.
- Assessment of marketing efforts of electric vehicles by automobile manufacturers.
- Survey results of consumer awareness and acceptance of electric vehicles and awareness of the benefits associated with ZEVs.

As part of the FY 2016-17 Funding Plan, staff, in consultation with stakeholders proposed a framework for the three-year plan and provided the first three-year funding needs forecast along with a market and technology assessment. Staff also proposed a suite of indicators to measure ZEV market growth over time. Although SB 1275 required CARB to update the plan every three years, staff has provided updates to all components of the plan each year since 2016. Staff provided the first major update to the plan in the FY 2019-20 Funding Plan and the second major update in the FY 2022-23 Funding Plan. This year's plan provides an update to the ZEV market information provided in FY 2022-23 as well as CARB's clean vehicle purchase incentive programs, clean mobility investments, and outreach efforts.

Part 1: Light-Duty Zero-Emission Vehicle Market Update and Light-Duty Vehicle Purchase Incentives

Light-Duty Zero-Emission Vehicle Market and Technology Assessment

In this section of the Long-Term Plan, staff updates the ZEV Market and Technology Assessment originally included in the FY 2016-17 Funding Plan as required by SB 1275. As part of this assessment, staff presents:

- An overview of recent ZEV market growth in California, the United States, and worldwide.
- Analysis of the growing used ZEV market in California.
- An update on the state of ZEV technology, particularly battery costs and a comparison of the total cost of ownership of ZEVs compared to internal combustion engine vehicles.
- Update of ZEV infrastructure in California.

Several of the topics covered here such as growth in ZEV sales, market share, and vehicle diversity are also indicators that staff uses to evaluate progress toward a sustainable ZEV market in California. As such, California-specific trends for each of these indicators are discussed in greater detail in the “Sustainable ZEV Market” section later in this Long-Term Plan.

Trends in the Light-Duty Zero-Emission Vehicle Market

A record-breaking 10 million ZEVs were sold worldwide in 2022, a 55% increase from 2021.¹ According to Global ZEV Outlook 2022, ZEV sales accounted for nearly 14% of all global vehicle sales in 2022, which is a fourfold increase from 2019.² This brings the total number of ZEVs on the world’s roads to roughly 26 million, 3.5 times the amount in 2019.³ China still maintained the largest ZEV fleet in the world with a total of 13.8 million ZEVs with Europe reaching the highest ZEV penetration rates in the world with a total of 7.8 million ZEVs on the road by the end of 2022.⁴ The United States came in third with 3 million total ZEVs by the end of 2022.⁵ Zero-emission vehicle sales saw another record year in 2022, despite continuing supply chain deficiencies, macro-economic and geopolitical uncertainty, and high commodity and energy prices.⁶

While ZEV sales have remained strong and most of the world is working towards operating levels seen pre-2020, effects from the COVID-19 pandemic are still being felt across the vehicle production and delivery line. Worldwide closures followed by a slow return to operation have led to shortages of semiconductor chips causing delays in the production and delivery of vehicles, the impacts of which continued into 2023. The U.S. auto industry finished 2022 with new-vehicle inventory of about 1.8 million cars and trucks, which was 66% higher than 2021 but remains far below the 3.5

¹ International Energy Agency. Global ZEV Outlook 2023.
<https://iea.blob.core.windows.net/assets/dacf14d2-eabc-498a-8263-9f97fd5dc327/GEVO2023.pdf>

² Ibid

³ Ibid

⁴ Ibid

⁵ Ibid

⁶ Ibid

million at the end of 2019.⁷ Below-average supplies and strong consumer demand has kept average new vehicle sales prices near record highs.⁸

Additionally, continued inflation in the new vehicle sector and increases in financing rates in response to inflation have driven up the costs for purchasing a vehicle. A recent Consumer Price Index summary released by the United States Bureau of Labor Statistics, indicates that new vehicle prices in July 2023 are on average 3.5% higher than they were in July 2022.⁹ However, other sectors have seen a decrease in prices during that same period. Used vehicle prices decreased by 5.6% and energy commodities and services have experienced a decrease of 19.9% during the 12-month period ending in July 2023.¹⁰ In an ongoing effort to tame inflation, the central bank continues to increase interest rates.¹¹ Higher interest rates mean higher borrowing costs for consumers which will temper spending and demand for goods and services. Additionally, on August 16, 2022, the Inflation Reduction Act was signed into law to help combat inflation by reducing healthcare and energy costs, supporting a green economy, and generating funds by increasing federal taxes on the wealthiest corporations.¹²

The record spike in gas prices that started in early 2022 spurred an increased demand for ZEVs and hybrids.¹³ Gas prices are substantially lower than the record high in July 2022 but remain relatively high. Californians are paying 40% more in 2023 compared to the 2017-2020 average.¹⁴ According to the United States Energy Information Administration, the California average price of a gallon of gas in July 2023

⁷ Jim Henry, "February Auto Sales Rise; Inventory Higher, But Still Thin", Forbes, February, 23, 2023 <https://www.forbes.com/sites/jimhenry/2023/02/23/february-auto-sales-rise-inventory-higher-but-still-thin/?sh=5e2f425c6760>

⁸ Jim Henry, "High Demand And More Cars In Stock Create A Big Increase In May Auto Sales" Forbes, May 30, 2023 <https://www.forbes.com/sites/jimhenry/2023/05/30/high-demand-and-more-cars-in-stock-create-a-big-increase-in-may-auto-sales/?sh=18122d77328b>

⁹ United States Bureau of Labor Statistics. *Economic News Release: Consumer Price Index Summary*. Released August 10, 2023. <https://www.bls.gov/news.release/cpi.nr0.htm>

¹⁰ Ibid.

¹¹ Smialek, Jeanna. *Fed Raises Rates After a Pause and Leaves Door Open to More*. The New York Times. Published July 26, 2023. <https://www.nytimes.com/2023/07/26/business/fed-meeting-interest-rate-powell.html>

¹² The White House Briefing Room. *FACT SHEET: The Inflation Reduction Act Supports Workers and Families*. August 19, 2022. <https://www.whitehouse.gov/briefing-room/statements-releases/2022/08/19/fact-sheet-the-inflation-reduction-act-supports-workers-and-families/>

¹³ Charged Fleet. *Interest in ZEVs and Hybrids Spikes as Fuel Prices Soar*. March 29, 2022. <https://www.chargedfleet.com/10164307/interest-in-evs-and-hybrids-spike-as-fuel-prices-soar>

¹⁴ U.S. Energy Information Administration. *California All Grades All Formulations Retail Gas Prices*. Retrieved on August 14, 2023. https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=EMM_EPM0_PTE_SCA_DPG&f=M

was \$4.83¹⁵ with the national average being much lower at \$3.71 per gallon.¹⁶ According to data from a Cox Automotive study, the percentage of car shoppers considering a ZEV increased 34% from 2021 to 2022.¹⁷ While the long-term ZEV buying behavior is still uncertain, ZEVs will continue to buffer consumers from the price instability of fuel by eliminating dependence on fossil fuels for their transportation needs.

The world continues to feel the impact of the health and economic crisis. Many industries, including new cars sales, took a direct hit in 2020 that is still being felt in 2023. As new car sales rebound and vehicle prices remain elevated as a result of limited inventory, inflation, and demand, it is critical to continue support of the ZEV market. Through the challenging conditions of the last three years, ZEVs have continued to gain market share in California. After comprising 12% of light-duty vehicle sales in 2021, ZEV sales made up over 24% of vehicle sales in 2022.¹⁸ This is a positive sign regarding the growth and sustainability of the ZEV market. However, significant additional market growth is needed to meet California's ZEV deployment goals, which supports the need for stronger regulatory action.

On August 25, 2022, the Board approved the Advanced Clean Cars II Regulation with approval from the Office of Administrative Law on November 30, 2022.¹⁹ The Advanced Clean Cars II Regulation takes the state's already robust motor vehicle emission control rules and enhances them to meet more aggressive tailpipe emissions standards and ramp up to 100% new zero-emission vehicle sales by 2035. The Advanced Clean Cars II Regulation will rapidly scale down light-duty passenger car, truck and SUV emissions starting with the 2026 model year through 2035 and require an increasing number of zero-emission vehicles to be sold. The regulation will rely on advanced vehicle technologies, including battery-electric, hydrogen fuel cell electric and plug-in hybrid-electric vehicles (PHEV), to meet air quality and climate change emissions standards. To date, 17 states have adopted all or part of California's low-emission and zero-emission vehicle regulations, as allowed under

¹⁵ IBID

¹⁶ U.S. Energy Information Administration. *U.S. All Grades All Formulations Retail Gas Prices*. Retrieved on July 17, 2023.

https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pets&s=emm_epm0_pte_nus_dpg&f=m

¹⁷ Cox Automotive. ZEV Consideration at Record High, but Dealers Feel Unprepared. Published June 27, 2023. Retrieved July 17, 2023. <https://www.coxautoinc.com/news/new-cox-automotive-study-ev-consideration-at-record-high-but-dealers-feel-unprepared/>

¹⁸ California Energy Commission (2023). New ZEV Sales in California. Data last updated June 30, 2023. Retrieved July 17, 2023, from <https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics/new-ZEV-sales>

¹⁹ California Air Resources Board. California moves to accelerate to 100% new zero-emission vehicle sales by 2035. August 25, 2022. <https://ww2.arb.ca.gov/news/california-moves-accelerate-100-new-zero-emission-vehicle-sales-2035>

Section 177 of the Federal Clean Air Act.²⁰ Several of these states have already adopted the Advanced Clean Cars II Regulation, and others may follow.

California New Light-Duty Zero-Emission Vehicle Market

While various supply issues continue to impact the market, ZEV sales remain strong in California. A total of 345,818 new light-duty ZEVs were sold in California in 2022, a 38% increase from 2021.²¹ An additional 223,298 new light-duty ZEVs were sold in the first half of 2023 marking the strongest pace of ZEV sales to-date.²² ZEV market share in California sits at 24.3% through the first half of 2023, up from 18.84% market share at the end of 2022.²³

New ZEV sales in California are expected to remain strong throughout 2023 as persistently high gas prices are driving interest and demand for alternative fuel vehicles. As manufacturers continue to introduce new ZEV models, in part in response to regulatory action like the Advanced Clean Cars program²⁴, consumers have an increasing variety of ZEVs to choose from that meet their daily driving needs.²⁵ Based on current trends, new car sales in California are on pace to increase in 2023 over 2022 as pent-up demand from supply change shortages and inventory shortages continue to impact vehicle demand.²⁶ The additional new ZEV sales from the first half 2023 now

California has the largest new ZEV market in the United States with over 1.6 million light-duty ZEVs sold through June 2023. Over 223,000 new light-duty ZEVs were sold in the first half of 2023, marking the strongest quarters for ZEV sales to-date. New light-duty ZEV market share now stands at about 24.3% of all new light-duty vehicles sold.

²⁰ California Air Resources Board. *States that have Adopted California's Vehicle Standards under Section 177 of the Federal Clean Air Act*. Published May 13, 2022.

https://ww2.arb.ca.gov/sites/default/files/2022-05/%C2%A7177_states_05132022_NADA_sales_r2_ac.pdf

²¹ California Energy Commission (2022). *New ZEV Sales in California*. Data last updated August 2, 2023. Retrieved August 21, 2023 <https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics/new-ZEV-sales>

²² Ibid.

²³ Ibid

²⁴ California Air Resources Board. *California moves to accelerate to 100% new zero-emission vehicle sales by 2035*. August 25, 2022. <https://ww2.arb.ca.gov/news/california-moves-accelerate-100-new-zero-emission-vehicle-sales-2035>

²⁵ Charged Fleet. *Interest in ZEVs and Hybrids Spikes as Fuel Prices Soar*. March 29, 2022. <https://www.chargedfleet.com/10164307/interest-in-evs-and-hybrids-spike-as-fuel-prices-soar>

²⁶ California New Car Dealers Association. *California Auto Outlook: 2022 Q1*. May 2023. <https://www.cncda.org/news/california-new-car-dealers-association-releases-first-quarter-2023-auto-outlook/>

brings the total of ZEVs sold in California since 2011 to just over 1.6 million. While not an exact counting of vehicles currently on the road, this indicates that California has reached the 1.5 million vehicle goal much sooner than the 2025 deadline. Despite this achievement, we still have more work to do to reach the goal of 5 million ZEVs on California's roads by 2030 and to build a sustainable ZEV market. The Advanced Clean Cars II Regulation supports this goal by requiring 100% new ZEVs sales by 2035, with requirements for an increasing number of ZEVs to be sold beginning in the 2026 model year.

California Used Light-Duty Zero-Emission Vehicle Market

As California's new ZEV market continues to grow, so does California's used ZEV market. In June 2023, the used ZEV inventory in the United States hovered between 31,000 and 32,000 vehicles, more than double the number in 2022.²⁷ California has the largest share of this inventory of used ZEVs with a total monthly average of about 7,000 used light-duty ZEVs as of April 2022.²⁸ It is important to note that this number is representative of the used inventory available at a snapshot in time. The number of vehicle listings can fluctuate on any given day, but it is clear that the ZEV inventory in California is much more robust than in previous years.²⁹

After years of high demand and low inventories pushed used ZEV prices to record highs, prices decreased 28% year-over-year in the third quarter of 2023 and reached levels not seen since April of 2021.³⁰ Based on Recurrent Automotive's April 2023

California has the largest used ZEV inventory in the United States, half of which fall under \$30,000.

analysis of California's used ZEV market, about half of used ZEVs fall under \$30,000, but the influx of expensive used ZEVs on the market pushes the average used ZEV price to about \$34,480.³¹ This is in comparison to the average price of a used internal combustion engine vehicle which was about \$24,500 in early 2023. The used ZEV market in California is equally important as the new ZEV market as it makes

ZEV technology accessible at lower price points, which tend to be more affordable to lower- and middle-income households. It will be important to increase incentive support for the used ZEV market over the coming years to foster the widespread adoption of the technology that is needed to meet California's various climate and air

²⁷ Najman, Liz. Recurrent Automotive. *California Electric Vehicle Trends*.
<https://www.recurrentauto.com/research/california-electric-vehicles>

²⁸ Ibid

²⁹ Ibid

³⁰ Recurrent Automotive. *Used Electric Car Prices & Market Report - Q2 2023*.
<https://www.recurrentauto.com/research/used-electric-vehicle-buying-report>

³¹ Ibid.

quality goals. Additionally, the recently approved Advanced Clean Cars II Regulation contains a number of ZEV assurance measures, such as minimum warranty and durability requirements, and increased serviceability which ensures consumers can replace their gas-powered vehicles with new or used vehicles that meet their needs for transportation and protect the emission benefits of the program.³² The regulation also offers automakers additional compliance opportunities for actions to improve access to zero-emission vehicles in disadvantaged and low-income communities, such as providing reduced price zero-emission vehicles for community mobility programs, producing affordable zero-emission vehicles, and retaining used vehicles in California to support the state's complimentary policies and incentives.³³ Lastly, CARB received funding for FY 2022-23 to develop and implement the statewide Zero-emission Assurance Project which will help lower-income Californians reduce the risk of buying a used ZEV by providing a rebate or vehicle service contract for the replacement battery or fuel cell component, if needed. As these are newer efforts, staff will continue to analyze their impacts on the used ZEV market in California as part of this long-term plan effort for light-duty ZEVs and provide updates in future iterations of the plan.

Light-Duty Zero-Emission Vehicle Technology Assessment Update

Battery price is the major cost component in ZEV manufacturing. Monitoring the battery cost production and close analysis of cost reduction is critical for market projection. This section discusses current and future battery costs and its impact on ZEV market acceleration, based on public information that is currently available. As with all other components of this plan, staff expects to have updated information in next year's plan that considers updates to the current regulatory and incentive landscape.

Battery/Battery Pack System Cost and Projections

Recent findings show that the trend of declining battery costs reversed in 2022, rising to \$151 per kilowatt hour (kWh). This represents a 7% increase from 2021 though still nearly 90% lower than in 2010.³⁴ The higher prices are expected to stay at similar levels next year, further defying historical trends.³⁵

³² California Air Resources Board. *Advanced Clean Cars II*. <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/advanced-clean-cars-ii>

³³ Ibid.

³⁴ BloombergNEF. *Battery Pack Prices Rise For The First Time to An Average of \$151kWh*. December 6, 2022 <https://about.bnef.com/blog/lithium-ion-battery-pack-prices-rise-for-first-time-to-an-average-of-151-kwh/>

³⁵ Ibid.

BloombergNEF’s 2022 Battery Price Survey credits increased prices on rising costs of raw materials and battery components. During the second half of 2022, lithium, cobalt, and nickel prices were moderated. Based on their analysis, BloombergNEF expects battery prices to start dropping again in 2024, when lithium prices are expected to ease as more extraction and refining capacity comes online. Based on the updated observed learning rate, BloombergNEF’s 2022 Battery Price Survey predicts that average pack prices should fall below \$100/kWh by 2026, two years later than previously expected.³⁶

As part of the regulatory development process for the Advanced Clean Cars II Regulation, program staff analyzed the incremental direct manufacturing cost of battery-electric vehicles (BEV), PHEVs, and fuel cell electric vehicles (FCEV) relative to conventional gas-powered vehicles based on vehicle teardown reports and other studies.³⁷

The price of automotive battery packs was around \$151 per kWh by the end of 2022— a nearly 90% decline from 2010.

Taking this information into consideration, staff developed battery pack costs projections for the Advanced Clean Cars II³⁸ using the midpoint presented in the National Academy of Science (NAS) study due to the robustness and transparency of the analysis.³⁹ Program staff estimated that cost reduction rates will slow somewhat after 2030 and applied a lower 5% year-over-year reduction from 2030 to 2035.⁴⁰

Zero-Emission Vehicle Infrastructure Update

An extremely important component of a successful and sustainable ZEV market is the availability of charging infrastructure to support the number of ZEVs on the road needed to meet California’s air quality and climate goals. Access to charging is continually cited by consumers as one of the top barriers to ZEV adoption. As such, continued support of a growing charging infrastructure network is critical to achieve widespread ZEV adoption. Executive Order B-48-18 set a goal of placing 5 million ZEVs on California’s roads by 2030 and called for the installation of 200 hydrogen fueling stations and 250,000 ZEV chargers, including 10,000 direct current (DC) fast chargers, by 2025.⁴¹

³⁶ Ibid.

³⁷ California Air Resources Board. Advanced Clean Cars II ZEV Technology Assessment, Appendix G. 2022. <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/accii/appg.pdf>

³⁸ Ibid.

³⁹ Ibid.

⁴⁰ Ibid.

⁴¹ Executive Order B-48-18, <https://www.library.ca.gov/wp-content/uploads/GovernmentPublications/executive-order-proclamation/39-B-48-18.pdf>

The California Energy Commission (CEC) is the lead agency for overseeing investments and tracking progress of ZEV charging infrastructure, and CARB staff work very closely with CEC in support of widespread ZEV adoption in California. AB 2127 (Ting, Chapter 365, Statutes of 2018) requires CEC to prepare a statewide assessment of the charging infrastructure needed to achieve the goal of 5 million ZEVs on the road by 2030 and reduce emissions of greenhouse gases to 40% below 1990 levels by 2030. Executive Order N-79-20 directed the CEC to expand this assessment to support 100%ZEV sales for new passenger vehicles, 100% ZEV operations for drayage trucks, and 100% ZEV operations for off-road vehicles and equipment by 2035. Analysis from CARB's 2020 Mobile Source Strategy estimated that 8 million light-duty ZEVs and 180,000 medium- and heavy-duty ZEVs will be needed in 2030 to meet these goals.⁴²

As of January 2023, there are over 92,900 public and shared private electric vehicle chargers in California which includes over 9,800 DC fast chargers.

In CEC's first assessment, Assembly Bill 2127 Electric Vehicle Charging Infrastructure Assessment Analyzing Charging Needs to Support ZEVs in 2030, the analysis estimates that more than 700,000 chargers are needed to support 5 million ZEVs and nearly 1.2 million public and shared private chargers are needed to support 8 million ZEVs in 2030.⁴³ As of January 2023, there are more than 91,900 public and shared private electric vehicle chargers in California which includes more than 9,800 DC fast chargers.⁴⁴ CEC's recent assessment also indicates that an additional 167,000 chargers are planned through various state grants, settlement agreements, and approved electric utility investments meaning that the state is on track to meet the 2025 goal of 250,000 public and shared chargers.⁴⁵ In order to support 8 million ZEVs in 2030, CEC's analysis indicates that more than 700,000 shared private and public chargers are needed outside of what is already installed or planned.⁴⁶

⁴² California Air Resources Board (2021). 2020 Mobile Source Strategy.

https://ww2.arb.ca.gov/sites/default/files/2021-12/2020_Mobile_Source_Strategy.pdf

⁴³ California Energy Commission (2021). Assembly Bill 2127 Electric Vehicle Charging Infrastructure Assessment Analyzing Charging Needs to Support ZEVs in 2030. Published July 14, 2021.

[https://www.energy.ca.gov/programs-and-topics/programs/electric-vehicle-charging-infrastructure-assessment-ab-2127#:~:text=AB202127%20percent202127%20\(2018\)%20requires%20the%20requires%20the,below201990%20levels%20by%202030%20percent201990%20levels%20by%202030](https://www.energy.ca.gov/programs-and-topics/programs/electric-vehicle-charging-infrastructure-assessment-ab-2127#:~:text=AB202127%20percent202127%20(2018)%20requires%20the%20requires%20the,below201990%20levels%20by%202030%20percent201990%20levels%20by%202030)

⁴⁴ California Energy Commission (2023). Electric Vehicle Chargers in California. Data last updated July 5, 2023. Retrieved August 21, 2023. <https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics/electric-vehicle>

⁴⁵ Ibid.

⁴⁶ Ibid.

As California has a critical and immediate need to increase charging infrastructure across the state, continued and significant public investment in addition to policies that encourage increased private investment will be necessary to help reach these goals. CARB staff will continue working closely with CEC to monitor deployment of charging infrastructure and provide updates in future iterations of this appendix as it relates to widespread ZEV adoption in California.

Trajectory Analysis to 2030

The sales trajectories established in the three-year funding simulations are calculated to 2030 to help estimate progress toward State goals, as required by the Supplemental Report to the FY 2018-19 Budget Act. The State's ZEV deployment goals are:

- 1 million vehicles by 2023
- 1.5 million vehicles by 2025
- 5 million vehicles by 2030

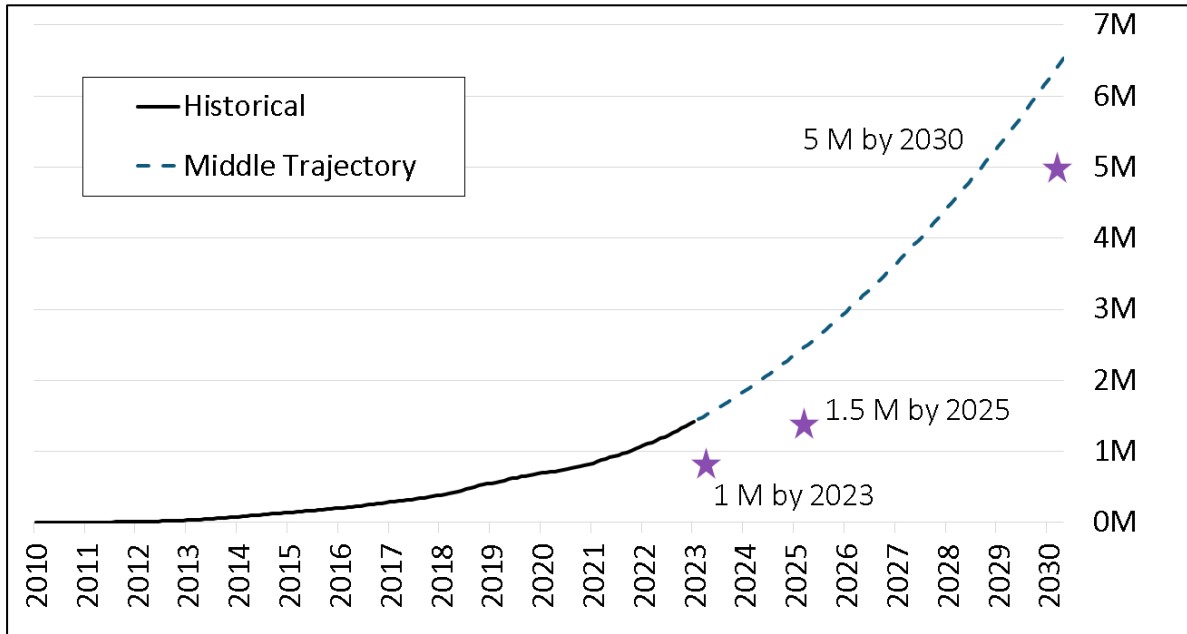
While some residual effects of the global pandemic have begun to diminish, there still are lingering impacts on the ZEV market that are restricting its growth. For example, the vehicle market continues to face supply-chain complications that bottleneck the potential demand for new, popular ZEVs. Even with the current market complications, the State goals are estimated to be met on time based on the middle-projected scenario.

Recent data indicate that cumulative ZEV sales are on target to reach goals that were established in Executive Order B-48-18. In Figure C-1 below, the solid black line that begins in 2010 and continues through March 2023 is the historical number of cumulative ZEV sales, while the adjacent green line is the middle trajectory forecast from April 2023 through 2030. The purple stars that are imposed on the figure mark the three state goals that were previously established. From the image, the 1 million vehicles by 2023 goal were met at the end of 2021, while the subsequent goal of 1.5 million by 2025 was met in 2023. Lastly, the 5 million vehicles goal is projected to be met, towards the end of 2028. These projections are consistent with those provided in the Initial Statement of Reasons for the Advanced Clean Cars II Regulation.⁴⁷ That analysis projected cumulative ZEV and PHEV sales to be 1.9 million in 2025, to exceed 5 million in 2029, and to reach 6.8 million in 2030.

Figure C-1: Trajectory Toward Zero-Emission Vehicle Deployment Goals (Cumulative Sales)

⁴⁷California Air Resources Board (2022). Staff Report: Initial Statement of Reasons. Public Hearing to Consider the Advanced Clean Cars II Regulation.

<https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/accii/isor.pdf>



Through the National Electric Infrastructure Program (NEVI) program, California is also set to receive \$384 million over five years allocated for the installation of DC fast chargers along nominated alternative fuel corridors. While the number of increased charging stations may not directly impact ZEV market share, there is an endogenous relationship between the two quantities.

Further, additional vehicle body style classes continue to gain more ZEV models. For example, the number of ZEV models for SUVs and pickups is increasing, which was limited to only a few models in the past year, although waitlists and shipping delays still exist for some of the new pickup models.

Estimated Funding Need to Reach Five Million Zero-Emission Vehicles

In addition to the trajectory analysis shown in Figure C-1, Table C-1 shows the estimated rebates and funding needed to reach cumulative ZEV deployment goals, assuming the market and program continue along their trajectories until the goals are achieved.

Table C-1: Estimated California Vehicle Rebate Project Funding Need to Reach Zero Emission Vehicle Deployment Goals

Electric Vehicle Deployment Goal	Additional Vehicles Rebated	Funding Need
5 million vehicles	218,000-1,252,000	\$881M-\$5.2B

The funds needed to reach state goals shown in Table C-1 reflect only CVRP rebates and do not include other incentives, changes to regulations that are already underway, private investment in vehicles, infrastructure, or other supportive resources. Also, as noted above, these numbers also do not assume that the above goals are achieved in time but simply consider the total cost necessary to achieve the goals. Total private investment for 218,000 to 1,252,000 additional vehicles may be between \$88 million and \$5.2 billion, with a total public investment of \$8.5 billion to \$48 billion.

Projected funding needs and additional vehicles rebated have increased in recent months due to various factors that have also increased CVRP participation. For instance, as of February 2023 increased rebate-eligible BEV and PHEV participants are awarded an additional \$3,000 while FCEV applicants are awarded an additional \$500. In the same month, the Tesla Model 3 and Model Y became re-eligible which has since then accounted for roughly 80% of all rebates in the CVRP. Both those program events have had a considerable impact on program participation and rebates awarded per incentive dollar which explain the larger amounts of funding needed and additional vehicles rebated to reach five million vehicles.

A Sustainable Light-Duty Zero-Emission Vehicle Market

To address the SB 1275 requirement of assessing when a self-sustaining market is expected, CARB staff in consultation with academia and stakeholders, decided to use the Diffusion of Innovation Theory as the framework for this analysis when it did the first Long-Term Plan for CVRP and the ZEV market as part of the FY 2016-17 Funding Plan. Based on this approach, staff defined the self-sustainable ZEV market as a state of the market where broad incentives are not required to increase ZEV adoption. A self-sustaining market is expected once the California new ZEV market share reaches 16-20%, the market has reached the early majority segment, cost parity with comparable internal combustion engine vehicles, and there is enough demand and vehicle choice diversity to help market mechanisms take over and drive the market. The detailed description of the theory and staff's original work to establish this metric to define a sustainable ZEV market can be found in Part II of the FY 2016-17 Funding Plan.⁴⁸

⁴⁸ California Air Resources Board. *Proposed Fiscal Year 2016-17 Funding Plan For Low Carbon Transportation And Fuels Investments And The Air Quality Improvement Program*. May 2016. https://ww2.arb.ca.gov/sites/default/files/classic/msprog/aqip/fundplan/proposed_fy16-17_fundingplan_full.pdf

In developing the FY 2022-23 update to the Long-Term Plan, staff asked stakeholders if it should consider alternative approaches to defining a sustainable ZEV market.⁴⁹ There was no alternative offered, and staff has not identified a better approach than the current one; hence, staff will continue using the metric of 16-20% ZEV market share based on the Diffusion of Innovation Theory as the indicator of a sustainable ZEV market. Staff recognizes, however, that this theory is predicated on a free market, whereby the technologies originally included in the theory's development were not regulated in the same way that vehicles are regulated in California. Regardless, this theory serves as a reasonable guide given the nature of the vehicle market.

In the 2016-17 Funding Plan, staff identified metrics that can be used to track progress toward market sustainability. The most outstanding one was ZEV market share and staff chose this metric to define the sustainable market. Other indicators evaluated include annual ZEV sales numbers, diversity in available models, and consumer awareness. Progress on these metrics is described below. Staff also identified several technology-based metrics such as battery and vehicle cost as indicators of progress, which were described earlier in this Long-Term Plan in the ZEV Market and Technology Assessment section. Finally, staff also evaluated the importance and impact of the federal policies, including the federal tax credit, in the next section. This was done since federal policies may ultimately have a significant impact on the growth of the ZEV market toward sustainability and it is one of the elements CARB is required to evaluate per the Supplemental Report of the 2018-19 Budget Act. Annual New Light-Duty ZEV Sales and Market Share.

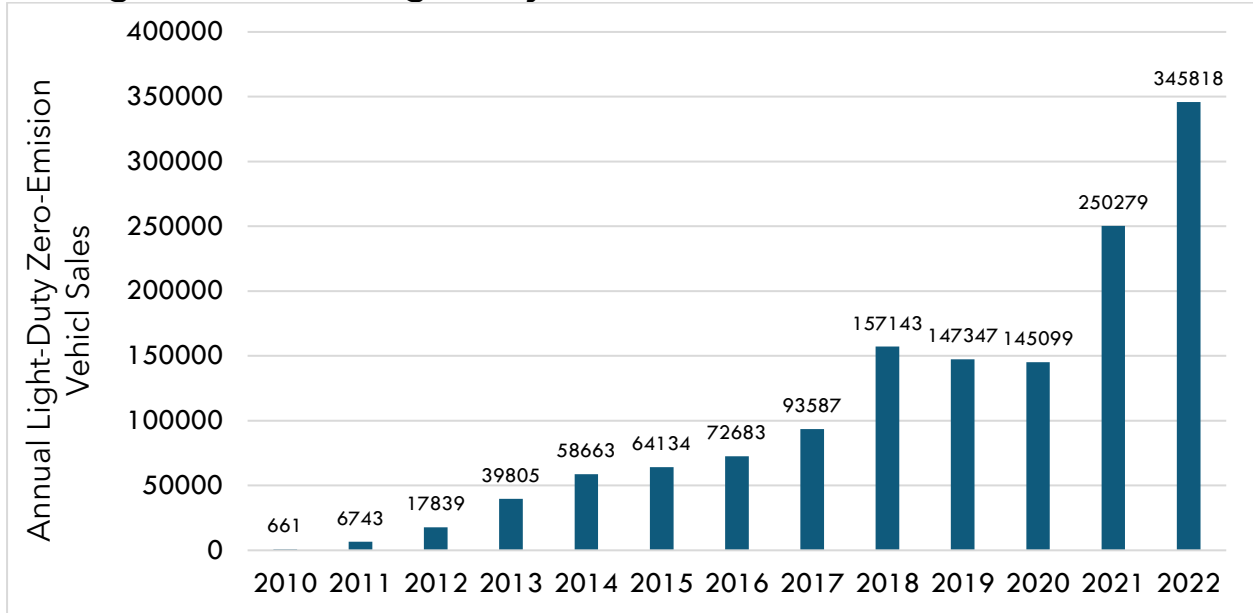
Staff considers annual new ZEV sales in California as an indicator of market growth, and, over the last few years closely monitored and analyzed the trend. California annual ZEV sales have grown continuously over the last three years even though general light-duty vehicle sales have been declining since 2016. The new vehicle market in 2022 began to rebound from the recent health and economic crisis; new light-duty vehicle registrations are up from 2020 numbers but are still lower than numbers seen pre-2020.⁵⁰ New ZEV sales remained strong through 2022 and into the first half of 2023. Figure C-2 illustrates the growth in new light-duty ZEV sales through 2022. Figure C-3 illustrates ZEV market growth in California from 2011 through the second quarter of 2023. Table C-2 shows details of new ZEVs sold over the last 5 years and California ZEV market share held steady at around 8% of the new light-duty vehicle sales in 2020 and surged ahead to over 24% market share in the first quarter

⁴⁹ First Public Workshop on the Fiscal Year 2022-23 Update to the Three-Year Plan for Light-Duty Vehicles and Clean Transportation Investments. February 10, 2022. Workshop materials and Zoom meeting recording found on the CARB website: <https://ww2.arb.ca.gov/our-work/programs/low-carbon-transportation-investments-and-air-quality-improvement-program/low-0>.

⁵⁰ California New Car Dealers Association. *California Auto Outlook: 2023 Q1*. May 2023. https://www.cncda.org/wp-content/uploads/Cal-Covering-1Q-23_FINAL_051523.pdf

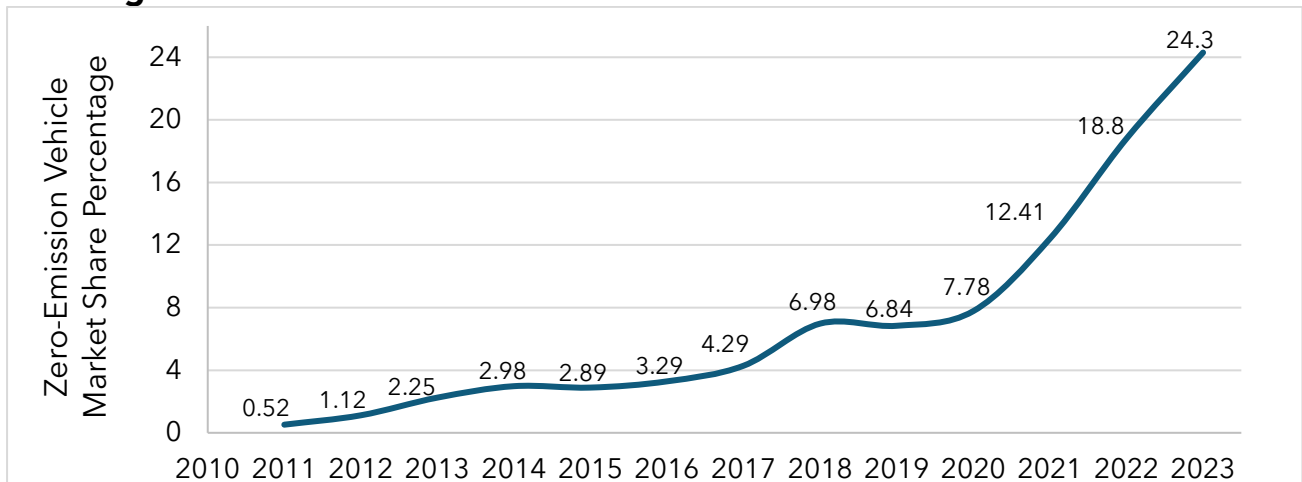
of 2023. The California ZEV market share is expected to increase as the new light-duty market continues to rebound in 2023 and beyond.

Figure C-2: Annual Light-Duty Zero-Emission Vehicle Sales in California



Data Source: California Energy Commission ZEV Sales Dashboard. Data through 2022.⁵¹

Figure C-3: California Zero-Emission Vehicle Market Share Over Time



Data Source: California Energy Commission ZEV Sales Dashboard. Data through Quarter 2 2023.⁵²

⁵¹ California Energy Commission (2023). New ZEV Sales in California. Data last updated June 30, 2023. Retrieved July 17, 2023, from <https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics/new-ZEV-sales>

⁵² Ibid.

Table C-2: Hybrid and Zero-Emission Vehicle New Vehicle Registrations and Market Share⁵³

Metric	2019	2020	2021	2022	Year to Date 2023
Plug-In Hybrid-Electric Vehicle registration	50,660	38,153	63,141	50,748	30,729
Plug-In Hybrid-Electric Vehicle share	2.35%	2.05%	3.13%	2.80%	3.35%
Zero-Emission Vehicle registration**	96,687	106,946	187,138	292,496	192,569
Zero-Emission Vehicle share	4.49%	5.73%	9.28%	13.67%	20.99%
Total # of Plug-In Hybrid-Electric Vehicle & Zero-Emission Vehicles Sold	147,347	145,099	250,279	345,818	223,298
Total # of Light Duty Vehicles Sold	2,153,747	1,864,164	2,016,192	1,835,429	917,604
Total Plug-In Electric Vehicle Market Share	6.84%	7.78%	12.41%	18.84%	24.33%
Year-to-Year Growth Rate	-6.23%	-1.53%	72.49%	38.17%	TBD

Data Source: California Energy Commission Zero Emission Vehicle and Infrastructure Statistics⁵⁴

*Data through June 2023

**Includes BEV and fuel cell electric vehicle (FCEV) registration data

New plug-in electric vehicle registrations in 2022 reached 345,818, which is a 38% increase from 2021 numbers. Since remaining steady through 2020, the ZEV market

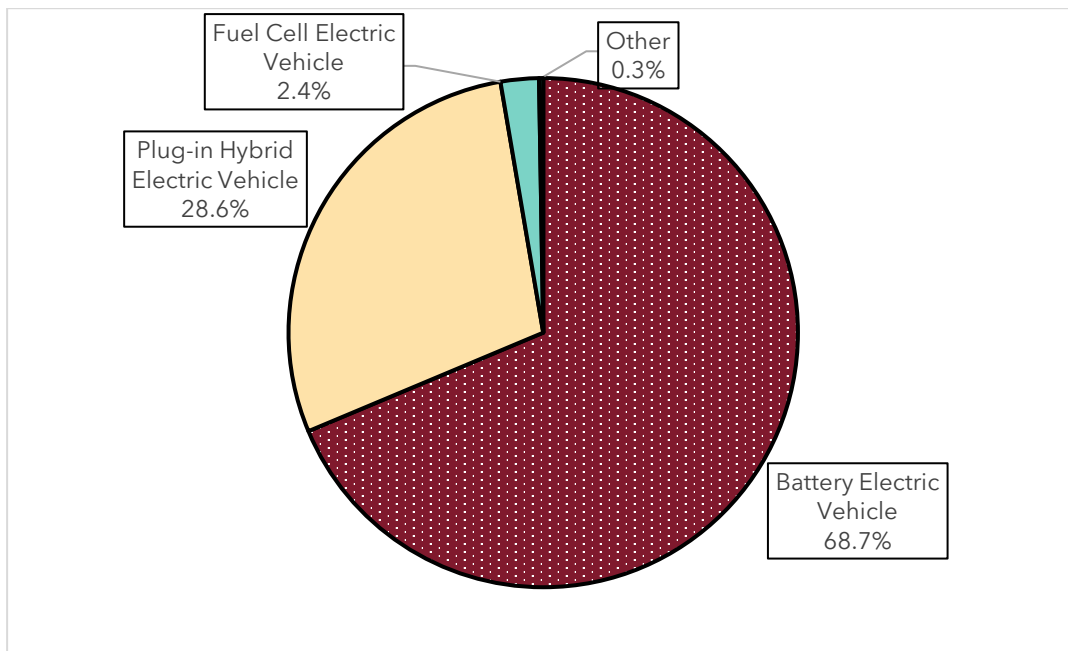
⁵³ Ibid.

⁵⁴ Ibid

began to surge in 2021 and has continued to do so throughout the first half of 2023. This is likely due to increasing supply, the growing number of ZEV models, continued expansion of California’s charging network, and the State’s commitment to strong ZEV incentives. As the Advanced Clean Cars II requires vehicle manufacturers to increase ZEV production beginning with Model Year 2026, and more ZEV models are introduced in varying vehicle classes, it is likely that their market share will continue to increase.⁵⁵

In recent years, the same technology split trend under CVRP has been observed and as Figure C-4 shows, CVRP recipients chose BEVs at about twice the rate of PHEVs. This indicates that with more diverse and higher-range BEVs with higher incentive amounts available, consumers are more interested in choosing cleaner technologies.

Figure C-4: Clean Vehicle Rebate Project Cumulative Rebates by Technology Type (through March 2023)

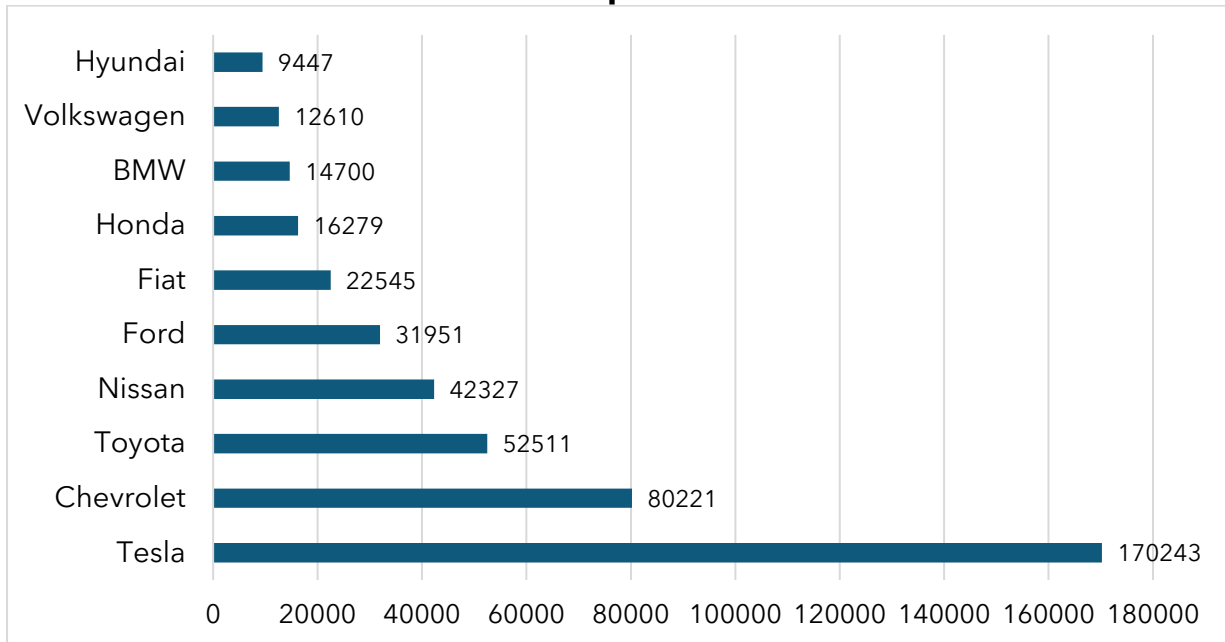


Tesla, Chevrolet, Toyota, Nissan, and Ford are the top five manufacturers whose vehicles have received rebates under CVRP, which is similar to the makeup of the

⁵⁵ California Air Resources Board. *Advanced Clean Cars II Regulation*. <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/accii/2acciifro1961.4.pdf>

top-selling ZEV manufacturers in California.⁵⁶ Figure C-5 illustrates the number of rebates received under CVRP by the top ten vehicle makes since the inception of the program through March 2023.

Figure C-5: Cumulative Clean Vehicle Rebate Project Rebates by Vehicle Make - Top Ten



In summary, ZEV sales managed to maintain a market share of about 8% of new car sales in California through the end of 2020, surged to over 18% by the end of 2022, and continued to increase this percentage to nearly 24% through the first half of 2023. While recent ZEV market share percentages have surpassed staff’s defined indicator of a sustainable ZEV market of 16-20% market share, it is important to continue investment in these vehicles. In total, more than 1.6 million ZEVs have been sold in California through Q2 of 2023 - exceeding the goal of 1.5 million ZEVs deployed by 2025.⁵⁷

Vehicle Choice Diversity

Consumers have different needs and expectations, especially when it comes to vehicles. Vehicle choice and model availability across market segments is a critical decision-making factor for new car shoppers and a diverse selection of makes and

⁵⁶ Green Car Congress. *Veloz: California ZEV market continues strong growth; Q1 strongest quarter to date; 16.32 percent market share.* May 2, 2022.

<https://www.greencarcongress.com/2022/05/20220502-veloz.html>

⁵⁷ California Energy Commission (2023). *New ZEV Sales in California.* Data last updated August 9, 2022. Retrieved August 2, 2023, from <https://www.energy.ca.gov/EVstats>

models is an indicator for market growth. Through Q1 of 2023, SUVs, trucks, and vans accounted for nearly 70% of new vehicles sales in California while small, mid-size, and large cars accounted for the remaining 30%.⁵⁸

For Model Year 2022, 103 different models of electric-drive vehicles across 11 EPA vehicle classes are available in the U.S. market, and 30 of them are CVRP-eligible in California.

For model year 2022, 103 different models of electric-drive vehicles across 14 U.S. EPA vehicle classes are available in the U.S. market⁵⁹, and 37 of them are CVRP-eligible in California.

As staff has noted, vehicle diversity is an indicator of the health of the ZEV market, which is supported by research. For example, a recent publication by the International Council on Clean Transportation shows that cities with more models available to

consumers had higher ZEV registrations.⁶⁰ More choices in larger vehicle categories like SUV, minivan, pickup trucks, and light-duty trucks in the PEV market are needed for the emerging ZEV market to be more attractive to consumers and become competitive with the gas-powered market.

As several electric trucks and SUVs are expected to hit the U.S. market in the coming years, it is important that eligibility requirements for incentive programs are crafted in a way that supports these emerging larger vehicle categories. Bifurcating eligibility requirements for smaller vs. larger plug-in hybrid and battery-electric vehicles is one way to do so. As larger plug-in hybrid and battery-electric vehicles come to the market, staff recognizes that these vehicles may have a higher manufacturer suggested retail price (MSRP) with ranges that may be shorter than smaller vehicle classes that have been part of the ZEV market for some time. This change could help CVRP continue to be supportive of electric vehicle deployment across the various vehicle classes in the light-duty market while prioritizing funding for the cleanest vehicles.

Table C-3 lists each of the 103 models available by type across 14 different vehicle classes in the U.S. market. Models with an asterisk (*) are eligible for CVRP. Tesla vehicles are marked with two asterisks (**) to indicate that they were only eligible for CVRP in 2022 if the vehicle order was placed prior to March 16, 2022.

⁵⁸ California New Car Dealers Association, *California Auto Outlook: Q1 2023*, Volume 19, Number 2, Released May 2023. Retrieved July 18, 2022, from https://www.cncda.org/wp-content/uploads/Cal-Covering-1Q-23_FINAL_051523.pdf

⁵⁹ U.S. Department of Energy. *Transportation Energy Data Book Edition 40*. <https://tedb.ornl.gov/data/>

⁶⁰ https://theicct.org/sites/default/files/publications/ICCT_EV_surge_US_cities_20190610.pdf

Table C-3: Electric-Drive Vehicles Available by Manufacturer, Model Year 2022⁶¹

Model	Vehicle Type	Vehicle Class
Audi e-tron	Battery-Electric Vehicle	Standard Sport Utility Vehicle Four-Wheel Drive
Audi e-tron GT	Battery-Electric Vehicle	Midsize Cars
Audi e-tron S	Battery-Electric Vehicle	Standard Sport Utility Vehicle Four-Wheel Drive
Audi e-tron S Sportback	Battery-Electric Vehicle	Standard Sport Utility Vehicle Four-Wheel Drive
Audi e-tron Sportback	Battery-Electric Vehicle	Standard Sport Utility Vehicle Four-Wheel Drive
Audi Q4 e-tron*	Battery-Electric Vehicle	Standard Sport Utility Vehicle Four-Wheel Drive
Audi Q4 e-tron Sportback*	Battery-Electric Vehicle	Standard Sport Utility Vehicle Four-Wheel Drive
Audi RS e-tron	Battery-Electric Vehicle	Midsize Cars
BMW i4	Battery-Electric Vehicle	Subcompact Cars
BMW i4 eDrive40	Battery-Electric Vehicle	Subcompact Cars

⁶¹ [Fueleconomy.gov](https://www.fueleconomy.gov)

Model	Vehicle Type	Vehicle Class
BMW i4 eDrive40	Battery Electric Vehicle	Subcompact Cars
BMW i4 M50	Battery-Electric Vehicle	Subcompact Cars
BMW iX	Battery-Electric Vehicle	Standard Sport Utility Vehicle Four-Wheel Drive
BMW iX xDrive50	Battery-Electric Vehicle	Standard Sport Utility Vehicle Four-Wheel Drive
BMW iX xDrive50	Battery-Electric Vehicle	Standard Sport Utility Vehicle Four-Wheel Drive
Chevrolet Bolt EUV*	Battery-Electric Vehicle	Small Station Wagons
Chevrolet Bolt ZEV*	Battery-Electric Vehicle	Small Station Wagons
Ford F-150 Lightning Four-Wheel Drive*	Battery-Electric Vehicle	Standard Pickup Trucks Four-Wheel Drive
Ford F-150 Lightning Four-Wheel Drive Extended Range*	Battery-Electric Vehicle	Standard Pickup Trucks Four-Wheel Drive
Ford F-150 Lightning Platinum Four-Wheel Drive*	Battery-Electric Vehicle	Standard Pickup Trucks Four-Wheel Drive
Ford Mustang Mach-E*	Battery-Electric Vehicle	Small Sport Utility Vehicle Two-Wheel Drive

Model	Vehicle Type	Vehicle Class
Ford Mustang Mach-E*	Battery-Electric Vehicle	Small Sport Utility Vehicle Four-Wheel Drive
Hyundai Ioniq 5*	Battery-Electric Vehicle	Large Cars
Hyundai Kona Electric*	Battery-Electric Vehicle	Small Sport Utility Vehicle Two-Wheel Drive
Kia ZEV6*	Battery-Electric Vehicle	Midsize Station Wagons
Kia Niro Electric*	Battery-Electric Vehicle	Small Station Wagons
Lucid Air Dream	Battery-Electric Vehicle	Large Cars
Lucid Air Dream P	Battery-Electric Vehicle	Large Cars
Lucid Air Dream P	Battery-Electric Vehicle	Large Cars
Lucid Air Dream R	Battery-Electric Vehicle	Large Cars
Lucid Air G	Battery-Electric Vehicle	Large Cars
Lucid Air G	Battery-Electric Vehicle	Large Cars

Model	Vehicle Type	Vehicle Class
Lucid Air G Touring	Battery-Electric Vehicle	Large Cars
Mazda MX-30*	Battery-Electric Vehicle	Midsize Cars
Mercedes-Benz AMG EQS	Battery-Electric Vehicle	Large Cars
Mercedes-Benz EQB 300*	Battery-Electric Vehicle	Small Sport Utility Vehicle Four-Wheel Drive
Mercedes-Benz EQB 350*	Battery-Electric Vehicle	Small Sport Utility Vehicle Four-Wheel Drive
Mercedes-Benz EQS 450 Plus	Battery-Electric Vehicle	Large Cars
Mercedes-Benz EQS 580 4matic	Battery-Electric Vehicle	Large Cars
MINI Cooper SE Hardtop 2 door*	Battery-Electric Vehicle	Subcompact Cars
Nissan LEAF*	Battery-Electric Vehicle	Midsize Cars
Nissan LEAF PLUS*	Battery-Electric Vehicle	Hatchback
Nissan LEAF S*	Battery-Electric Vehicle	Hatchback

Model	Vehicle Type	Vehicle Class
Nissan LEAF SV/SL*	Battery-Electric Vehicle	Midsized Cars
Polestar 2 Dual Motor	Battery-Electric Vehicle	Midsized Cars
Polestar 2 Single Motor	Battery-Electric Vehicle	Midsized Cars
Polestar Polestar AWD	Battery-Electric Vehicle	Midsized Cars
Polestar Polestar FWD	Battery-Electric Vehicle	Midsized Cars
Porsche Taycan	Battery-Electric Vehicle	Compact Cars
Porsche Taycan 4 Cross Turismo	Battery-Electric Vehicle	Midsized Cars
Porsche Taycan 4S	Battery-Electric Vehicle	sedan
Porsche Taycan 4S	Battery-Electric Vehicle	Compact Cars
Porsche Taycan 4S	Battery-Electric Vehicle	Midsized Cars
Porsche Taycan GTS	Battery-Electric Vehicle	Compact Cars

Model	Vehicle Type	Vehicle Class
Porsche Taycan GTS ST	Battery-Electric Vehicle	Compact Cars
Porsche Taycan Turbo	Battery-Electric Vehicle	Compact Cars
Porsche Taycan Turbo Cross Turismo	Battery-Electric Vehicle	Midsized Cars
Porsche Taycan Turbo S	Battery-Electric Vehicle	Compact Cars
Porsche Taycan Turbo S Cross Turismo	Battery-Electric Vehicle	Midsized Cars
Rivian R1S	Battery-Electric Vehicle	Standard Sport Utility Vehicle Four-Wheel Drive
Rivian R1T	Battery-Electric Vehicle	Standard Pickup Trucks Four-Wheel Drive
Tesla Model 3**	Battery-Electric Vehicle	Midsized Cars
Tesla Model S	Battery-Electric Vehicle	Large Cars
Tesla Model S Plaid (19 inch wheels)	Battery-Electric Vehicle	Large Cars
Tesla Model X	Battery-Electric Vehicle	Standard Sport Utility Vehicle Four-Wheel Drive

Model	Vehicle Type	Vehicle Class
Tesla Model Y**	Battery-Electric Vehicle	Small Sport Utility Vehicle Two-Wheel Drive
Tesla Model Y**	Battery-Electric Vehicle	Small Sport Utility Vehicle Four-Wheel Drive
Volkswagen ID.4*	Battery-Electric Vehicle	Small Sport Utility Vehicle Two-Wheel Drive
Volkswagen ID.4 AWD Pro	Battery-Electric Vehicle	Small Sport Utility Vehicle Four-Wheel Drive
Volkswagen ID.4 AWD Pro S	Battery-Electric Vehicle	Small Sport Utility Vehicle Four-Wheel Drive
Volkswagen ID.4 Pro	Battery-Electric Vehicle	Small Sport Utility Vehicle Two-Wheel Drive
Volvo C40 Recharge twin*	Battery-Electric Vehicle	Small Sport Utility Vehicle Four-Wheel Drive
Volvo XC40*	Battery-Electric Vehicle	Small Sport Utility Vehicle Four-Wheel Drive
Audi A7	Plug-In Hybrid-Electric Vehicle	Midsize Cars
Audi Q5	Plug-In Hybrid-Electric Vehicle	Small Sport Utility Vehicle Four-Wheel Drive

Model	Vehicle Type	Vehicle Class
Bentley Flying Spur Hybrid	Plug-In Hybrid-Electric Vehicle	Midsize Cars
BMW 330e	Plug-In Hybrid-Electric Vehicle	Compact Cars
BMW 530e	Plug-In Hybrid-Electric Vehicle	Compact Cars
BMW 745e	Plug-In Hybrid-Electric Vehicle	Large Cars
BMW X5	Plug-In Hybrid-Electric Vehicle	Small Sport Utility Vehicle Four-Wheel Drive
Chrysler Pacifica*	Plug-In Hybrid-Electric Vehicle	Minivan - Two-Wheel Drive
Ferrari 296 GTB	Plug-In Hybrid-Electric Vehicle	Two Seaters
Ferrari SF90	Plug-In Hybrid-Electric Vehicle	Two Seaters
Ford Escape Four-Wheel Drive Plug-In Hybrid-Electric Vehicle*	Plug-In Hybrid-	Small Sport Utility Vehicle Two-Wheel Drive

Model	Vehicle Type	Vehicle Class
	Electric Vehicle	
Hyundai Ioniq Plug-in Hybrid	Plug-In Hybrid-Electric Vehicle	Midsize Cars
Hyundai Santa Fe Plug-in Hybrid*	Plug-In Hybrid-Electric Vehicle	Small Sport Utility Vehicle Four-Wheel Drive
Hyundai Tucson Plug-in Hybrid*	Plug-In Hybrid-Electric Vehicle	Small Sport Utility Vehicle Four-Wheel Drive
Jeep Grand Cherokee 4xe	Plug-In Hybrid-Electric Vehicle	Standard Sport Utility Vehicle Four-Wheel Drive
Jeep Wrangler 4dr 4xe	Plug-In Hybrid-Electric Vehicle	Small Sport Utility Vehicle Four-Wheel Drive
Kia Niro Plug-in Hybrid*	Plug-In Hybrid-Electric Vehicle	Small Station Wagons
Kia Sorento Plug-in Hybrid*	Plug-In Hybrid-Electric Vehicle	Small Sport Utility Vehicle Four-Wheel Drive
Land Rover Range Rover	Plug-In Hybrid-Electric Vehicle	Standard Sport Utility Vehicle Four-Wheel Drive

Model	Vehicle Type	Vehicle Class
Lexus NX 450h Plus All-Wheel Drive*	Plug-In Hybrid-Electric Vehicle	Small Sport Utility Vehicle Four-Wheel Drive
Lincoln Aviator Plug-In Hybrid-Electric Vehicle All-Wheel Drive	Plug-In Hybrid-Electric Vehicle	Standard Sport Utility Vehicle Four-Wheel Drive
Lincoln Corsair All-Wheel Drive Plug-In Hybrid-Electric Vehicle	Plug-In Hybrid-Electric Vehicle	Small Sport Utility Vehicle Four-Wheel Drive
MINI Cooper SE Countryman All4	Plug-In Hybrid-Electric Vehicle	Midsize Cars
Mitsubishi Outlander Plug-In Hybrid-Electric Vehicle*	Plug-In Hybrid-Electric Vehicle	Small Sport Utility Vehicle Four-Wheel Drive
Porsche Cayenne E-Hybrid Turbo S	Plug-In Hybrid-Electric Vehicle	Standard Sport Utility Vehicle Four-Wheel Drive
Porsche Cayenne Turbo S E-Hybrid Coupe Turbo S E-Hybrid	Plug-In Hybrid-Electric Vehicle	Standard Sport Utility Vehicle Four-Wheel Drive
Porsche Cayenne Turbo S/Coupe E-Hybrid	Plug-In Hybrid-Electric Vehicle	Standard Sport Utility Vehicle Four-Wheel Drive
Porsche Cayenne/Coupe E-Hybrid	Plug-In Hybrid-	Standard Sport Utility Vehicle Four-Wheel Drive

Model	Vehicle Type	Vehicle Class
	Electric Vehicle	
Porsche Cayenne/Coupe/Platinum E-Hybrid	Plug-In Hybrid-Electric Vehicle	Standard Sport Utility Vehicle Four-Wheel Drive
Porsche Panamera	Plug-In Hybrid-Electric Vehicle	Large Cars
Porsche Panamera Turbo S E-Hybrid/Exec/ST	Plug-In Hybrid-Electric Vehicle	Large Cars
Toyota Prius Prime*	Plug-In Hybrid-Electric Vehicle	Midsize Cars
Toyota RAV4 Prime*	Plug-In Hybrid-Electric Vehicle	Small Sport Utility Vehicle Four-Wheel Drive
Volvo S60 T8	Plug-In Hybrid-Electric Vehicle	Compact Cars
Volvo S60 T8	Plug-In Hybrid-Electric Vehicle	Compact Cars
Volvo S90 T8	Plug-In Hybrid-Electric Vehicle	Midsize Cars

Model	Vehicle Type	Vehicle Class
Volvo V60 T8	Plug-In Hybrid-Electric Vehicle	Small Station Wagons
Volvo V60 T8	Plug-In Hybrid-Electric Vehicle	Small Station Wagons
Volvo XC60 T8*	Plug-In Hybrid-Electric Vehicle	Small Sport Utility Vehicle Four-Wheel Drive
Volvo XC90 T8	Plug-In Hybrid-Electric Vehicle	Standard Sport Utility Vehicle Four-Wheel Drive

In summary, there were 37 ZEV models eligible for CVRP in 2022 and more than one hundred models and model variants available in the U.S. market. There has been a significant increase in the number of ZEV models over recent years. In 2011, there were about five ZEVs available for sale, by 2020 there were more than 80, more than 90 in 2021, and more than 100 in 2022. However, vehicle diversity remains far more limited than the fully diversified ICE market. The options in the ZEV market are rapidly increasing but have yet to meet the needs of a wide range of consumers for various vehicle choices in different categories. However, manufacturers have announced they anticipate additional ZEV introductions over the next several years, specifically in larger vehicle classes.⁶²

⁶² Bartlett, Jeff and Preston, Ben. Consumer Reports. "Automakers Are Adding Electric Vehicles to Their Lineups. Here's What's Coming." Published June 7, 2022. <https://www.consumerreports.org/hybrids-evs/why-electric-cars-may-soon-flood-the-us-market-a9006292675/>

Consumer Awareness and Assessment of Light-Duty Zero-Emission Vehicle Marketing Efforts by Automobile Manufacturers

The Supplemental Report to the FY 2018-19 Budget Act directs CARB to assess the marketing efforts of ZEV manufacturers. CARB is coordinating with stakeholders including automakers, Alliance for Automotive Innovation (Auto Innovators), California New Car Dealers Association (CNCDA), and Veloz to evaluate current marketing efforts and determine how to enhance these efforts.

CNCDA's Green Vehicle Report is released twice a year and provides comprehensive information on the state's green vehicle market. The report includes a segment watch, including the top 20 best-selling alternative powertrain vehicles; best sellers in market segments including hybrid, plug-in hybrid, electric, and fuel cell vehicles; and market trends by powertrain type and brand shares in alternative powertrain market. In coordination with CNCDA, CVRP hosts webinars to highlight the efforts that dealers are taking to be green leaders.

Veloz is a nonprofit organization with members from key sector companies, agencies, and nonprofits that aim to inspire Californians to drive electric. Veloz engages electric car stakeholders with its summit series, as well as webinars throughout the year designed to share and discuss the latest updates in the electric car industry. In addition to its consumer-facing ZEV website, Electric For All, Veloz also produces statewide public education campaigns to encourage ZEV adoption.⁶³ These campaigns raise awareness about ZEVs, bust myths and provide access to tools that help consumers make their next ZEV purchase. The first campaign launched in 2018 and was titled "Opposites Attract." It featured a series of short videos and memes to communicate directly to target audiences. The second campaign, launched in 2019 and titled "Kicking Gas," starred former California Governor Arnold Schwarzenegger and focused on increased awareness and education of ZEVs. The 2021 campaign, titled "40 Million Reasons to Go Electric", highlighted the reasons every Californian should go electric with a focus on social, economic, and environmental justice. The most recent Veloz public awareness campaign, titled "Myths Busting Myths" launched in September 2022 and focused on busting myths surrounding ZEV technology and ZEV ownership.⁶⁴ CARB and Center for Sustainable Energy (CSE) are founding members of Veloz.

The Alliance for Automotive Innovation continues to promote dialogue with industry, federal, and state governments around public policy and incentives, as well as providing analysis around market data. Automakers are also helping to provide the public with more information about ZEVs by educating dealer staff through

⁶³ Veloz, *Electric For All*. <https://www.electricforall.org>. Accessed on July 23, 2022.

⁶⁴ Electric For All Powered by Veloz, "Myths Busting Myths". <https://www.electricforall.org/campaign/>. Accessed on July 18, 2023.

trainings. CVRP continues to educate and foster relationships with eligible automakers and dealers about the program rebate and the clean vehicle market.

Plug In America offers PlugStar, which provides nationwide dealer training on ZEVs as well as online support and tools for consumers, dealers, and electric utilities.⁶⁵ The PlugStar website provides a ZEV buying guide that allows shoppers to compare models, find information on charging, research available incentives, and get connected with PlugStar-trained ZEV dealers. PlugStar also offers in-person and online ZEV training for dealers nationwide that includes topics such as information about vehicle technology, incentives, and electric utility rates. More in-depth training is available to dealers to become PlugStar certified which provides dealers with a much better understanding of ZEVs and improves ZEV sales.⁶⁶

It should be noted that CSE, as the CVRP administrator, undertakes extensive outreach and education activities to increase new car purchasers' awareness of ZEVs. In addition, a dedicated outreach and education team focuses on lower-income consumers in disadvantaged communities to ensure these priority populations receive proper education and information regarding ZEVs and incentives. Since 2014, CSE's outreach and education teams have participated in more than 800 events across the state and conducted more than 68,000 ZEV and incentive-related conversations with consumers.

Furthermore, CSE's Dealer Outreach team focuses on providing training, tools, and tips to dealers for ZEVs and incentives. During the COVID-19 global pandemic, the Dealer Outreach team has transitioned outreach to virtual platforms, including phone calls, emails, virtual information sessions and webinars. While in-person visits were not possible due to the pandemic, the staff made 623 phone calls and sent 19,580 emails to dealership staff from May 2021 to May 2023. Table C-4 shows the dealership outreach in recent years under the CVRP grant.

In addition to outreach the dealer team hosted three different test drive events in 2022 and 2023:

1. CARB Southern Headquarters Grand Opening (May 2022), which included five test drive vehicles (Mercedes EQS, Audi E-tron, two Toyota Mirai, and a Toyota RAV4 Prime) and had an estimated attendance of 1,200
2. ATAE/NADA Auto Show, which included three test drive vehicles (Ford Mustang Mach-E, Chevrolet Bolt, and Toyota Mirai)
3. Pechanga Band of Luiseno Indians Earth Day, which included participation from DCH Kia of Temecula (EV6, Sportage); Temecula Valley Toyota and

⁶⁵ Plug In America, PlugStar ZEV Dealer Training, <https://pluginamerica.org/about-us/evtraining/>

⁶⁶ Ibid.

Temecula Valley Lexus (BZ4X, and RZ 450e), and Hyundai (Ioniq 5). The event had an estimated attendance of 250.

Table C-4: California Vehicle Rebate Project Dealer Outreach Team Activities

Dealership Outreach by Year	2017-2015	2018	2019	2020	2021	2022	2023*	Total
In Person Visits	222	990	1,777	339	0	0	1	3,329
Information Sessions	2	48	67	50	23	30	14	234
Materials Distributed	2,769	6,694	12,080	4,738	686	3,746	1,472	32,185

*As of 7/13/2023

Under the CVRP grant, CSE administers surveys to individual program participants and covers topics such as demographics, housing characteristics, interest in and research on PHEVs, sources of information used, decision-making process, dealership experience, vehicle details, and charging.

Other consumer surveys are being conducted under various research grants and contracts. CARB will coordinate to streamline the survey methodologies and questions to collect similar information across surveys to help inform long-term analyses.

Larger research efforts are also occurring that analyze consumer trends of new vehicle purchasers across the country. J.D. Power created the U.S. Electric Vehicle Consideration (EVC) Study that aims to understand why consumers aren't purchasing ZEVs.⁶⁷ The inaugural U.S. EVC Study was fielded from February through May 2023 with respondents being car shoppers with an intent to purchase or lease a new vehicle in the next 12 months. The third edition of the survey was launched in 2023 and results indicate that 26% of car shoppers are very likely to consider purchasing a new ZEV, up

Since 2014, the CVRP outreach and education teams have participated in more than 800 events across California and conducted more than 68,000 ZEV and incentive-related conversations with consumers.

⁶⁷ J.D. Power, June 15, 2023 Press Release: *Battleground for Electric Vehicle Purchase Consideration is Wide Open, J.D. Power Finds.* <https://www.jdpower.com/business/press-releases/2023-us-electric-vehicle-consideration-evc-study>

from 24% in 2022.⁶⁸ California leads the nation in ZEV consideration, with 73% of shoppers saying that they are likely to consider a ZEV. The modest increase is due to positive and negative market factors: lower gas prices, inflation, rising interest rates, greater model availability and charging availability. One of the key barriers, cited by respondents since the first survey in 2021, is the lack of access to charging at home or work. A finding in the first edition of this survey indicated that consumers who had first-hand experience with ZEVs were more likely to buy a ZEV.⁶⁹ The third edition also highlights that experience with ZEVs is plays an important role in purchase consideration.⁷⁰ Additional key findings from the second edition of the survey include that ZEV consideration is rising fastest with younger generations of consumers as 72% of Gen Y, also known as Millennials, consumers would consider purchasing a ZEV.⁷¹ The 2022 survey found that ZEV consideration varies by geographic location and that lack of ZEV education is still a key reason car shoppers do not consider these vehicles.⁷² This implies that in order to build stronger consumer demand for ZEVs, industry, auto manufacturers, and policy makers need to continue to focus heavily on consumer education and outreach and look for opportunities to increase hands-on experience with ZEVs among consumers. This will be critical over the next 10-15 years as California works to achieve 100% zero-emission vehicle sales.

Partnering with Community Based Organizations to Increase Awareness and Access to ZEV Incentives

Staff recognizes the value and importance of partnering with local community-based organizations (CBO) and grassroots organizations to increase access to and awareness of ZEVs and various incentives. These CBOs also act as a channel to voice community priorities and provide input on how we can improve our programs, so they are meeting the needs of these communities. There are various efforts underway within CARB's light-duty vehicle purchase incentive programs to expand outreach through CBOs in order to increase participation in these programs by priority populations. And most recently, the Board directed staff, along with the adoption of the Advanced Clean Cars II Regulation, to focus continue to work with stakeholders to further expand access to ZEVs and zero-emission mobility in the hardest to reach communities in the State. In this section, staff summarizes the current CBO efforts underway in CVRP, CC4A, Financing Assistance, and Access Clean California

⁶⁸ Ibid

⁶⁹ *Ibid*

⁷⁰ Ibid

⁷¹ Ibid.

⁷² J.D. Power. *May 26, 2022 Press Release: Electric Vehicle Consideration Up but Skepticism Still Exists, J.D. Power Finds.* <https://www.jdpower.com/business/press-releases/2022-us-electric-vehicle-consideration-evc-study>.

(ACCess) and provides insight into any future plans to expand partnerships with CBOs and grassroots organizations.

CVRP: Each year, CVRP has continued to increase outreach on ZEVs and available incentives in disadvantaged and low-income communities. This includes building a Community Partner Network which is a statewide coalition of Community Based Organizations (CBO) that have a common goal of ensuring clean air for all. CBOs are trusted community members who know community priorities and challenges. The CBOs in CVRP's Community Partner Network provide a wide variety of important services including financial literacy, education, weatherization services, job training and health advocacy.

CBOs are the foundation of the CVRP Community Partner Network and provide statewide coverage in disadvantaged communities. The CVRP Community Partner Network consists of the following organizations:

- Central California Asthma Collaborative (Seven CBOs throughout Central California)
 - Central California Environmental Justice Network
 - El Pablo Para el Aire y Agua Limpio
 - El Quinto Sol de América
 - LEAP Institute
 - Madera Coalition for Community Justice
 - Valley Improvements Projects
 - Little Manila Rising
 - Environmental Justice Project at Catholic Charities of Diocese of Stockton
- Metropolitan Area Advisory Committee (San Diego County and Imperial County)
- Community Resource Project (Sacramento and Yolo Counties)
- Comite Civico del Valle (Imperial County)
- Pryor Consulting (Sacramento County)

The CVRP Community Partner Network educates community members about CVRP and the benefits of ZEVs through community workshops, test drives, canvassing, art contests, digital marketing and one-on-one educational assistance. The CBOs inform consumers on how CVRP and other CARB programs can provide incentives to assist in reducing the cost of purchasing a clean vehicle.

In FY 22-23, CVRP focused on expanding outreach to tribal and Black communities. To assist with creating a strategy on how to best provide outreach to Black communities, CVRP partnered with Pryor Consulting, a black-woman-owned business. CVRP also included tribal nations in focus group forums to better understand the concerns and barriers to adopting ZEVs that are specific to tribal communities in order to direct outreach activities. CVRP also expanded the

Community Partner Network to include the Community Housing Development Corporation, which provides services in the Richmond/Bay Area, and California Interfaith Power and Light, a statewide organization focusing on Los Angeles, Riverside and San Bernardino Counties.

Staff recognizes the importance of ongoing outreach through community based and grassroots organizations, particularly in priority communities. With CVRP expected to close to new applications in October 2023, the current Financing Assistance programs closed, and the new joint statewide Clean Cars 4 All and Financing Assistance Program yet to launch, staff has directed the CVRP administrator to maintain support of the Community Partner Network through FY 23-24 so there wouldn't be a lapse in outreach. This ensures that outreach about ZEVs and all available federal, state, and local incentives continues in these communities while staff works to get the new joint program launched.

CC4A: Participating air districts are using a variety of methods to educate community members about their programs. CBOs play a critical role in conducting outreach to potential applicants and providing information about clean vehicle funding and the associated benefits of ZEVs. CBOs also advise air districts and their program partners with the most effective methods to raise awareness about Clean Cars 4 All, especially in the underserved communities they represent. In-person events, including ZEV ride-and-drives, provide program participants an opportunity to familiarize themselves with ZEV technology. CBOs will continue to be utilized by air districts, particularly to increase program awareness in geographic areas and with ethnic groups that have not had representative participation in the past. The statewide Clean Cars 4 All program will require the identification of and coordination with CBOs throughout the state in order to ensure equitable access and education. CBOs that the CC4A program has partnered and collaborated with include:

- Grid Alternatives (Multiple Districts)
- Beneficial State Foundation (Multiple Districts)
- Sacramento Electric Vehicle Association (Sacramento Metropolitan Air Quality Management District (Sac Metro AQMD))
- Rio Linda-Elverta Community Center and Park (Sac Metro AQMD)
- Midtown Business Association (Sac Metro AQMD)
- Hagginwood Community Center (Sac Metro AQMD)
- Johnston Community Center (Sac Metro AQMD)
- Woodlake Community Center (Sac Metro AQMD)
- Mexican Cultural Center of Northern California (Sac Metro AQMD)
- Oak Park Community Center (Sac Metro AQMD)
- Building Healthy Communities (Sac Metro AQMD)
- Fruitridge Community Center (Sac Metro AQMD)
- South Oak Park Community Association (Sac Metro AQMD)
- Samuel Pannell Meadowview Community Center (Sac Metro AQMD)

- Robertson Community Center (Sac Metro AQMD)
- Foothill Community Center (Sac Metro AQMD)
- Hammond Climate Solutions (San Diego Air Pollution Control District (San Diego APCD))
- Metropolitan Area Advisory Committee (San Diego APCD)
- Environmental Health Coalition (San Diego APCD)
- Casa Familiar (San Diego APCD)
- Greenlining Institute (San Diego APCD)
- Groundworks (San Diego APCD)
- South Bay Community Services (San Diego APCD)

Financing Assistance: Financing Assistance for Lower-Income Consumers project (Financing Assistance) is designed to help lower-income Californians purchase advanced clean vehicles by providing electric vehicle purchase price grants, facilitating low interest loans, and providing charging grants or pre-paid charging cards on a first come, first-served basis. A needs-based model that prioritizes applications based on criteria such as income, disadvantaged community (DAC) residency, need for financial counselling or planning, and categorical eligibility is going to be adopted this year. CBOs are going to play a pivotal role in program implementation and success by acting as project liaisons to bring outreach and education to their communities and provide valuable input based on the community's needs for better program development to the project.

The following is a list of CBOs that the Financing Assistance project has partnered with or worked to provide outreach and education about incentives.

- Central California Asthma Collaborative
- Center for Sustainable Energy
- Foundations for California
- GRID Alternatives
- Rising Sun
- Metropolitan Area Advisory Committee
- Abode Services
- Alameda County Housing Authority
- Anewamerica
- Acterra
- Back on Track Community Services
- Bay Area Community Services
- Bridge Housing
- CDACA
- Center for Human Development
- Clearinghouse CDFI
- Community Financial Resources

- Community Resource Center
- Contra Costa Housing Authority
- Contra Costa Unified School District
- EAH Family Housing
- East Bay Workforce Dev.
- Ensuring Opportunity
- Fighting Back Partnership
- Fremont Family Resource Center
- Goodwill Industries
- GRIP Greater Richmond Interfaith Program
- Health Right
- Jewish Family Service
- Los Medanos College
- Mission Asset Fund
- Mutual Housing
- Napa Community Corrections Service Center
- Opportunity Junction
- Peninsula Family Service
- Pittsburg Unified School District
- Planned Parenthood
- Richmond Community Foundation
- Richmond Neighborhood Housing Services
- Richmond Workforce Development Board
- Roots Community Health Center
- Rubicon Services
- Sandidge Urban Group Inc
- Shelter Inc
- Sparkpoint
- Swords to Plowshares
- The Stride Center
- TransForm
- Treasure Island Homeless Development Initiative
- United Way
- Vallejo City School District
- Volunteers of America
- Watsonville Neighborhood Services
- Richmond Neighborhood Housing Services
- Workforce Development Board of Solano County
- Working Solutions

The upcoming statewide program Financing Assistance and Statewide Clean Cars 4 All will require the program administrator to include detailed plans for collaboration and partnership with CBOs and grassroots organizations in their proposals.

ACCess: One of the primary goals of Access Clean California is to work with local CBOs and similar grassroots organizations to help increase awareness of and streamline access to Clean Transportation Equity projects in priority communities. Through its outreach partner network, Access Clean California provides funding, training, and other capacity-building resources to CBOs to support outreach and application assistance in their local communities. As the project matures from its pilot phase and looks to expand its network of outreach partners to fill outreach gaps, it will prioritize forming new partnerships with CBOs and similar grassroots organizations across the state. To date, Access Clean California has leveraged its relationships with existing outreach partners to meet local community leaders, learn about community-level outreach needs and gaps, and discover new community organizations with which to partner. Through CARB's complementary capacity-building grant projects Access Clean California is also able to form relationships with and formally partner with new grassroots-level organizations who are deeply embedded and trusted in their communities. CARB recognizes this as a particular advantageous pathway to expand its network of outreach partners moving forward. The following is a list of CBOs that ACCess is currently funding or has partnered with in the past, including CBOs funded through larger partnerships like Central California Asthma Collaborative and also through the San Diego Mobility Project (supported by ACCess).

- Central California Asthma Coalition's network of six Central Valley-based CBOs
- Little Manila Rising -San Joaquin County
- Catholic Charities Diocese of Stockton - San Joaquin, Stanislaus, Merced Counties
- Valley Improvement Projects - Stanislaus County
- Madera Coalition for Community Justice-Madera County
- Central California Environmental Justice Network (CCEJN) -Fresno, Tulare, and Kern Counties
- Latino Environmental Advancement Project (LEAP Institute) - Kings County
- Comite Civico del Valle
- Fresno Metro Black Chamber of Commerce
- Healthy Active Streets
- Latina/o Roundtable
- META Coop
- Peninsula Family Services
- People for Mobility Justice
- South Kern Sol
- Social Justice Learning Institute
- I Am Green

- Project New Village
- Groundwork
- The Urban Collaborative Project
- San Diego Urban Sustainability Coalition

Historical Consumer Awareness

While acceptance of BEVs and PHEVs has historically been challenged by lack of awareness, a national 2021 survey of adults by Pew Research Center found that 92% have heard at least a little about ZEVs, and 30% had heard a lot about ZEVs.⁷³

An early 2022 survey of U.S. adults by Consumer Reports found that 14% would definitely choose a BEV if choosing a new car today, and an additional 22% said they would seriously consider one. Of those who did not indicate they would definitely choose a ZEV, the most commonly noted reasons that would prevent one from choosing a ZEV were “charging logistics, such as where and when I’d be able to charge it” (61%), vehicle range (55%), and vehicle costs (52%). Forty percent said they were at least somewhat familiar “with the fundamentals of owning an electric-only vehicle.”⁷⁴ An Ipsos Mobility Navigator study finds interest in ZEVs increased over time to 36% in 2021.⁷⁵

A 2020 Consumer Reports survey found that most nationwide consumers, 68%, have learned about BEVs but do not know much about them.⁷⁶ Only 2% had never heard of BEVs and the remaining 29% range from knowledgeable to very knowledgeable about BEVs.⁷⁷ Exposure to BEVs appears widespread; many have seen public charging stations (63%) or ads for BEVs (44%).⁷⁸ Fewer have seen a BEV in their neighborhood (36%) or know someone who owns one (3%).⁷⁹ Despite this awareness, only 4% of Americans plan on getting a BEV for their next vehicle, and 27% would consider a BEV as their next vehicle.⁸⁰ Interest in

⁷³ Tyson, A., Kennedy, B., & Funk, C. (2021). Gen Z, Millennials stand out for climate change activism, social media engagement with issue. Pew Research Center. https://www.pewresearch.org/science/wp-content/uploads/sites/16/2021/05/PS_2021.05.26_climate-and-generations_REPORT.pdf

⁷⁴ Consumer Reports Survey Research Department. (2022). Battery electric vehicles and low carbon fuel: A nationally representative multi-mode survey. Consumer Reports. https://advocacy.consumerreports.org/wp-content/uploads/2022/08/2022-Battery-Electric-Vehicles_by-gender-1.pdf

⁷⁵ Kiser, J. (2021, September 9). Interest in electric vehicles has tripled. How can automakers take advantage? Ipsos. <https://www.ipsos.com/en-us/news-polls/Interest-in-electric-vehicles-has-tripled-How-can-automakers-take-advantage>

⁷⁶ The 2020 Consumer Reports Survey was administered by the NORC at the University of Chicago; participants are representative of consumers nationwide. CR Survey Research Department. (2020). “Electric Vehicles and Fuel Economy: A Nationally Representative Multi-Mode Survey.” Available at: https://article.images.consumerreports.org/prod/content/dam/surveys/Consumer_Reports_Electric_Vehicles_Fuel_Economy_National_August_2020

⁷⁷ Ibid.

⁷⁸ Ibid.

⁷⁹ Ibid.

⁸⁰ Ibid.

California is higher, with 40% considering an electric vehicle for their next purchase.⁸¹ Reasons for avoiding BEVs include lack of knowledge about them, lack of charging stations, the purchase price of BEVs, and range, among others.⁸² Nationally, while consumers appear to know about BEVs, they do not appear confident in the depth of their knowledge and are interested in learning more before committing to purchase or lease.

Furthermore, a survey of Sacramento, California residents echoes findings that consumers are aware of PHEVs and BEVs but need deeper familiarity to consider purchasing or leasing a vehicle.⁸³ About half are aware of BEV/PHEV advertising, and about a quarter are aware of education programs.⁸⁴ Several respondents reported that they are aware of state government incentives (54%), federal government incentives (46%), and parking incentives (46%).⁸⁵ Despite this knowledge, Hardman et al. found that the likelihood of a consumer getting a BEV is more closely correlated with a consumer having sought information themselves or having a conversation with a BEV owner than any other factor. It appears that awareness without the personal means of gaining familiarity with the vehicle is usually not enough to spur purchasing or leasing of a PHEV or BEV. Staff recognizes that a lot has changed in the market since 2020 and is working on updated surveys whose results will be included in future iterations of this appendix.

Hardman et al. conclude that incentives and charging programs are less effective when there are gaps in consumer knowledge and familiarity with BEVs. The authors suggest understanding the conversations between BEV/PHEV owners and non-owners to emulate when designing outreach and infrastructure programs.

These studies underscore the importance of program outreach and education about PHEV/BEVs in general. Methods for reaching consumers may be more encouraging when focusing on familiarity with the vehicles. Incentives and infrastructure are useful policy measures combined with in-depth knowledge and familiarity. CARB program outreach can be evaluated with this lens to increase consumer participation and knowledge.

⁸¹ Consumer Reports. Consumer Attitudes Towards Electric Vehicles and Fuel Efficiency in California: 2020 Results. Published March 2021. <https://advocacy.consumerreports.org/wp-content/uploads/2021/03/California-EV-FE-Survey-Report-3.8.21.pdf>

⁸² The 2020 Consumer Reports Survey was administered by the NORC at the University of Chicago; participants are representative of consumers nationwide. CR Survey Research Department. (2020). "Electric Vehicles and Fuel Economy: A Nationally Representative Multi-Mode Survey." Available at: https://article.images.consumerreports.org/prod/content/dam/surveys/Consumer_Reports_Electric_Vehicles_Fuel_Economy_National_August_2020

⁸³ Hardman, S., Kurani, K. S., and Chakraborty, D. (2020). "The usual policy levers are not engaging consumers in the transition to electric vehicles: a case of Sacramento, California." *Environmental Research Communications*. Available at: <https://iopscience.iop.org/article/10.1088/2515-7620/aba943>

⁸⁴ Ibid.

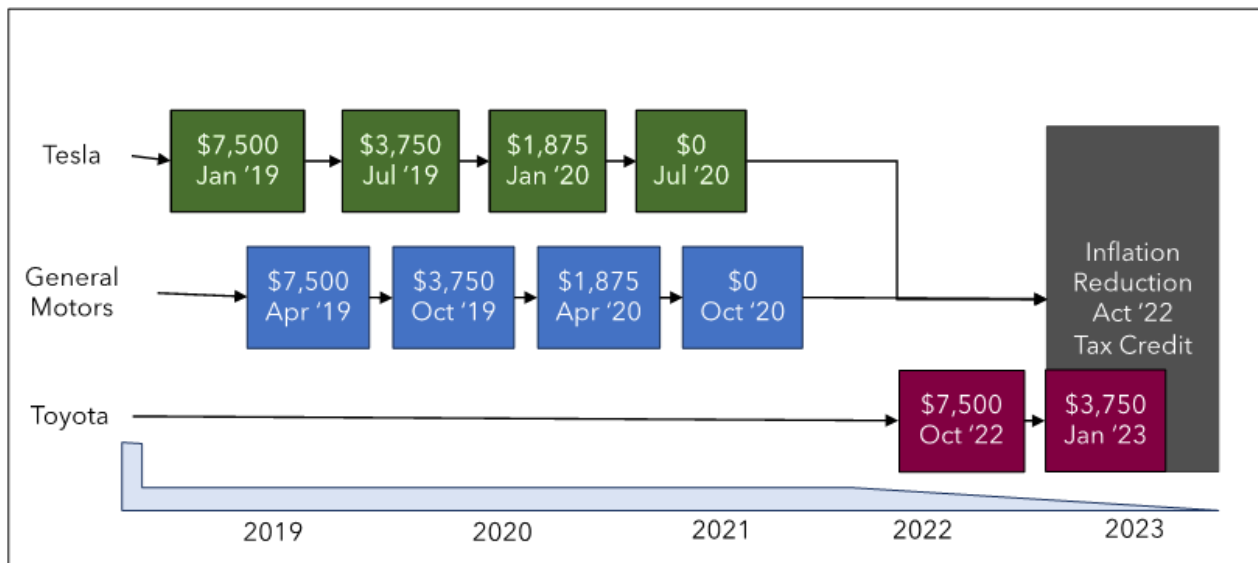
⁸⁵ Ibid.

Impact of Federal Policies - Federal Tax Credit

The Supplemental Report of the 2019-20 Budget requires CARB to evaluate the impacts of federal policy, such as the federal tax credit, on the adoption of ZEVs. Further, the State Auditor recommended that CARB collect survey information for consumer-focused incentive programs that include the behavioral effects of the federal tax credit. The analysis below builds upon previous data provided annually in the Funding Plan and will continue to be expanded through new survey efforts in the future. The analysis only focuses on the federal ZEV tax credit in place prior to amendments made by the Inflation Reduction Act. Future iterations of this analysis will include information and data pertaining to the amended federal ZEV tax credit, now known as the Clean Vehicle Credit.

The Internal Revenue Code Section 30D allowed a tax credit of up to \$7,500 for the purchase of a qualifying plug-in electric vehicle. Prior to 2023 this tax credit amount would phase out once a vehicle manufacturer has sold 200,000 qualified vehicles. Six months after this milestone was reached, the credit amount was cut in half (from a maximum of \$7,500 to \$3,750). After another 6 months, the maximum credit would be cut in half again. Finally, the amount was reduced to \$0 for ZEV purchases from that company at the one-and-a-half-year mark. Tax credits began to phase out in January 2019 for Tesla and April 2019 for General Motors (GM) and for Toyota the second quarter of 2022 (Figure C-6). Additionally, between August 17 and December 31, 2022, vehicles needed to undergo final assembly within the US to be eligible for the federal tax credit.

Figure C-6: Maximum Tax incentive levels for Tesla Motors, General Motors, and Toyota during the phase-out period



The CVRP Consumer Survey asks respondents to rate the importance of the federal tax credit in making it possible to acquire an electric vehicle. Those who answered “extremely important” are most influenced by the incentive and can be used as a proxy for those who might not have purchased/leased their vehicle without the tax credit. For applicants adopting a vehicle between December 2020 and September 2022, 43% of CVRP survey respondents said the federal tax credit was extremely important, as shown in Figure C-7. The importance of the federal tax credit is rebounding following a decline in 2020, the rebound is likely related to the wider availability of the tax credit following the passing of the Inflation Reduction Act of 2022. (see Figure C-8).

Figure C-7: Importance of the Federal Tax Credit Among Clean Vehicle Rebate Project Participants - Clean Vehicle Rebate Project Consumer Survey Edition: 2021-2023 (n=13,354)

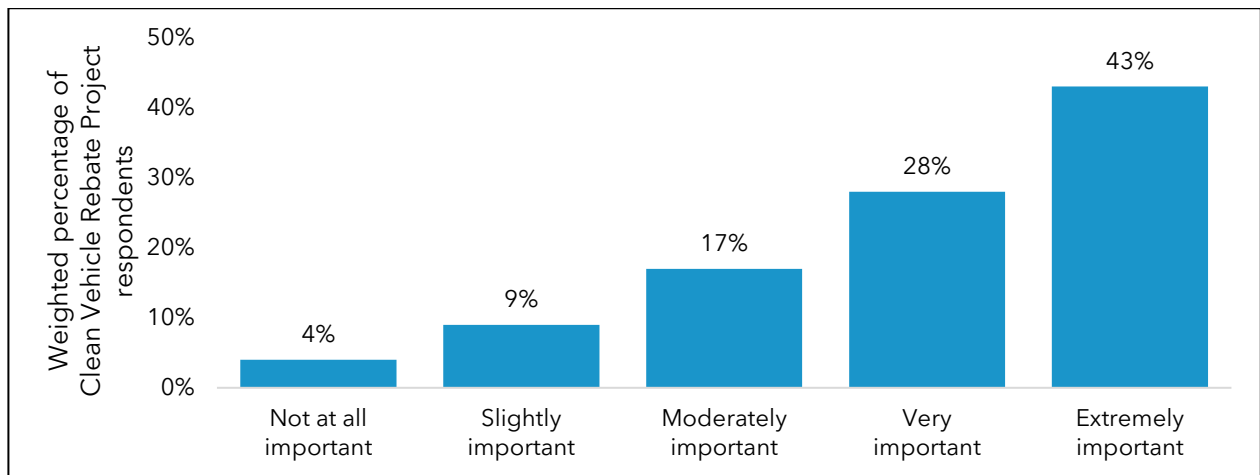
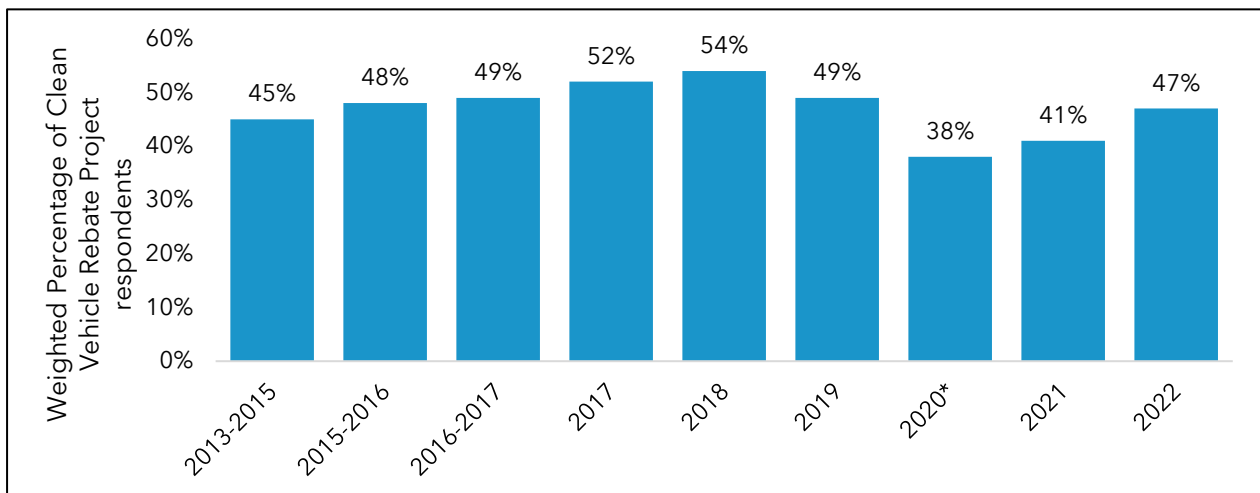


Figure C-8: Percent of Clean Vehicle Rebate Project Participants Indicating the Federal Tax Credit is Extremely Important Over Time - 86,598 Survey Respondents Weighted to Represent 460,414 Rebate Recipients



The decline in reported importance of the tax credit in calendar year 2020 may be linked to the phase-out of federal tax credits for Tesla and GM. These changes provide an opportunity to evaluate the importance of the tax credit and its impact on participants' views of the CVRP rebate. Figures C-9 and C-10 show the percentage of CVRP recipients who obtained either a GM or a Tesla, respectively, and rated the federal tax credit as "extremely important." Both graphs show a decrease in perceived importance over time as the credit amount decreased from \$7,500 to \$0. Even though there was no change in the CVRP rebate amount during these periods, the percentage of participants who rated the rebate as "Extremely important" decreased as well.

Figure C-9: Percentage of Clean Vehicle Rebate Project Respondents Rebated for Tesla Vehicles Rating Incentives as "Extremely Important" During Tesla Phase Out - Clean Vehicle Rebate Project Consumer Survey Edition: 2017-2020

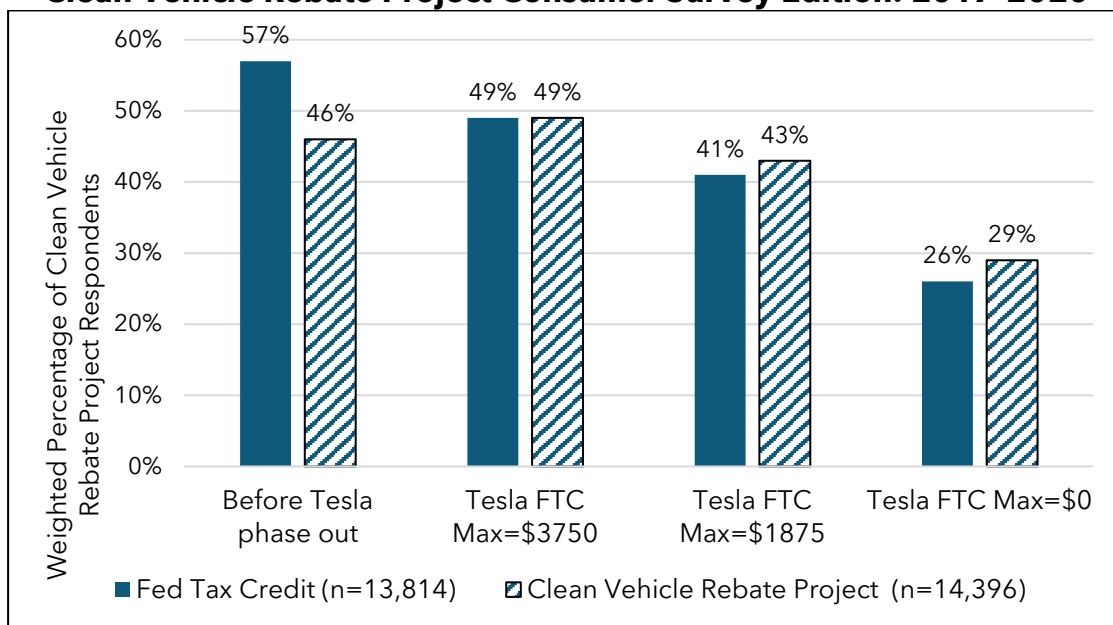
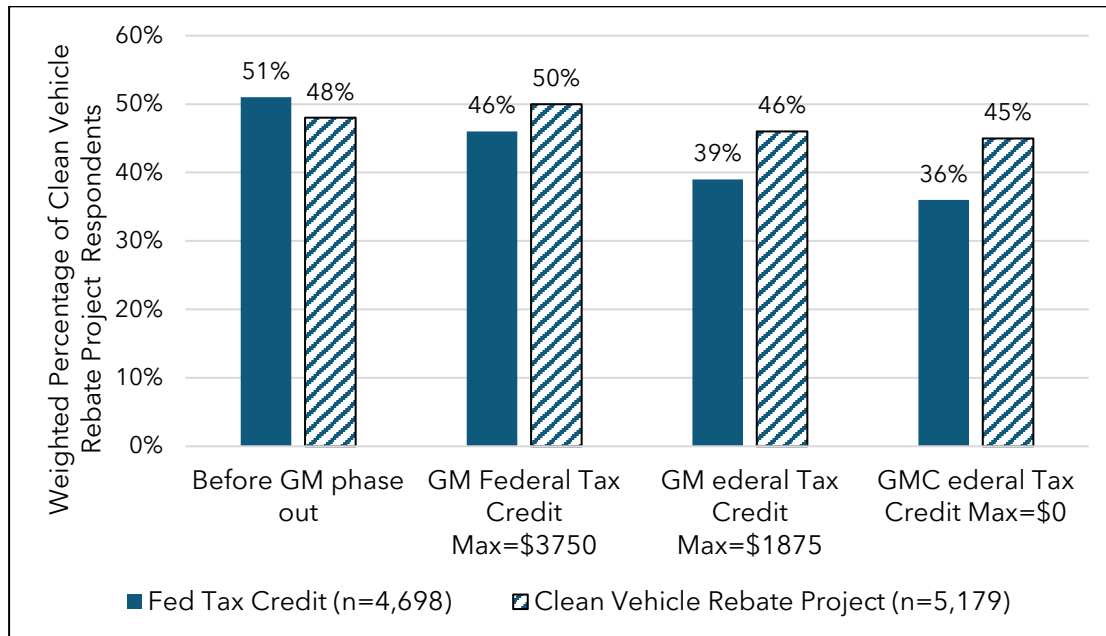


Figure C-10: Percentage of Clean Vehicle Rebate Project Respondents Rebated for General Motors Vehicles Rating Incentives as "Extremely Important" During General Motors Phase Out - Clean Vehicle Rebate Project Consumer Survey Edition: 2017-2020



The CVRP survey responses indicate that both the tax credit and the rebate remain important to over one-third of ZEV consumers despite the phase-out of tax credits for the best-selling manufacturers. The phase-out of tax credits for Tesla and GM showed that decreasing incentive levels are associated with a decrease in participants' views of the importance of the tax credit in making it possible to acquire a ZEV. As the tax credits have phased out for Tesla, GM, and Toyota the survey data do not indicate that the CVRP rebate has increased in importance.

On August 16, 2022, the federal Inflation Reduction Act (IRA)⁸⁶ was signed into law and includes a number of measures to improve the economy with a focus on working families in America.⁸⁷ One of these measures includes a series of amendments to the Qualified Plug-in Electric Drive Motor Vehicle Credit (IRC 30D⁸⁸), now known as the Clean Vehicle Credit, to be phased in over the next few years. Starting August 16, 2022, there will be an added requirement that electric vehicles must have final assembly in North America to be eligible for the credit.⁸⁹ Starting January 2023, the 200,000-unit cap for manufacturers will be

⁸⁶ Text - H.R.5376 - 117th Congress (2021-2022): Inflation Reduction Act of 2022. (2022, August 16). <https://www.congress.gov/>

⁸⁷ The White House Briefing Room. *FACT SHEET: The Inflation Reduction Act Supports Workers and Families*. August 19, 2022. <https://www.whitehouse.gov/briefing-room/statements-releases/2022/08/19/fact-sheet-the-inflation-reduction-act-supports-workers-and-families/>

⁸⁸ Internal Revenue Service. Plug-In Electric Drive Vehicle Credit (IRC 30D). <https://www.irs.gov/businesses/plug-in-electric-vehicle-credit-irc-30-and-irc-30d>

⁸⁹ Internal Revenue Service. "Plug-In Electric Drive Vehicle Credit (IRC 30D)". Updated August 16, 2022. Accessed on August 21, 2022. <https://www.irs.gov/businesses/plug-in-electric-vehicle-credit-irc-30-and-irc-30d>

removed and new MSRP and income caps will be effective.⁹⁰ The MSRP cap is set at \$80,000 for SUVs, vans, and pickup trucks and \$55,000 for all other vehicle classes; the income caps are set at \$150,000 for single tax filers, \$225,000 for those filing head of household, and \$300,000 for those filing jointly.⁹¹ Starting in 2024, a taxpayer may choose to transfer the credit to a dealer, allowing the buyer to receive the credit as a rebate at the point of purchase and requirements around battery component and critical minerals will take effect.⁹² In addition to amendments to the Clean Vehicle Credit, the IRA includes the creation of a new tax credit for the purchase of a used ZEV effective January 1, 2023.

Additionally, the current administration has previously outlined a target of 50% of new vehicle sales in the U.S. must be electric in 2030.⁹³ These supportive policies will be necessary as we look to encourage ZEV adoption. While their actual impact is unknown, they resemble policies that have been successful in other countries. Staff will continue to analyze the changing landscape of federal ZEV policies and report on their impact on ZEV adoption in future iterations of this appendix.

Summary of Sustainable Zero-Emission Vehicle Market Section

Staff has defined the ZEV market reaching and maintaining a 16-20% market share of the new light-duty car market as the point at which it would be considered sustainable, and no longer need financial incentives for the broader market. This is in addition to vehicle choice diversity that is comparable to the internal combustion engine vehicle market, lower incremental cost for ZEVs, increased availability of charging infrastructure, and a growing secondary market. As noted previously, ZEV car sales soared to more than 12% share of new car sales in California by the end of 2021 and grew to more than 24% by early-2023 despite the market disruptions. Increases in ZEV sales and vehicle diversity and reductions in battery costs are all strong indicators of continued market growth. While vehicle choice diversity of PHEVs and BEVs is not comparable to the conventional gas-powered market, the number of available models is growing signaling a shift in manufacturer funding priorities for cleaner vehicle technologies. Lastly, increasing consumer awareness remains an issue where and additional work is needed in order to support continued ZEV adoption.

Evaluation of Program Funding Needs (Three Year Need)

California's ZEV market has rebounded since late-2020 with an increase in purchases and leases for new ZEVs. With the advancement of the technology, the current market trend

⁹⁰ Text - H.R.5376 - 117th Congress (2021-2022): Inflation Reduction Act of 2022. (2022, August 16). <https://www.congress.gov/>

⁹¹ Ibid.

⁹² Ibid.

⁹³ The White House Briefing Room Fact Sheet: President Biden Announces Steps to Drive American Leadership Forward on Clean Cars and Trucks. August 5, 2021. <https://www.whitehouse.gov/briefing-room/statements-releases/2021/08/05/fact-sheet-president-biden-announces-steps-to-drive-american-leadership-forward-on-clean-cars-and-trucks/>

indicates that ZEV costs and fueling time are likely to be reduced, while vehicle range and model choices are expected to increase. However, supply chain issues, inflation, and increasing interest rates have caused vehicle prices to increase. Consumer education and awareness of ZEVs and their benefits have improved and as a result, the California ZEV market soared to more than 18% share of new car sales in California by the end of 2022 and grew to more than 24% by early-2023.

The next three to five years are critical for the ZEV market as industry, in response to CARB regulations and growing ZEV mandates around the world, is heavily investing in development and expansion of ZEV production and new government policies around the world are paving the way for the big shift from old polluting technologies to cleaner ones.⁹⁴ During this time, and likely enhanced by CARB regulations to further increase ZEV penetration in new vehicle sales, the California ZEV market will likely leap over the chasm between the early adopter market segment and reach the early majority market. This will lead to adjustments in price and technological features that better serve the needs of the mass market. CARB staff anticipates that at that point, California will reach a sustainable market where government incentives are no longer required for the mass market and efforts will be focused on harder to reach consumer segments and used vehicles.

In this section of the Long-Term Plan, staff evaluates the funding need for CVRP, CC4A, Financing Assistance, and ACCess over the next three years as required by SB 1275. An update on three-year funding needs for CVRP is not included in this update as the program is expected to exhaust available funding by mid-October 2023 and is not expected to receive any additional funding. Staff also projects forward ZEV sales out to 2030 if the ZEV market growth continues on its current trajectory to make a preliminary assessment of how the market is doing compared to the State's ZEV deployment goals of:

- 1 million vehicles by 2023
- 1.5 million vehicles by 2025
- 5 million vehicles by 2030

The forecast out to 2030 is a requirement of the Supplemental Report to the 2018-19 Budget Act. While this report focuses on the ZEV deployment goals established in SB 1275, other CARB documents, such as the Mobile Source Strategy, provide an update on progress and strategies required to meet the State's other air quality targets and greenhouse gas reduction goals. The State's climate goals impacting the ZEV market include the target set by Executive Order S-03-05 to be carbon neutral by 2045 and Executive Order N-79-20⁹⁵ which calls for 100% of in-state sales of new passenger cars and trucks be zero emission by 2035. The 2020 Mobile Source Strategy has called for an even

⁹⁴ International Energy Agency. Global ZEV Outlook 2019.
<https://www.iea.org/publications/reports/globalevoutlook2019/>

⁹⁵ Executive Order N-79-20 <https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf>

more aggressive deployment of light-duty passenger vehicles, and CARB will be proposing regulations to support these goals.⁹⁶

Analysis of Incentive Funding Amounts for CVRP, Clean Cars 4 All, and Financing Assistance

Vehicle Purchase Incentive Amounts

During development of the FY 2022-2023 major update to the Long-Term Plan, CARB staff worked with CSE to estimate the impact of different incentive levels on vehicle purchase affordability for both new and used ZEV purchasing households using the Affordability Calculator tool from CSE's Caret platform. For this year's update, CSE provided updated information from the Affordability Calculator. The model analyzes the number of affordable vehicle options given an incentive mix for households at different income levels. For this analysis, affordability is defined as spending no more than 15% of one's income on all vehicle costs, including loan principal, interest, fuel, insurance, and maintenance. The calculations are based on a modified financial health rule that says when one is buying a car, one should put 20% down, get a four-year loan, and spend no more than 10% of income on vehicle costs (the 20/4/10 rule, explained further here:

<https://www.capitalone.com/cars/learn/managing-your-money-wisely/what-is-the-20410-rule-for-car-buying/1532>).

The following inputs and assumptions were included in this analysis:

- **New Vehicles:** 2023 model year vehicles listed on fueleconomy.gov, where each vehicle option is a combination of make, model and trim where that combination is related to all-electric range. For example, the Nissan LEAF includes several "options" due to differences in range at various trim levels.
- **Used Vehicles:** 2010 to 2021 model year vehicles listed on fueleconomy.gov, where each vehicle option is a combination of model year, make, model, and trim. Trim levels were again counted as separate options if the trim level affects all-electric range.
- **New Vehicle Base MSRP:** Varies by vehicle, from automaker websites or car journalism publishers such as Car and Driver
- **Used Vehicle Purchase Prices:** Fair Purchase Prices from Kelley Blue Book, priced without options in July 2023.
- **Annual Interest Rate:** approximately 17% based on national averages for credit applicants with credit scores in the 600s.
- **Maintenance Costs:** \$65/month, assuming \$0.06 per mile (*FOTW #1190, June 14, 2021: Battery-Electric Vehicles Have Lower Scheduled Maintenance Costs than Other*

⁹⁶ California Air Resources Board. *Proposed 2020 Mobile Source Strategy*. September 2021.

https://ww2.arb.ca.gov/sites/default/files/2021-09/Proposed_2020_Mobile_Source_Strategy.pdf

Light-Duty Vehicles) and 13,000 miles per year (*Gorzelay, J. (2022). By The Numbers: What It Costs To Maintain An Electric Vehicle*

- **Fuel Costs:** Varies by vehicle-based on fueleconomy.gov default estimate.
- **Insurance Costs:** \$251/month based on national averages (*Leovic, D. (2023). How much does electric car insurance cost?*)
- **Finance Term:** 60 months, based on the national average for new cars rounded to the nearest year (*Jones, J. (2023). Average car payment and auto loan statistics 2023*)
- **Down Payment Ratio:** 10%, modified from the 20/4/10 rule to approximate the grant provided by the Financing Assistance program.
- **Cost-to-Income Ratio:** 15%, modified from the 20/4/10 rule to account for the reality that Californians tend to spend more than 10% of their income on transportation.
- **Sales Tax:** 8.82% average based on 2021 Taxfoundation.org-reported California averages (<https://taxfoundation.org/publications/state-and-local-sales-tax-rates/>).
- **Dealer Fees:** \$762, the highest DMV fee for a new ZEV (CA DMV)
- **Purchase power adjustment:** Income divided by the square root of the household size, applied to account for additional costs (including transportation costs) associated with larger household sizes (More on equivalency scales: <https://www.oecd.org/els/soc/OECD-Note-EquivalenceScales.pdf>).

Using these inputs, the tool generated the number of affordable vehicle choices available to a car shopper, given the combination of income, household size, and incentive level. For example, a three-person household with an annual income of \$74,580, equivalent to 300% the federal poverty level (FPL), receiving a \$17,000–\$17,500 point-of-sale incentive (the Clean Cars for All incentive plus the federal tax credit, limited to vehicles qualifying for the federal tax credit) and an interest rate capped at 8% (through the Finance Assistance program) would have two affordable vehicle option available for purchase: the 2023 Chevrolet Bolt ZEV and Chevrolet Bolt EUV. The analysis suggests that for a three-person household at 300% of the FPL no vehicles are affordable given these affordability rules without the addition of the federal tax credit. A larger, five-person household with income at 300% of the FPL (\$105,420) has more affordable choices at lower incentive levels: a \$10,000 CC4A incentive with an 8% interest rate cap through the Finance Assistance program enables three affordable choices: the Nissan LEAF, Chevrolet Bolt ZEV and Chevrolet Bolt EUV.

In the used vehicle market, several vehicle options are affordable without incentives to a three-person household making 300% of the FPL. The analysis indicates 39 options are affordable, including 2011–2016 Nissan LEAF models, 2012–2017 Mitsubishi i-MiEV, 2013–2016 FIAT 500e, 2012–2016 Ford Focus Electric, 2013–2017 smart fortwo ED, 2014–2015 Chevrolet Spark, 20ax Energi, 2013–2014 Ford Fusion Energi, and 2011–2012 Chevrolet Volt.

The current \$9,500–\$10,000 CC4A incentive, capping interest rates at 8% through the Finance Assistance program and applying a \$4,000 federal tax credit to the down payment of a used clean vehicle more than triples the number of choices to 147 and adds some large

vehicles to the affordable options including the 2020 Hyundai Kona and 2018 Mitsubishi Outlander PHEV. As with new vehicle affordability, slightly more choice is available to larger households with income at 300% of the FPL: 156 options with a \$9,500-\$10,000 CC4A incentive, 8% interest rate, and a \$4,000 federal tax credit.

Clean Cars 4 All

Clean Cars 4 All Projection Methodology

Staff’s estimated funding levels for Clean Cars 4 All are based primarily on data collected over four years of implementation, as well as regular consultations with each implementing air district. Staff also made the following assumptions:

- The capacity of each district to process applications is the primary determinant of participation rates given the program’s inherently resource-intensive application process.
- Each air district’s capacity improves modestly over time due to streamlined processes, improved outreach and education, and greater availability of vehicles in the secondary market.
- Each air district receives an increasing number of monthly applications over time.
- The incentive amount (averaged across participants) stays fairly consistent throughout this three-year period.
- The demand for the new programs in San Diego and statewide will increase substantially over the next three years.
- Program demand will also increase due to CVRP phasing out
- The average cost of each incentive without administrative funds is \$11,100.
- Average administrative funds for all programs is assumed to be 22%

Participation and funding projections are made district by district before being aggregated to a total funding estimate for each of the three fiscal years. To account for uncertainty, staff estimated a range of values for each year. Table C-5 summarizes historic consumer participation for each air district.

Table C-5: Historic Consumer Participation by Air District

Air District	Fiscal Year 15-16	Fiscal Year 16-17	Fiscal Year 17-18	Fiscal Year 18-19	Fiscal Year 19-20	Fiscal Year 20-21	Fiscal Year 21-22	Fiscal Year 22-23
South Coast Air Quality Management District	586	947	1,008	1,725	1,733	1,452	589	1,032
San Joaquin Valley Air	548	364	274	704	984	712	307	765

Air District	Fiscal Year 15-16	Fiscal Year 16-17	Fiscal Year 17-18	Fiscal Year 18-19	Fiscal Year 19-20	Fiscal Year 20-21	Fiscal Year 21-22	Fiscal Year 22-23
Pollution Control District								
Bay Area Air Quality Management District	0	0	0	15	695	684	431	947
Sac Metro Air Quality Management District	0	0	0	0	0	328	179	213
Total Participants	1,134	1,311	1,282	2,444	3,412	3,176	1,506	2,957

The Assembly Bill (AB) 630 Report highlights annual performance goals and evaluates the CC4A program. CC4A continues to make significant progress to provide equitable access to clean transportation options for people living in low-income and disadvantaged communities in California. As CC4A air district programs reopened in late 2021, they experienced high application volumes despite fluctuating vehicle market conditions and the continuing global health crisis, indicating that demand for CC4A remains strong. Despite the success of the program to date, including the expansion to the San Diego air district, there remain many Californians that could benefit from the program but reside outside the regions where air districts participate in CC4A. These include DACs, tribal, rural, and low-income communities. Therefore, there is a need to expand the CC4A program statewide. A statewide program would also need to include a needs-based program that goes above and beyond the current first-come, first-served model. CC4A must also build upon the program’s existing approach and develop a community-level focus on consumer protection, outreach, and education. This shift in program design would specifically address community concerns with the current first-come, first-served model and ensure that funding is prioritized for Californians in most need, respect the needs of local communities, as well as support California’s climate and air quality commitments. For more information regarding the AB 630 Report, visit Appendix I.

To better inform funding demand based on the ZEV market, staff recognizes the need for a secondary market analysis. A handful of CARB research projects in collaboration with the University of California are underway to study the secondary ZEV market. Staff is actively pursuing the findings to better understand the dynamics of the used ZEV market as well as characteristics and behavior of consumers in this market. Once data become available, the information will be used to inform policy and funding decisions moving forward.

Clean Cars 4 All Three-Year Funding Need

Table C-6 shows staff’s projected participation levels in the Clean Cars 4 All programs over the next three fiscal years and the corresponding funding needs for each year. Overall, staff estimates a steady increase in participation over the coming three years as the existing programs continue to grow and the additions of programs in San Diego air district and statewide. The total funding amount includes the average cost per incentive plus the associated administrative funds.

Table C-6: Projected Participation and Funding Ranges

Air Districts	Fiscal Year 2023-24	Fiscal Year 2024-25	Fiscal Year 2025-26
South Coast Air Quality Management District	1,800-2,000	1,900 - 2,100	2,000 - 2,200
San Joaquin Valley Air Pollution Control District	700 - 900	800 - 1,000	900 - 1,100
Bay Area Air Quality Management District	600-800	700-900	800-1,000
Sac Metro Air Quality Management District	200 - 250	400 - 600	500 - 700
San Diego Air Pollution Control District	50-100	400-600	500-700
Statewide	50-100	1,800-2,000	2,000-2,500
Total Participants	3,400 - 4,150	6,000 - 7,200	6,700 - 8,200
Total Funding (in millions)	\$47-\$58	\$83-\$97	\$93-\$114

Impact of Proposed Clean Cars 4 All Program Changes

Staff is proposing two changes to the Clean Cars 4 All program. The first change involves zero-emission motorcycles (ZEM) which are currently only eligible through CVRP. Since CVRP is projected to run out of funding and close as early as October 2023, staff is proposing to add ZEMs to CC4A and Financing Assistance as an eligible replacement vehicle type. The second change involves funding for adaptive equipment. Language included in the Budget Act of 2022 provided direction for CARB staff to consider increased incentive levels to accommodate increased costs associated with adaptive equipment for eligible Californians with physical disabilities. While these changes are likely to increase program demand, it is too early to estimate the magnitude of the impact.

Over the next three years, staff will continue to monitor program data, market conditions, and collaborate with stakeholders to identify any necessary policy changes. In coordination with the Financing Assistance program, staff will be considering how and when to phase out conventional hybrid replacement vehicles to maximize emission benefits and help CARB meet its ZEV deployment goals. Staff will be closely monitoring participation in the new program in San Diego and the statewide program.

Financing Assistance

Financing Assistance Projection Methodology

To date, \$67 million has been allocated for both Financing Assistance programs, of which \$8 million has gone to the local pilot project in the Bay Area and \$45 million to the statewide project. \$80.5 million of FY 2022-23 appropriation and remaining funds from FY 2021-22 along with \$10 million for the Zero-Emission Assistance Program and \$125 million to establish Statewide Clean Cars 4 All was solicited to establish a joint Financing Assistance and Statewide CC4A program. Community Housing Development Corporation was selected to administer and launch the new joint program in early 2024.

The Financing Assistance project was a pilot project implemented under two separate programs with different approaches. Considering the lessons learned from these pilots and in close collaboration with stakeholders, staff is developing a full-fledged project by merging the two programs and adopting the needs-based model to better serve low-income consumers. The new program will consider the most recent changes in the ZEV market, as well as using data from the local and statewide programs. Updates will be made as more data becomes available through the implementation of the new project. These three-year projections are subject to change as more data becomes available, so staff will reevaluate funding needs annually. Staff has determined that projections based on program data are likely to adequately capture the dynamics of this program over the next three fiscal years.

To better determine the highest bound for funding based on market demand staff recognizes the need for a secondary market analysis. A handful of CARB research projects in

collaboration with the University of California are underway to study the secondary ZEV market. Staff is actively pursuing the findings to better understand the dynamics of the used ZEV market as well as characteristics and behavior of consumers in this market. Once data become available, the information will be used to inform policy and funding decisions moving forward.

Financing Assistance Three Year Funding Need

Table C-7 shows staff’s projected funding need for Financing Assistance program over the next three fiscal years. Overall, staff estimates a steady increase in program interest and participation over the coming three years as CVRP is phasing out. Staff anticipates the program grows statewide and new and used ZEVs become more popular and available. However, projecting demand for this program, given its upcoming shift to a needs-based approach, it is difficult given lack of data. Staff will update these estimates annually through a public process, allowing the opportunity to incorporate new information and to refine our estimates as we learn more from the new needs-based approach.

Table C-7: Financing Assistance Three-Year Funding Estimates

Financing Assistance for Lower-Income Consumers	Fiscal Year 2022-23	Fiscal Year 2023-24	Fiscal Year 2024-25
Total Funding (in millions)	\$110-\$120	\$120-\$150	\$150-\$200

Impact of Proposed Financing Assistance Program Changes

Staff is proposing adding zero-emission motorcycles to the eligible vehicles under the Financing Assistance program to align with Clean Cars 4 All program and expand transportation options for low-income consumers. In order to accommodate the needs of special needs low-income consumers, staff is proposing to provide funds for adaptive equipment to help facilitate these consumers participation in Financing Assistance Program.

Proposed changes may increase participation and funding need, but it's too early to estimate actual impact. Staff will monitor the data closely and make necessary adjustments as needed.

Access Clean California

Access Clean California Projection Methodology

The overarching goals for Access Clean California for the upcoming three years are to: continue expanding the outreach partner network to fill outreach gaps, with an emphasis on partnering with CBOs and similar grassroots organizations; expand and improve the Benefits Finder application webtool and supporting case management system; and, continue to leverage the project to improve community feedback on CARB’s larger portfolio of incentive and regulatory programs.

CARB staff estimates that between \$5 million to \$7 million in funding would be needed in each of the next three fiscal years to support achieving these goals. Staff's projected funding need reflects CARB's intent for Access Clean California to play a critical role supporting the development and implementation of a needs-based implementation model for Financing Assistance, and similarly supporting statewide Clean Cars 4 All. Staff estimates \$3 million to \$5 million of the projected funding demand would go to supporting Access Clean California's existing outreach partners network, which currently consists of over 21 non-profit and community-based organizations, and to expanding the network to additional community organizations to fill outreach gaps. Based on funding expended to-date, staff estimate that at least 50% of the future funding need for Access Clean California will be to directly support outreach-related activities conducted by the project's outreach partners.

Staff estimates the majority of the remaining annual funding need - approximately \$1 million to \$2 million -- would be used to continue building and/or maintaining resources that help outreach partners implement their strategies to educate and engage their communities. These resources include the Benefits Finder application webtool and case management system, the outreach partner Resource Hub, monthly meetings, newsletters, etc., that the outreach partners use to support implementation of their strategies to educate and engage their communities. To ensure the Benefits Finder makes it as easy as possible for applicants to stack the various available incentives, funding will also be needed to integrate new consumer-focused, climate equity incentive projects, including but not limited to the clean vehicle incentive projects currently being developed by investor-owned utilities using CARB's Low-Carbon Fuel Standard holdback credit funds. Finally, staff estimates that approximately 5% of the total funding allocation would be used to facilitate improved community feedback on CARB's incentive and regulatory programs.

Access Clean California Three Year Funding Need

Table C-8 shows staff's estimated total funding need for each year for Access Clean California. Overall, staff estimates an increase in the number of outreach partners throughout the state and increased participation via the Benefit Finder. Staff anticipates the percentage of funding directly passed through to support outreach partner organization activities will increase slightly each year, as the up-front costs associated with developing the supporting resources (e.g. Benefits Finder and Resource Hub) decline and operational efficiencies are gained over time. Staff will update these estimates annually through a public process, allowing the opportunity to incorporate new information and to refine our estimates. Rationale for estimates is described in further detail below.

Table C-8: Access Clean California Three-Year Funding Estimates

Access Clean California	Fiscal Year 23-24	Fiscal Year 24-25	Fiscal Year 25-26
Total Funding (in millions)	\$5-\$7	\$5-\$7	\$5-\$7

Impact of Proposed Changes to Access Clean California

Staff is not proposing any significant policy changes at this point.

CVRP Three Year Funding Need

Staff did not analyze the three-year need for CVRP because the program is expected to exhaust existing funding by mid-October 2023 and the program is not expected to receive additional funding.

Long-Term Vision for CARB Light-Duty Vehicle Purchase Incentive Programs

As previously stated, this document provides a minor update to the Long-Term Plan for Light-Duty Vehicles. During the development of the major update in FY 22-23, staff held three virtual public workshops to discuss the overall themes of this portion of the document with stakeholders and to inform staff’s analysis of the ZEV market and vehicle purchase incentive programs. Public workshops were held on February 10, March 30, and June 22 of 2022.⁹⁷ Over the course of these workshops, staff provided updated information about the ZEV market, available technology, incremental costs for ZEVs, market sustainability metrics, the equitable transition to zero-emissions, and CARB’s long-term vision for its clean vehicle incentive program.

Throughout the process, stakeholders expressed their support for several improvements to CARB’s vehicle purchase incentive programs that were approved by the Board in 2022 and continue to be implemented. These include:

- Increased incentive amounts as costs for new and used vehicles soar
- Increased program alignment to improve the consumer experience with vehicle purchase incentives
- Increased outreach and a focus on priority communities with historically low vehicle purchase incentive program participation rates
- Additional partnerships with an increasing number of community-based and grass roots organizations for program outreach and implementation
- Increased support of the secondary ZEV market

⁹⁷ California Air Resources Board. Low Carbon Transportation and Air Quality Improvement Program Meetings and Workshops. <https://ww2.arb.ca.gov/our-work/programs/low-carbon-transportation-investments-and-air-quality-improvement-program/low-0>

- Expansion of prequalification for CVRP statewide to bring all vehicle purchase incentives to the point of purchase

These stakeholder suggestions align with CARB's priorities for light-duty vehicle purchase incentive programs for the longer term.⁹⁸ These priorities include improving the consumer experience through increased program alignment, consolidation of programs and/or applications, and a move to a needs-based model of implementation. Additionally, it is a top priority to increase outreach through community-based organizations and other grass roots efforts to improve awareness of and access to clean transportation incentives in priority communities. Another key priority is to set incentive amounts to levels that are sufficient to assist low- and moderate-income consumers with the switch to zero-emission vehicles. It is also important that CARB's vehicle purchase incentive programs fund the cleanest vehicle technology in order to support California's various air quality and climate goals. Lastly, it is a priority to increase support for used ZEVs in an effort to keep these clean vehicles in California and to provide an affordable ZEV option for car buyers.

With stakeholder input and agency priorities in mind, CARB approved several program changes to be implemented to light-duty vehicle purchase incentive programs over the next few fiscal years. These proposed program changes include:

- Increasing incentive amounts for lower income car buyers.
- Expanding pre-qualification statewide for CVRP to bring all incentives to the point of purchase for low-income car shoppers.
- Continued alignment across programs where possible.
- Increasing partnerships with and outreach through CBOs and other grass roots organizations.
- Piloting a needs-based approach that could be implemented across all vehicle purchase incentive programs.
- Implementing a single application for all vehicle purchase incentive programs through ACCess.
- Expanding support of electric bicycles for low-income consumers.

With California ZEV market share at over 24% and no additional funding expected for CVRP, staff plans to close CVRP in Quarter 4 of 2023 when existing funding is completely exhausted and end CARB support of purchase incentives for the broader ZEV market. This marks the shift of CARB's vehicle purchase incentive programs to a sole focus on lower-income consumers through Financing Assistance and Clean Cars 4 All. Beyond FY 2024-25, CARB staff recognize that there will need to be continued investment in the secondary ZEV market, particularly for consumers who do not have a vehicle to scrap, to

⁹⁸ California Air Resources Board. Third Public Workshop on the Fiscal Year 2022-23 Update to the Three-Year Plan for Light-Duty Vehicles and Clean Transportation Investments. June 22, 2022. <https://ww2.arb.ca.gov/our-work/programs/low-carbon-transportation-investments-and-air-quality-improvement-program/low-0>

help enable affordable ZEV options for consumers and continued growth in this segment of the market.

CARB staff will work with stakeholders through the public process to further discuss and implement these changes in the various vehicle purchase incentive programs over the next few fiscal years. As the ZEV market grows, staff will update this analysis, adjust programs as needed, and provide updates in future iterations of this plan.

Conclusions

Considering the current state of ZEV technology, the ZEV market, the economy, and fuel prices, the market is moving towards the path to achieve the State's ZEV deployment goals. California met the 2023 and 2025 ZEV deployment goals early according to our data. However, increased stringency of CARB's ZEV program and requiring by 2035 that all new vehicle sales be 100% ZEV will further efforts toward meeting these goals and help stabilize the market.

ZEVs have yet to become the mainstream option for vehicle purchasers and there are still challenges that consumers must overcome before choosing this new technology over gas-powered vehicles. Availability of less expensive ZEVs and a more diverse selection in different vehicle classes with higher range is needed to make ZEVs more favorable than conventional gas-powered vehicles. Lastly, a greatly expanded and reliable ZEV charging infrastructure network is very critical to achieving the widespread adoption of ZEVs that is needed to meet California's various climate and air quality goals.

As the market is approaching the early majority segment, or mainstream consumers, who are sensitive to pricing and vehicle utility, incentives are more essential than ever before. Incentives will continue to encourage mainstream consumers to purchase cleaner vehicles and help maintain the current momentum of the ZEV market. Continued investments in light-duty vehicle purchase incentives will be key over the next 10 to 15 years especially as these programs further hone in their focus on priority populations who need the most help getting into zero-emission vehicles. Multi-year funding allocations will be of most importance as they eliminate program disruption, improve consumer confidence in the programs, allow for long-term planning of programs, and allow programs to be responsive to current market conditions.

Additionally, an MSRP cap or purchase price cap could be adjusted over time. As more models become available, reducing the MSRP cap could help drive the supply side of the market to produce more economical choices, supporting the needs of the mass market and lower-income consumers. Although, staff recommends that in each vehicle class there should be at least two model choices available to consumers. Ramping down incentives and adjusting as the market progresses may allow us to be more responsive to market changes and thus better direct limited incentives funding towards those who need it the most, in particular to priority populations.

CARB continues to make improvements to CARB's light-duty vehicle purchase incentive programs that will continue to expand access to cleaner vehicles in priority populations. This includes increasing incentive amounts, expanding outreach through community-based organizations, simplifying the application process, and expanding incentive support of the secondary ZEV market. This additional targeted support is critical to achieving the equitable, widespread ZEV adoption needed to meet California's various climate and air quality goals. Staff will provide continued updates to the long-term plan which will be included in upcoming funding plans.