Appendix C: Updated Long-Term Plan for Light-Duty Electric Vehicle (EV) Market, Light-Duty Vehicle Purchase Incentives, Clean Mobility Investments, and Outreach

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Introduction

Overview

Since the introduction of the first Light-Duty Long-Term Plan in fiscal year (FY) 2016-17, the zero-emission vehicle (EV) market has grown tremendously. Various events over the last few years, including the ongoing effects of CARB's many years of EV and other automobile air pollution regulations, the introduction of new vehicles (there are now over 90 electric vehicle models in the U.S.) and clean mobility programs, have improved the EV 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 EV program, requiring 100 percent EV 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. Impacts to EV production, inventory, and dealerships coupled with decreased household income for many have made it difficult to analyze the impacts of these events on the assumptions, evaluations, and recommendations for light-duty EV and clean mobility programs. Major changes in the light-duty EV market and clean mobility programs, along with continuing regulatory efforts, will be required to allow for project sustainability within a limited budget and to better foster market growth from harder to reach market segments especially during times of economic uncertainty.

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 gained a number of lessons learned and overcame a variety of implementation challenges. This year's long-term plan signals the next phase for equity and focuses on existing projects that have identified successful strategies on maximizing participation and benefits for low-income residents and low-income and disadvantaged communities (also known as priority populations). CARB's priorities for this new phase of 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 is also assessing 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 requires 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 EVs 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.
- Sales price difference between electric vehicles and non-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 EVs.

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 EV 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. This year's plan provides the second major update to the plan with a focus on the growing EV market as well as CARB's clean vehicle purchase incentive programs, clean mobility investments, and outreach efforts.

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

Light-Duty EV Market and Technology Assessment

In this section of the Long-Term Plan, staff updates the EV 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 EV market growth in California, the United States, and worldwide.
- Analysis of the growing used EV market in California.
- An update on the state of EV technology, particularly battery costs and a comparison of the total cost of ownership of EVs compared to internal combustion engine vehicles.
- Update of EV infrastructure in California.

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

Trends in the Light-Duty EV Market

A record-breaking 6.6 million EVs were sold worldwide in 2021, double the amount sold in 2020. According to Global EV Outlook 2022, EV sales accounted for nearly 10 percent of all global vehicle sales in 2021 which is 4 times what the global EV market share was in 2019. This brings the total number of EVs on the world's roads to roughly 16.5 million – 3 times the amount in 2018. China still maintained the largest EV fleet in the world with a total of 7.8 million EVs with Europe reaching the highest EV penetration rates in the world with a total of 5.5 million EVs on the road by the end of 2021. The United States came in third with over 2 million EVs total by the end of 2021. Overall, global sales of EVs reached record highs in 2021 despite challenges created by the ongoing health and economic crisis and lingering supply chain issues.¹

While EV sales have remained strong and most of the world is working towards operating levels seen pre-2020, effects 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 have seeped into 2022.² This has in turn led to increases

¹ Global EV Outlook 2021. <u>https://www.iea.org/reports/global-ev-outlook-2021</u>

² Jim Henry, "Auto Dealers Can Drive A Hard Bargain, As New-Car Shortage Continues", Forbes. April 22, 2021 <u>https://www.forbes.com/sites/jimhenry/2021/04/22/auto-dealers-can-drive-a-hard-bargain-as-new-car-shortage-continues/?sh=5bb65c863308</u>

in prices for new and used vehicles as demand still outpaces supply.³ It is unknown when the auto chip supply will be fully recovered as ongoing world events continue to impact production.

Additionally, record inflation 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 consumer prices in August 2022 are on average 8.3 percent higher than they were in August 2021.⁴ Energy commodities and services continue to experience an increase in prices with the cost of gasoline being nearly 26 percent higher than it was in August 2021.⁵ The costs for new and used vehicles has increased 10.1 and 7.8 percent respectively over the same 12 month period.⁶ In an effort to tame inflation, the central bank is increasing interest rates.⁷ 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.⁸

Record inflation has also created a spike in gas prices that started in early 2022 and has spurred increasing demand for EVs and hybrids. According to the American Automobile Association, the national average price of a gallon of gas in September 2022 was \$3.70 with the average in California being much higher at \$5.43 per gallon.⁹ According to data from Cox Automotive's Autotrader and Kelley Blue Book websites from March 2022, the percentage of car shoppers considering a EV increased 69 percent from January when gas prices initially started to increase.¹⁰ While interest in EVs was increasing prior to the spike in gas prices, analysts from Cox Automotive suggest that it is too early to predict if this will have a permanent impact on buying behavior.¹¹ One thing does remain certain – EVs will permanently buffer consumers

³ Ibid.

⁴ United States Bureau of Labor Statistics. *Economic News Release: Consumer Price Index Summary*. Released September 13, 2022. <u>https://www.bls.gov/news.release/cpi.nr0.htm</u>

⁵ Ibid.

⁶ Ibid.

⁷ Smialek, Jeanna. Inflation Soars in June, Pinching Consumers and Challenging Policymakers. The New York Times. Published July 13, 2022. <u>https://www.nytimes.com/2022/07/13/business/economy/inflation-june-interest-rates.html</u>

⁸ The White House Briefing Room. FACT SHEET: The Inflation Reduction Act Supports Workers and Families. August 19, 2022. <u>https://www.whitehouse.gov/briefing-room/statements-</u>

releases/2022/08/19/fact-sheet-the-inflation-reduction-act-supports-workers-and-families/

⁹ American Automobile Association. *California Gas Prices*. Retrieved on September 14, 2022. <u>https://gasprices.aaa.com/?state=CA</u>

 ¹⁰ Charged Fleet. Interest in EVs and Hybrids Spikes as Fuel Prices Soar. March 29, 2022.
 <u>https://www.chargedfleet.com/10164307/interest-in-evs-and-hybrids-spike-as-fuel-prices-soar</u>
 ¹¹ Ibid.

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 ongoing health and economic crisis. Many industries, including new cars sales, took a direct hit in 2020 that is still being felt in 2022. As new car sales rebound and vehicle prices increase as a result of limited inventory, inflation, and demand, it is critical to continue support of the EV market. It is encouraging to see that the new EV market in California achieved a market share greater than 12 percent through 2021 despite such market disruptions and surged ahead in 2022 to over 16 percent. This is a positive sign regarding the growth and sustainability of the EV market. However, significant additional market growth is needed to meet California's EV deployment goals, which supports the need for stronger regulatory action.

On August 25, 2022, the Board voted to approve the Advanced Clean Cars II Regulation with approval from the Office of Administrative Law expected by the end of 2022.¹² 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% zero-emission vehicles. 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 zero-emission vehicles to be produced. Additionally, the regulation will rely on advanced vehicle technologies, including battery-electric, hydrogen fuel cell electric and plug-in hybrid electric vehicles, 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 Section 177 of the Clean Air Act.¹³ With the recent approval of the Advanced Clean Cars II Regulation, these and other states may choose to adopt these stricter standards.

Resilience in the EV Market during COVID-19 Pandemic

COVID-19 caused economic stress in the EV industry; however, while sales slowed and CVRP applications declined during the height of COVID-19, as time went on, CVRP applications recovered, revealing resilience within CVRP and the industry. Several

¹² California Air Resources Board. California moves to accelerate to 100% new zero-emission vehicle sales by 2035. August 25, 2022. <u>https://ww2.arb.ca.gov/news/california-moves-accelerate-100-new-zero-emission-vehicle-sales-2035</u>

¹³ 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

analyses¹⁴ were conducted throughout the pandemic period, defined for this purpose as March 1, 2020, to June 15, 2021.¹⁵ It is acknowledged that the pandemic period covered a much longer period of time; however, for the purpose of this report, the surveys and focus group studies have been limited to the March 2020 to June 2021 timeframe--the heightened period of the pandemic¹⁶. Applicant and survey data were analyzed for behaviors among the general population, the low-to-moderate income (LMI) population and priority populations. A survey of Californians was conducted to understand purchasing and travel preferences during the pandemic.

Common among these analyses are findings that show an initial impact on trends at the onset of COVID-19 followed by a recovery or increase in participation around the first quarter of 2021. CVRP participation demonstrated resilience during this time, likely due to policy consistency and consumer choice and demand. For example, consumers maintained the need to use rebates to purchase or lease EVs and increased their interest in using personal vehicles above other forms of transportation. Interest in leasing also helped, indicating that consumer choice within policies is ideal for maintaining resilience. Lessons can be learned for future economic uncertainty: maintain consistency, offer choice, and ensure customers' needs are met. A summary of each analysis is as follows.

Understanding the Resiliency and Trends of the EV Market During COVID-19 Pandemic

This literature review examined trends in EV markets within the context of COVID-19.¹⁷ It focused on California, national and global EV markets. While Europe and China implemented EV policies that aided the industry during the pandemic, the U.S. did not. Though the U.S. industry suffered during the height of the pandemic, sales largely recovered in 2021. Reduced supply and higher prices were discussed as other impacts

https://www.cdc.gov/museum/timeline/covid19.html#Early-2020

¹⁴ Center for Sustainable Energy. Demographic Analysis of LMI Focus Groups – Supplemental Report to Analysis of LMI CVRP Participation. Published May 2022.

https://cleanvehiclerebate.org/sites/default/files/attachments/CVRP_LMI_Focus_Group_Supplemental_ Report.pdf

¹⁵ Anderson, J., Alvarez, F., Bowers, J., Eluganti, M., Gartner, J., Good, C., Havel, K., Henkin, Z., MacNeille, B., McCormack, R., Stafford, M., Thang, A. (2022). Resilience in the EV Market during COVID-19.

https://cleanvehiclerebate.org/sites/default/files/attachments/CVRP_LMI_Focus_Group_Supplemental_ Report.pdf

¹⁶ COVID-19 was declared a pandemic by the World Health Organization on March 11, 2020. Vaccines for COVID-19 became available for all adults by Summer 2021. Source: Centers for Disease Control and Prevention (CDC). *CDC Museum COVID-19 Timeline*.

¹⁷ Anderson, J., Alvarez, F., Bowers, J., Eluganti, M., Gartner, J., Good, C., Havel, K., Henkin, Z., MacNeille, B., McCormack, R., Stafford, M., Thang, A. (2022). Resilience in the EV Market during COVID-19.

https://cleanvehiclerebate.org/sites/default/files/attachments/CVRP_LMI_Focus_Group_Supplemental_ Report.pdf

of the pandemic. This review also explored changes in the auto leasing, financing, insurance industry and online shopping related to the U.S. auto industry and the CVRP.

CVRP Market Segmentation Before and During COVID-19 Pandemic

This analysis identified CVRP behaviors before and during COVID-19 and found that among CVRP applicants, purchases, as opposed to leases, increased in popularity. Findings include the following.¹⁸

- Lease versus Purchase: Before the pandemic, the ratio of purchased to leased vehicles was roughly 2:1. During the pandemic, the ratio increased to roughly 3:1.
- Manufacturer's Suggested Retail Price (MSRP) Cap: The MSRP cap of \$60,000 put into place in December 2019 appears to have affected higher-end vehicle buyers more than those who lease vehicles at this price point. The number of rebates for buyers of higher-priced EVs fell from 15.9 percent share of all purchased vehicles to 8.2 percent once the cap went into effect (March 2020), while the number of rebates for lessees in this high market segment only decreased by 0.1 percentage points during the same time frame. It is difficult to establish causality regarding whether COVID-19 or the MSRP cap (or both) affected this shift in buyer applications.
- All-Electric Range Mileage Cap: The increased minimum all-electric range for plug-in hybrid electric vehicles (PHEV) was only in place during the last 3 months of this analysis; hence it is difficult to determine any specific effects. It is interesting to note that the Prius Prime, which only posts an electric range of 25 miles, did make the list of top models both before and during COVID, so the result of the mileage cap will most likely be felt in the future.
- Increased Federal Poverty Level (FPL) Eligibility: Starting January 21, 2021, the CVRP program amended eligibility for the Increased Rebate to include applicants at the 300–400 percent FPL. Analyses revealed that after the increase went into effect, the percent of applications from people in this targeted income bracket increased 4 percentage points for buyers and 3 percentage points for lessees between the first 6 months of 2020 compared with the first 6 months of 2021.

EV Versus Non-EV Primary Driver Population Differences During the COVID-19 Pandemic

The spread of COVID-19 resulted in subsequent government-mandated and voluntary lockdown restrictions. The lockdowns and health concerns changed driving patterns as many individuals started working remotely and spent less time in public. In the report, "Resilience in the EV Market during COVID-19", we examined shifts in behavior of EV

¹⁸ Ibid.

drivers towards vehicle purchasing, public and personal transportation, EVs, incentives and environmental changes due to COVID-19 impact and compare it to non-EV drivers.¹⁹

The Center for Sustainable Energy (CSE), the CVRP administrator, designed two surveys for licensed drivers in California to understand how the swift expansion of remote work and health concerns about public transportation has influenced consumers' views towards transportation options and EV considerations during the COVID-19 pandemic.²⁰ Consumers were asked about their interactions with transportation, electric vehicles, awareness of EV incentives, future vehicle purchasing, clean technology options and air quality awareness since the Executive Order declaring a statewide emergency in March 2020 that set forth travel and other restrictions. The findings of this study include the following:

- EV drivers preferred plug-in hybrids, battery-electric, fuel cell vehicles, whereas non-EV drivers preferred traditional gasoline and conventional hybrids.
- Tesla and BMW were the top two automaker choices for EV drivers; Toyota and Honda for non-EV drivers.
- Vehicle acceleration and body style were the most important vehicle characteristics for EV drivers, whereas maintenance costs and comfort were important for non-EV drivers.
- The majority of EV drivers considered purchasing a vehicle that is at most \$50,000 purchase price, whereas non-EV drivers would purchase a vehicle up to \$30,000.
- The majority of EV and non-EV drivers did not plan to lease a vehicle for their next purchase.
- There was a 22 percent increase in EV drivers considering purchasing or leasing an EV since lockdown.
- EV drivers are more likely to shop for vehicles online.
- Both EV and non-EV drivers showed an increase in the use of personal vehicles, bikes and walking more than before lockdown.
- Both EV and non-EV drivers showed a decrease in the use of public transportation since lockdown.
- The majority of EV drivers were aware of the California Clean Fuel Reward EV rebate program, whereas most non-EV drivers were not aware of any EV rebate programs.
- 84 percent of EV drivers were aware of one or more charging stations in their neighborhood compared to 53 percent of non-EV drivers.
- The majority of EV drivers have considered purchasing or already purchased a clean technology option.

¹⁹ Ibid.

²⁰ Ibid.

• EV drivers were more aware of improvements to air quality since lockdown than non-EV drivers.

CVRP Lease Behavior During COVID-19 Pandemic

California's CVRP provides consumer rebates for the purchase or lease of new clean vehicles. More than 478,000 CVRP rebates have been distributed since the first application in 2010.²¹ In total, 45 percent of CVRP rebates have been used for leased vehicles, while the remainder has been for purchased vehicles. This high lease rate is partly due to higher rates seen towards the inception of CVRP in 2010, and lease rates have been dropping throughout the years. Overall, it is higher than the industry average for new vehicle acquisition, which was 31 percent for Q4 in 2019. This industry average rate dropped to 27 percent in Q2 of 2020 when the COVID-19 pandemic began and was 26 percent at the end of Q2 in 2021.²² Similarly, lease rates among CVRP applicants have been substantially lower in recent years, falling to 23 percent in 2020 and 25 percent for the first half of 2021.

To understand current CVRP lease and purchase trends, it is important to discuss the general reasoning behind why consumers may prefer to lease instead of purchase an EV. Key factors include unfamiliarity with EV technology, the rapid advancement of EVs, the declining costs of EVs and the lower down and monthly payments for leasing compared to financing a new vehicle. As EVs have advanced in the past decade, so has familiarity with these vehicles and their technology. With more EV options, reduced battery costs, longer range, improved perceptions of reliability, and better overall operating experience, EV consumers may prefer to purchase vehicles rather than lease, especially for certain vehicle makes.

The purpose of the report, "Resilience in the EV Market during COVID-19", is to understand the demographics and behaviors of CVRP rebate recipients that leased vehicles leading up to and during the COVID-19 pandemic and the resulting economic conditions.²³ In this report, the period through January 2019 and February of 2020 is considered pre-COVID-19, and the period between March 2020 and the end of June 2021 is considered COVID-19. This report also focuses on LMI income applicants, whose leasing choices are more likely to be indicative of the monetary and reliability

²¹ Center for Sustainable Energy. (2020). CVRP Rebate Statistics. Data last updated September 28, 2021. Retrieved October 15, 2021, from <u>https://cleanvehiclerebate.org/rebate-statistics</u>.

²² Norrestad, F. (2021, September 3). *Percentage of Newly-Bought Vehicles on Lease in the United States from 1st Quarter of 2017 to 2nd Quarter of 2021.* Statista. Retrieved October 10, 2021, from <u>https://www.statista.com/statistics/453122/share-of-new-vehicles-on-lease-usa/</u>.

²³ Anderson, J., Alvarez, F., Bowers, J., Eluganti, M., Gartner, J., Good, C., Havel, K., Henkin, Z., MacNeille, B., McCormack, R., Stafford, M., Thang, A. (2022). Resilience in the EV Market during COVID-19.

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perceptions previously described. To be considered LMI, participants must have a household income at or below 300 percent FPL.

Year-over-year comparisons show that CVRP participants increased their utilization of leases since COVID-19, especially among the Increased Rebate population. LMI demographics that increased leasing were ages 16-20, 60-69 and 70-79, primarily representing Middle Eastern or North African and white or Caucasian individuals.

CVRP Priority Population Participation During COVID-19 Pandemic

Applications among priority populations initially decreased during the onset of COVID-19, but year-over-year comparisons showed that applications ultimately increased during the COVID-19 period. The negative economic impacts on the groups examined in this report may be offset by programmatic policies focused on increasing their participation.²⁴

The report, "Resilience in the EV Market during COVID-19", identified trends observed in priority California CVRP applicants and LMI applicants leading up to and during the COVID-19 pandemic. We considered the period of January 2019 through February 2020 the pre-COVID-19 economic period, and March 2020 through the end of June 2021 the COVID-19 economic period. During the COVID-19 economic period, 38.2 percent of CVRP's rebates were used by those in a priority population, as opposed to 31.8 percent in the Pre-COVID-19 period.

During the lifetime of CVRP, programmatic policies shifting toward equity have been enacted to better reach populations of interest. Priority populations are defined by California Climate Investments (CCI) as those that are economically disadvantaged, exposed to multiple sources of pollution, or are especially vulnerable to the effects of pollution and a changing climate. CVRP provides funds to priority applicants that reside in designated communities and income brackets who may face increased barriers to EV adoption. In 2019, 31.7 percent of CVRP applicants were in a priority population. In 2020, the share of priority population applicants increased to 35.1 percent, and for the first half of 2021, the share increased to 41 percent. Applicants in priority populations have experienced an overall increase in participation rates through the COVID-19 economic period.

Additionally, this report focused on 2 sets of priority applicants considered LMI based on household income who are eligible to receive an Increased Rebate through CVRP. To be considered LMI in the past, participants needed a household income at or below 300 percent FPL. However, this was increased to 400 percent FPL in January 2021. Findings include the following.

²⁴ Ibid.

• Priority Applicant Participation in CVRP

Priority applicants (i.e., applicants belonging to any of the priority populations) experienced a drop in participation rates after a peak of 36.5 percent in April 2020 before recovering to 38.5 percent in December 2020. Year-over-year (YOY) comparisons showed relatively lower increases in participation rates in June, August, and September of 2020. July 2020 yielded the only negative relative YOY comparison at -0.4 percentage points. This group made up 38.2 percent of total CVRP applications during COVID-19.

• **CVRP Applicants with Household Income at or Below 300 percent FPL** This group experienced a drop in participation rates between June and November of 2020. Compared to 2019, the relative YOY comparisons were lowest between June and November 2020. Negative YOY comparisons were observed in June, July, and August 2020. This group made up 17.5 percent of total CVRP applications during COVID-19.

CVRP Applicants with Household Income between 300 percent and 400 percent FPL

This group did not experience any significant drops in participation rates for CVRP or relative YOY comparisons during COVID-19. This group made up 9.9 percent of total CVRP applications during COVID-19.

- CVRP Applicants Located within a Low-Income Community (LIC)
 This group is comprised of applicants residing in census tracts having a median income at or below 80 percent of the statewide median income in California. Applicants in this group did not experience any significant CVRP participation rate drops during COVID-19. Relative YOY comparison increases decreased slightly from May to December 2020, but no negative YOY rates were observed. This group made up 24.0 percent of total CVRP applications during COVID-19.
- CVRP Applicants Located within a Disadvantaged Community (DAC) This group saw a drop in participation rates between May and December 2020. This group also experienced a drop in relative YOY comparison rates between May and November of 2020, with May being the only month a negative YOY rate was observed. This group made up 11.6 percent of total CVRP applications during COVID-19.
- CVRP Applicants that are Low-Income or Located in a LIC and are Located within ½ Mile of a Disadvantaged Community This group experienced a drop in CVRP participation rates from August to November of 2020. No change in YOY participation rates was observed in 2020 for September and November, and June 2021. Note that this group made up

the smallest portion of CVRP applicants, accounting for 5 percent during COVID-19, and fluctuations may be due to low sample size rather than a trend.

CVRP Composition Summary: Changes during COVID-19 Pandemic

The findings in this analysis demonstrate the trends and compositional changes of CVRP applications during the COVID-19 Pandemic.²⁵ There was a 43 percent decrease in total CVRP applications during COVID-19. However, most demographics saw little or no change in their share of applications, suggesting that while the total volume of applications decreased, there was no significant change in who was buying EVs. Applicants with a household income of less than \$150,000 who rebated non-Tesla vehicles had a 5.6 percent increase in applications during COVID-19, which was the greatest percentage change of any demographic. Women increased their share of applications for Tesla vehicles by 4.2 percent. There was no percentage change in applications among racial and ethnic identities greater than 3 percent. In general, Asian applicants saw their percent share of applications decrease, except for Southeast Asian applicants, whose percentage share for non-Tesla vehicles slightly increased. Hispanic applications for Tesla vehicles saw the largest increase in percentage shares by racial/ethnic identity. All age groups between 30-59 years old saw a decrease in the percentage share of applications, and all other age groups saw an increase, the largest change being a 2.7 percent decrease for the 40-49 age group who purchased Tesla vehicles.

The share of CVRP applications for Tesla vehicles increased from 51 percent pre COVID-19 to 63 percent during COVID-19. This growth can be attributed to the addition of Model Y sales in 2020, which garnered 24.4 percent of applications. While the share of applications for a Tesla Model 3 dropped from 47.1 percent to 38.9 percent, the Model 3 remained the most popular vehicle. The share of applications dropped by 2.9 percent for all other battery electric vehicles and 9 percent for plug-in hybrid electric vehicles. During COVID-19, the most popular non-Tesla model was the Chevy Volt EV, which accounted for 9.4 percent of applications.

CVRP LMI Composition Summary: Changes During COVID-19 Pandemic

The report, "Resilience in the EV Market during COVID-19", analyzes the trends and compositional changes of CVRP LMI applications during the COVID-19 pandemic.²⁶ For the purposes of this study, COVID-19 is defined as the time period between March 2020 and the end of June 2021. While January 2019-February 2020 is considered pre-COVID-19. This report compares these two periods for participation changes among LMI. Data from January-March 2021 is also reported, but it is not used for comparison because it is a different subset of months.

²⁵ Ibid.

²⁶ Ibid.

During COVID-19, there was a 33 percent decrease in total CVRP LMI applications. However, most demographics saw little or no change in their share of LMI applications, suggesting that while the total volume of applications decreased, there was no significant change in who was buying EVs. Applications by women and for Tesla vehicles had the largest percent change of any demographic, increasing their share of applications by 5.8 percent. There was no percentage change in applications among racial and ethnic identities greater than 3 percent. Hispanic and Latino LMI applicants increased their percent share of applications during COVID-19 for both Tesla and non-Tesla vehicles. Across all Asian identities, the percentage of applicants decreased during COVID-19 for Tesla vehicles. Southeast Asian and South Asian applicants saw an increase in the percent share of non-Tesla vehicles. The share of CVRP applications for Tesla vehicles increased from 38.5 percent to 48.5 percent during COVID-19. This growth can be attributed to the addition of Model Y sales in 2020.

In the first 3 months of 2021, 51 percent of LMI applications were for Tesla Vehicles. A preference for Tesla vehicles is shared by applicants who identify as the following: 21-39 years old, male, Hispanic or Latino, all racial identities aside from white and Middle Eastern or North African. While those identifying as 40 years old, female, white, Middle Eastern, North African and not Hispanic or Latino preferred non-Tesla vehicles during this period. Battery electric vehicles (BEV) commanded 71 percent of all LMI applications during this period. This is reflected in the application breakdown by model, which shows that 3 of the top 4 models were BEVs.

COVID-19 Survey

A survey about COVID-19 was administered from March 10, 2021, through April 12, 2021.²⁷ More than 2,200 Californians responded. Survey questions included preferences for travel, changes to purchasing or leasing vehicles, and perspectives on EVs. Topics covered included the following:

- Work-from-home driving behaviors
- Commuting changes during COVID-19
- Impacts on income
- Moving trends
- Vehicle acquisition plans
- Awareness of EV incentives
- Environmental concerns

Survey participants reported that COVID-19 reduced their travel in general, commuting to work and air travel. Participants also increased their use of personal

²⁷ Ibid.

vehicles compared to other modes of transportation. Decreased commuting contrasts with increased use of personal vehicles and is likely associated with other travel needs.

Approximately 29 percent of participants also reported that COVID-19 affected their vehicle purchases. Of this group, about two-thirds delayed their purchase. This contributed to the decrease in sales in 2020, pent-up demand, and the early 2021 sales surge. About 40 percent of all respondents said their income was reduced, with the LMI population more significantly impacted. Nearly half of the LMI participants considered current BEV options unaffordable, and incentives remained influential to buyers. In contrast, higher-income individuals were more likely to consider air quality when considering acquiring an EV.

Despite the decrease in sales, 14 percent of the respondents reported that they acquired a vehicle during the pandemic. About one-third of these respondents acquired a vehicle less expensive than originally planned. Most of those who acquired a vehicle acquired internal combustion engine vehicles (ICEV); 12 percent of LMI members of this group and 13 percent of non-LMI acquired EVs.

Additionally, despite analysis showing that leasing increased during the pandemic, especially among the Increased Rebate group, this survey reported that LMI in California are likely to purchase instead of leasing their next vehicle.

It is acknowledged that with a return to work, more vehicles on the road, current buying trends, inflation and vehicle inventory shortfalls, newer survey results in 2022, if taken, may likely be different.

California New Light-Duty EV Market

While various supply issues continue to impact the market, electric vehicle sales continue to remain strong in California. A total of 250,279 new light-duty EVs were sold in California in 2021.²⁸ An additional 160,421 new light-duty EVs were sold in the first half of 2022 marking the strongest EV sales to-date.²⁹ EV market share in California sits at 16.48 percent through the first half of 2022, up from 12.41 percent market share at the end of 2021. California has the largest new EV market in the United States with over 1.2 million light-duty EVs sold through June 2022. Over 160,000 new light-duty EVs were sold in the first half of 2022, marking the strongest quarters for EV sales to-date. New light-duty EV market share now stands at about 16.5 percent of all new light-duty vehicles sold.

New EV sales in California are expected to

remain strong throughout 2022 as increasing gas prices are driving interest and demand for alternative fuel vehicles and regulatory action, such as the Advanced

 ²⁸ California Energy Commission (2022). New EV Sales in California. Data last updated August 9, 2022.
 Retrieved August 9, 2022, from <u>https://www.energy.ca.gov/EVstats</u>
 ²⁹ Ibid.

Clean Cars II Regulation, calls for all new vehicles sold to be electric by 2035.^{30,31} However, reduced inventory as a result of the microchip shortage and other supply delays will put a damper on the number of new EVs sold this year. Based on current trends, new car sales in California are expected to increase slightly in 2022 over 2021 numbers but these projections are subject to change if there are continued or additional disruptions to the market or economy.³²

The additional new EV sales from the first half 2022 now brings the total of EVs sold in California to just over 1.2 million. This means that California has hit its first EV deployment goal of 1 million EVs - well before the 2023 deadline. This also puts California on track to reach the second goal of 1.5 million EVs on the road much sooner than the 2025 deadline. Despite this achievement, we still have quite a bit of ground to make up under the current regulatory landscape to reach the goal of 5 million EVs on California's roads by 2030 and to build a sustainable EV market. The Advanced Clean Cars II regulation aims to support the goal of all-electric new vehicle sales by 2035, with increased stringency on EV deployment and requirements for an increasing number of EVs to be produced beginning in 2026.

California Used Light-Duty EV Market

As California's new EV market continues to grow, so does California's used EV market. In the first half of 2022, the monthly average of used EV inventory in the United States ranged from between 15,000 to 20,000 vehicles.³³ California has the largest share of this inventory of used EVs with a total monthly average of about 3,000 used light-duty EVs as of April 2022.³⁴ It is important to note that this number is representative of the used inventory available at a snapshot in time. The total can fluctuate as the used

California has the largest used EV inventory in the United States, half of which fall under \$35,000. vehicle market is always in flux and private sales aren't tracked, but this number has remained relatively consistent throughout 2021 and into 2022.³⁵

Like the new vehicle market, the used EV market is experiencing a period of high demand

³⁰ Charged Fleet. Interest in EVs 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

³¹ California Air Resources Board. California moves to accelerate to 100% new zero-emission vehicle sales by 2035. August 25, 2022. <u>https://ww2.arb.ca.gov/news/california-moves-accelerate-100-new-zero-emission-vehicle-sales-2035</u>

ev/#:~:text=It's%20hard%20to%20get%20an,15%2C000%20and%2020%2C000%20used%20EVs.

³² California New Car Dealers Association. California Auto Outlook: 2022 Q1. May 2022. <u>https://www.cncda.org/wp-content/uploads/Cal-Covering-1Q-22-002.pdf</u>

³³ O'Dell, John. Forbes Wheels. 10 Tips to Find and Buy Used EVs. June 15, 2022. <u>https://www.forbes.com/wheels/advice/how-to-find-buy-used-</u>

 ³⁴ Najman, Liz. Recurrent Automotive. California Electric Vehicle Trends. <u>https://www.recurrentauto.com/research/california-electric-vehicles</u>
 ³⁵ Ibid.

leading to rising purchase prices. Based on Recurrent Automotive's April 2022 analysis of California's used EV market, about half of used EVs fall under \$35,000 but the influx of expensive used EVs on the market pushes the average used EV price to about \$41,000.³⁶ This is in comparison to the average price of a used internal combustion engine vehicle (ICEV) which was about \$31,450 in May 2022.³⁷

Tesla vehicles, some of the most popular EVs sold, have had a significant impact on California's growing new EV market. Tesla's boom in California really began in 2018 with the introduction of the Model 3 and these original purchases are now making their way to the secondary market.³⁸ Additionally, given low used EV supply, growing demand, and inflation, newer model years are making an appearance on the secondary EV market much sooner than expected as current market conditions have caused used vehicles to appreciate in value as opposed to the typical depreciation typically seen in vehicles.³⁹ About 75 percent of the used EV inventory in California is model year 2018 or newer.⁴⁰

The used EV market in California is equally important as the new EV market in California as it makes EV 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 of the used EV market over the coming years in order to foster the widespread adoption of the technology that is needed to meet California's various climate and air quality goals. Additionally, the recently approved Advanced Clean Cars II Regulation contains a number of zero-emission vehicle assurance measures. These include minimum warranty and durability requirements, increased serviceability, and facilitated charging and battery labeling, 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.⁴¹ The regulation also offers automakers additional compliance opportunities for actions to improve access to zero-emission vehicles in overburdened and low-income communities, such as providing reduced price zero-emission vehicles, and retaining those

³⁶ Ibid.

³⁷ Business Wire. After More Than a Year of Unprecedented Price Inflation, Used Car Market Beginning Its Road Back to Normal. June 6, 2022.

https://www.businesswire.com/news/home/20220606005767/en/After-More-Than-a-Year-of-Unprecedented-Price-Inflation-Used-Car-Market-Beginning-Its-Road-Back-to-

<u>Normal#:~:text=Download&text=CHICAGO2D%2D percent2D percent2D(BUSINESS20WIRE)%2D%2D percent20WIRE) percent2D percent2D,the20leading%20car%20shopping%20app percent20leading percent20car percent20shopping percent20app.</u>

³⁸ Recurrent Automotive. Used Electric Car Prices & Market Report – Q2 2022. <u>https://www.recurrentauto.com/research/used-electric-vehicle-buying-report</u>

³⁹ Ibid. ⁴⁰ Ibid.

⁴¹ California Air Resources Board. Advanced Clean Cars II. <u>https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/advanced-clean-cars-ii</u>

used vehicles in California to support the state's complimentary policies and incentives.⁴² 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 EV by providing a rebate or vehicle service contract for the replacement battery or fuel cell component. As these are newer efforts, staff will continue to analyze their impacts on the used EV market in California as part of this long-term plan effort for light-duty EVs and provide updates in future iterations of the plan.

Light-Duty EV Technology Assessment Update

Battery price is the major cost component in electric vehicle 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 EV 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 takes into account 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 is continuing, and the average cost of battery production is falling. A recent survey indicates that prices of automotive battery packs were around \$132 per kilowatt-hour (kWh) by the end of 2021 which represents a 6 percent decline from 2020 and a nearly 90 percent decline

from 2010.⁴³ This downward trend is expected to continue; however, the rising costs of battery components, such as lithium, nickel, and cobalt, may put a pause on this downward trend.⁴⁴

BloombergNEF's 2021 Battery Price Survey and other technical studies credit falling prices to improved and simplified battery cell and pack designs, introduction of new battery chemistries, and new manufacturing techniques. The price of automotive battery packs was around \$132 per kWh by the end of 2021 – a nearly 90 percent decline from 2010.

Based on their analysis, Bloomberg NEF expects the price of an average battery pack to be less than \$100/kWh by 2024. However, higher prices for raw materials could cause the average battery pack price to increase to \$135/kWh in 2022 which could delay this milestone by up to two years.⁴⁵ According to Bloomberg NEF, battery pack

⁴² Ibid.

⁴³ BloombergNEF. Battery Pack Prices Fall to an Average of \$132/kWh, But Rising Commodity Prices Start to Bite. November 30, 2021. <u>https://about.bnef.com/blog/battery-pack-prices-fall-to-an-average-of-132-kwh-but-rising-commodity-prices-start-to-bite/</u>

⁴⁴ Ibid.

⁴⁵ Ibid.

prices are projected to increase in 2022 for the first time in over a decade.⁴⁶ This coupled with rising inflation and other market disruptions leaves EV manufacturers with the choice to deal with the incremental costs or pass them on to consumers by raising EV prices. Other sources, such as from the National Academies of Sciences, Engineering, and Medicine, expect battery pack costs to decrease to \$90-\$115/kWh by 2025 and \$65-\$80/kWh by 2030.⁴⁷

As part of the regulatory development process for the proposed Advanced Clean Cars II (ACC II) rule, program staff analyzed the incremental direct manufacturing cost of BEVs, PHEVs, and FCEVs relative to conventional ICEVs based on vehicle teardown reports and other studies.⁴⁸ ⁴⁹ ⁵⁰ Taking all this information into consideration, staff developed battery pack costs projections for the ACC II regulatory analysis of \$95.3/kWh in 2026 and \$72.5/kWh in 2030 for BEVs using the midpoint presented in the NAS study due to the robustness and transparency of the analysis.⁵¹ Program staff estimated that cost reduction rates will slow somewhat after 2030 and applied a lower 5 percent year-over-year reduction from 2030 to 2035.

Update on Incremental Costs of Plug-In Electric Vehicles

The higher purchase price of EVs is considered one of the main consumer purchase barriers. The average incremental costs of an EV in 2018 ranged from approximately \$8,000 for a short-range car to about \$21,000 for a long-range SUV when compared to their ICEV counterparts.⁵² Despite recent decreases in battery costs, the cost of a new EV has soared in recent months. According to an analysis by Cox Automotive, the average price a consumer paid for a new EV in 2015 was \$35,880 which was not much more than the average of \$33,543 paid for a new ICEV.⁵³ However, the average price for an EV skyrocketed to \$63,821 by December 2021 while the average price of an ICEV was about \$47,000 – a difference of nearly \$17,000.⁵⁴

⁴⁶ Burton, Mark. Race for Cheaper EVs May Face Years-Long Setback on Metal Costs. March 31, 2022. <u>https://www.bloomberg.com/news/articles/2022-06-01/battery-price-increase-could-keep-electric-cars-expensive-for-years</u>

⁴⁷ National Academies of Sciences, Engineering, and Medicine. 2021. Assessment of Technologies for Improving Light-Duty Vehicle Fuel Economy—2025-2035. Washington, DC: The National Academies Press. <u>https://doi.org/10.17226/26092</u>

⁴⁸ Ibid.

⁴⁹ BloombergNEF 2021.

⁵⁰ CARB. 2022. Appendix G – ACC II ZEV Technology Assessment.

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

⁵¹ National Academies of Sciences, Engineering, and Medicine. 2021.

⁵² Lutsey, Nic and Nicolas, Michael. (2019). "Working Paper: Update on Electric Vehicle Costs in the United States through 2030". The International Council on Clean Transportation. Available at: <u>https://theicct.org/publications/update-US-2030-electric-vehicle-cost</u>

 ⁵³ Osaka, Shannon. Grist. Batteries are getting cheap. So why aren't electric vehicles? April 27, 2022.
 <u>https://grist.org/article/batteries-are-getting-cheap-so-why-arent-electric-vehicles/</u>
 ⁵⁴ Ibid.

There are additional explanations for these price increases outside of supply chain disruptions, inflation, and increasing demand due to soaring gas prices. Robby DeGraff, an industry analyst for AutoPacific, explained that many American auto manufacturers seem to be following in Tesla's footsteps by rolling out the bigger, high range, expensive EV models first in an effort to attract consumers and accrue higher profits that feed into their research and development of lower cost EV models.⁵⁵ Additionally, automakers are responding to high demand for crossover vehicles, which are typically more expensive than smaller vehicle classes, and focusing on longer range with bigger batteries which feeds into the higher purchase prices.⁵⁶

Although this higher purchase price is a critical element in consumer decision-making process, for a more accurate comparison, total cost of ownership is a more accurate measure to compare the cost of ICEVs and EVs. When comparing the first-owner five-year ownership costs of EVs in various classes with ICEVs, N. Lutsey and M. Nicolas found that consumer ownership parity was realized a few years sooner than initial cost parity.⁵⁷ This was due in large part to an average fuel savings of \$3,500-\$4,200, dependent on vehicle class, as electricity costs are generally much lower than conventional gasoline.⁵⁸

As we've seen, EV purchase prices are not yet competitive with ICEVs. On a per mile basis, operating a BEV is less expensive than operating an ICEV – the cost of electricity per mile is lower than the cost of gasoline per mile. However, assuming 3.5 years of ownership, even with higher-than-average fuel prices, the total cost of ownership for a BEV is higher than an ICEV when additional upfront costs such as increased manufacturing costs, vehicle purchase price markups, and home charging infrastructure installation are included.

While batteries are the most expensive component in the total cost of ownership calculation, there are opportunities for cost reductions in other areas. Redesigning EV manufacturing platforms and investing in fewer moving parts can help reduce the total manufacturing cost. There are indications that manufacturers are investing to develop more EV specific manufacturing platforms for larger scale production. Over the next 10 years, 18 of the world's top 20 automakers have made plans to invest more in EV production by increasing their portfolio of EV models and scaling up production of EVs⁵⁹.

⁵⁵ Ibid.

⁵⁶ Ibid.

⁵⁷ Ibid.

⁵⁸ Ibid.

⁵⁹ IEA. Global EV Outlook 2021. April 2021. <u>https://www.iea.org/reports/global-ev-outlook-2021</u>

Overall, the average purchase price of an EV varied by vehicle class and ranged from \$8,000-\$21,000 more than a comparable ICEV.⁶⁰ With battery cost reduction, redesigned vehicle manufacturing, and employing newer digital technologies to match battery capacity and size to consumer needs, the cost parity of EVs ranging about 150 miles compared to ICEVs can potentially be achieved by 2025 with cost parity expected for EVs with approximately 250 miles closer to the 2030 timeframe.⁶¹ However, these timelines will be impacted by the recent increase in battery pack costs and rising costs of purchasing a new vehicle.

In summary, findings of the technology assessment indicate that the overall trend of advancements towards lower cost and battery capacity improvements is continuing as expected. Therefore, manufacturers will benefit from these improvements and will be able to offer more EV choices with longer ranges and lower prices in the next five to ten years. This will also lead to EVs reaching consumer ownership parity with ICEVs within the next ten years. It remains to be seen how much of an impact rising battery pack and purchase costs of new EVs will have on these projections. CARB staff will continue monitoring incremental cost trends and provide updates in future iterations of this plan as this data is used to inform incentive amounts for CVRP, Clean Cars 4 All (CC4A), and Financing Assistance.

EV Infrastructure Update

An extremely important component of a successful and sustainable EV market is the availability of charging infrastructure to support the number of EVs 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 EV adoption. As such, continued support of a growing charging infrastructure network is critical to achieve widespread EV adoption. Executive Order B-48-18 not only set a goal of placing 5 million EVs on California's roads by 2030, but it also called for the installation of 200 hydrogen fueling stations and 250,000 EV chargers, including 10,000 direct current (DC) fast chargers, by 2025.⁶²

The California Energy Commission (CEC) is the lead agency for overseeing investments and progress tracking progress of EV charging infrastructure and CARB staff work very closely with CEC in support of widespread EV 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 EVs on the road by 2030 and reduce emissions of greenhouse gases to 40 percent below 1990 levels by 2030. Executive Order N-79-20 directed the CEC to expand this

⁶⁰ Lutsey, Nic and Nicolas, Michael. (2019). "Working Paper: Update on Electric Vehicle Costs in the United States through 2030". The International Council on Clean Transportation. Available at: <u>https://theicct.org/publications/update-US-2030-electric-vehicle-cost</u>

⁶¹ Ibid.

⁶² Executive Order B-48-18, <u>https://www.library.ca.gov/wp-</u> <u>content/uploads/GovernmentPublications/executive-order-proclamation/39-B-48-18.pdf</u>

assessment to support 100 percent EV sales for new passenger vehicles, 100 percent EV operations for drayage trucks, and 100 percent EV operations for off-road vehicles and equipment by 2035. Analysis from CARB's 2020 Mobile Source Strategy estimates that 8 million light-duty EVs and 180,000 medium- and heavy-duty EVs will be needed in 2030 to meet these goals.⁶³

In CEC's recent report, Assembly Bill 2127 Electric Vehicle Charging Infrastructure Assessment Analyzing Charging Needs to Support EVs in 2030, the analysis estimates that more than 700,000 chargers are needed to

support 5 million EVs and nearly 1.2 million public and shared private chargers are needed to support 8 million EVs in 2030.⁶⁴ As of March 31, 2022, there are more than 79,000 public and shared private electric vehicle chargers in California which includes more than 7,100 DC fast chargers.⁶⁵ CEC's recent assessment also indicates that an additional 123,000 chargers are planned through various state grants, settlement agreements, and approved electric

As of March 2022, there are over 79,000 public and shared private electric vehicle chargers in California which includes over 7,100 DC fast chargers.

utility investments leaving a gap of about 57,000 chargers needed to meet the 2025 goal of 250,000 public and shared chargers.⁶⁶ In order to support 8 million EVs 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.⁶⁷

⁶³ California Air Resources Board (2021). 2020 Mobile Source Strategy.

https://ww2.arb.ca.gov/sites/default/files/2021-12/2020 Mobile Source Strategy.pdf ⁶⁴ California Energy Commission (2021). Assembly Bill 2127 Electric Vehicle Charging Infrastructure Assessment Analyzing Charging Needs to Support EVs in 2030. Published July 14, 2021. https://www.energy.ca.gov/programs-and-topics/programs/electric-vehicle-charging-infrastructureassessment-ab-2127#:~:text=AB202127%20 percent202127 percent20(2018)20requires%20the percent20requires percent20the,below201990%20levels%20by%202030 percent201990 percent20levels percent20by percent202030.

⁶⁵ California Energy Commission (2022). Electric Vehicle Chargers in California. Data last updated April 29, 2022. Retrieved July 8, 2022, from <u>https://www.energy.ca.gov/EVstats</u>
 ⁶⁶ Ibid.

⁶⁷ 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 EV 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 2018–19 Budget Act. The State's EV 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 EV 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 EVs. Even with the current market complications, the State goals are estimated to be met on time based on the middle-projected scenario.

Current forecasts indicate that cumulative EV sales are on target to reach goals that were established in executive order B-48-18. In Figure C-2 below, the solid black line that begins in 2010 and continues to the end of 2021 is the historical number of cumulative EVs, while the adjacent green line is the middle trajectory forecast from 2022 through 2030. The purple stars that are imposed on the figure mark the three state goals that were previously established. From the image, the one million vehicles by 2023 goal was met at the end of 2021, while the subsequent goal of 1.5 million by 2025 is anticipated to be met sooner around mid-2023. The five million vehicles goal is also projected to be met within the third quarter of 2029, albeit with little leeway. These projections are consistent with those provided in the Initial Statement of Reasons for the Advanced Clean Cars II Regulation⁶⁸. That analysis projected cumulative EV and PHEV sales to be 1.9 million in 2025, to exceed 5 million in 2029, and to reach 6.8 million in 2030. The Advanced Clean Cars II Regulation will not only help California meet the 2030 goal of 5 million EVs on time, but it is expected to help exceed this target in the same timeframe

⁶⁸California Air Resources Board (2022). Staff Report: Initial Statement of Reasons. Public Hearing to Consider the Advanced Clean Cars II Regulation. <u>https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/accii/isor.pdf</u>



Moreover, as additional EV models become available, the expected result is that more consumers will transition to EVs, thus leading to higher EV sales and the possibility of state goals being reached earlier than projected. The sedan and hatchback body styles have historically been the most common EV options, but in recent years, SUV EVs have since gained popularity in the market. Alternatively, there is still a large void of EVs present in the pickup truck space, but that gap is beginning to be filled as additional models are available. With the support of Advanced Clean Cars II, additional enforcement will support the continual growth of the number of EV models available to consumers. Currently, there are over 90 different EV makes and models, and that number is predicted to increase to nearly 200 within the next few years.⁶⁹

As supply chains return to normalcy and new models enter the market, the current EV sales trajectory may be met with additional sales. However, the supply constraints and new vehicle models are not currently modeled in these forecasts, and additional steps would need to be taken to provide these revised projections.

Estimated Funding Need to Reach Five Million EVs

In addition to the trajectory analysis shown in Figure C-3, Table C-1 shows the estimated rebates and funding needed to reach cumulative EV deployment goals, assuming the market and program continue along their trajectories until the goals are achieved.

⁶⁹ <u>https://ww2.arb.ca.gov/resources/documents/cars-and-light-trucks-are-going-electric-frequently-asked-questions</u>

EV Deployment Goal	Additional Vehicles Rebated	Funding Need
1.5 million vehicles	8,000–228,000	\$24 M–\$90 M
5 million vehicles	19,000–311,000	\$93 M–\$843 M

Table C-1: Estimated CVRP Funding Need to Reach EV Deployment Goals

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 19,000 to 311,000 additional vehicles may be between \$93 million and \$843 million, with a total public investment of \$738 million to \$12 billion.

A Sustainable Light-Duty EV 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 EV market as part of the FY 2016-17 Funding Plan. Based on this approach, staff defined the self-sustainable EV market as a state of the market where broad incentives are not required to increase EV adoption. A self- sustaining market is expected once the California new EV market share reaches 16-20 percent, 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 EV market can be found in Part II of FY 2016-17 Funding Plan⁷⁰.

In developing FY 2022-23's update to the Long-Term Plan, staff asked stakeholders if it should consider alternative approaches to defining a sustainable EV market.⁷¹ 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 percent EV market share based on the Diffusion of Innovation Theory as the indicator of a sustainable EV

⁷⁰ 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. <u>https://ww2.arb.ca.gov/sites/default/files/classic/msprog/aqip/fundplan/proposed_fy16-17_fundingplan_full.pdf</u>

⁷¹ 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: <u>https://ww2.arb.ca.gov/our-work/programs/low-carbon-transportation-investments-and-air-quality-improvement-program/low-0</u>.

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 Long-Term Plan, staff identified metrics that can be used to track progress toward market sustainability. The most outstanding one was EV market share and staff chose this metric to define the sustainable market. Other indicators evaluated include annual EV 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 EV 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 EV 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 EV Sales and Market Share

Staff considers annual new EV sales in California as an indicator of market growth, and, over the last few years closely monitored and analyzed the trend. California annual EV 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 continues to be impacted by the current health and economic crisis; new light vehicle registrations are up from 2020 numbers but are still lower than numbers seen pre-2020.⁷² However, new EV sales remained strong through 2021 and into the first quarter of 2022. Figure C-3 illustrates the growth in new light-duty EV sales through 2021. Figure C-4 illustrates EV market growth in California from 2011 through the first quarter of 2022. Table C-2 shows details of new EVs sold over the last 5 years and California EV market share has held steady at around 8 percent of the new light-duty vehicle sales in 2020 and surged ahead to over 16 percent market share in the first quarter of 2022. The California EV market share is expected to increase as the new light-duty market continues to rebound in 2022 and beyond.

⁷² California New Car Dealers Association. *California Auto Outlook: 2022 Q1. May 2022.* <u>https://www.cncda.org/wp-content/uploads/Cal-Covering-1Q-22-002.pdf</u>



Figure C-3: Annual Light-Duty EV Sales in California

Data Source: California Energy Commission EV Sales Dashboard. Data through Quarter 2 2022.⁷⁴

 ⁷³ California Energy Commission (2022). New EV Sales in California. Data last updated August 9, 2022.
 Retrieved August 10, 2022, from <u>https://www.energy.ca.gov/EVstats</u>
 ⁷⁴ Ibid.

Metric	2018	2019	2020	2021	YTD 2022*
Plug in hybrid registration	59,699	50,660	38,153	63,141	27,326
Plug in hybrid share	2.65%	2.35%	2.05%	3.13%	2.80%
Electric registration**	97,444	96,687	106,946	187,138	133,095
Electric share	4.33%	4.49%	5.73%	9.28%	13.67%
Total # of PEVs Sold	157,143	147,347	145,099	250,279	160,421
Total # of LD Vehicles Sold	2,251,593	2,153,747	1,864,164	2,016,192	973,540
Total PEV Market Share	6.98%	6.84%	7.78%	12.41%	16.48%
Year-to-Year Growth Rate	-	-6.23%	-1.53%	72.49%	TBD

Table C-2: Hybrid and Electric New Vehicle Registrations and Market Share⁷⁵

Data Source: California Energy Commission Zero Emission Vehicle and Infrastructure Statistics *Data through June 2022

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

New PEV registrations in 2021 reached 250,279, which is a nearly 73 percent increase from 2020 numbers. While EV sales remained relatively steady through 2020, increasing supply, the growing number of EV models, continued expansion of California's charging network, and the State's commitment to strong EV incentives may be some reasons why the EV market surged in 2021 with continued record growth in early 2022. As more EV models are introduced in varying vehicle classes, it is likely that their market share will continue to increase.

In recent years, the same technology split trend under CVRP has been observed and as Figure C-5 shows, CVRP recipients chose BEVs 1.5 times more than 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-5: CVRP Cumulative Rebates by Technology Type (through March 2022)

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 top-selling EV manufacturers in California.⁷⁶ Figure C-6 illustrates the number of rebates received under CVRP by the top ten vehicle makes since the inception of the program through March 2022.

⁷⁶ Green Car Congress. Veloz: California EV market continues strong growth; Q1 strongest quarter to date; 16.32 percent market share. May 2, 2022. <u>https://www.greencarcongress.com/2022/05/20220502-veloz.html</u>



Figure C-6: Cumulative CVRP Rebates by Vehicle Make – Top Ten

In summary, EV sales managed to maintain a market share of about 8 percent of new car sales in California through the end of 2020, surged to over 12 percent by the end of 2021, and continued to increase this percentage to nearly 16.5 percent through the first half of 2022. While recent EV market share percentages approach staff's defined indicator of a sustainable EV market of 16-20 percent market share, it is unknown how ongoing market disruptions will impact future market growth. In total, more than 1.2 million EVs have been sold in California through Q2 of 2022⁷⁷ – exceeding the goal of 1 million EVs deployed by 2023.

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 models is an indicator for market growth. Through Q1 of 2022, SUVs, trucks, and vans accounted for nearly 70 percent of new vehicles sales in California while small, mid-size, and large cars accounted for the remaining 30 percent.⁷⁸ For model year

⁷⁷ California Energy Commission (2022). New EV Sales in California. Data last updated August 9, 2022. Retrieved August 10, 2022, from <u>https://www.energy.ca.gov/EVstats</u>

⁷⁸ California New Car Dealers Association, California Auto Outlook: Q1 2022, Volume 18, Number 2, Released May 2022. Retrieved July 13, 2022, from <u>https://www.cncda.org/wp-content/uploads/Cal-Covering-1Q-22-002.pdf</u>

2022, 96 different models of electric-drive vehicles across 11 EPA vehicle classes are available in the U.S. market⁷⁹, and 30 of them are CVRP-eligible in California.

For Model Year 2022, 96 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. As staff has noted, vehicle diversity is an indicator of the health of the EV market, which is supported by research. For example, a recent publication by the International Council on Clean Transportation (ICCT) shows that cities with more models available to consumers had higher EV registrations.⁸⁰ More choices in larger vehicle categories like SUV, minivan, pick-up truck, and light-duty trucks in the PEV market are needed for the emerging EV market to be more attractive to consumers and become competitive with the ICE market.

As a number of electric trucks and SUVs are expected to hit the U.S. market in the coming years, it is important that eligibility requirements for CVRP 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 recognize that these vehicles may have a higher MSRP with ranges that may be shorter than smaller vehicle classes that have been part of the EV 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 98 models available by type across 11 different vehicle classes in the U.S. market. Models with an asterisk (*) are eligible for CVRP.

Model	Drive Type	EPA Size Class
Audi e-tron	BEV	Standard Sport Utility Vehicle 4WD
Audi e-tron Sportback	BEV	Standard Sport Utility Vehicle 4WD
BMW i3*	BEV	Subcompact Cars
BMW i3s*	BEV	Subcompact Cars
Chevrolet Bolt EV*	BEV	Small Station Wagons
Ford Mustang Mach-E AWD*	BEV	Small Station Wagons

 ⁷⁹ U.S. Department of Energy. Transportation Energy Data Book Edition 40. <u>https://tedb.ornl.gov/data/</u>
 ⁸⁰ <u>https://theicct.org/sites/default/files/publications/ICCT_EV_surge_US_cities_20190610.pdf</u>

⁸¹ Fueleconomy.gov

Model	Drive Type	EPA Size Class
Ford Mustang Mach-E AWD Extended*	BEV	Small Station Wagons
Ford Mustang Mach-E RWD*	BEV	Small Station Wagons
Ford Mustang Mach-E RWD California Route 1*	BEV	Small Station Wagons
Ford Mustang Mach-E RWD Extended*	BEV	Small Station Wagons
Hyundai Ioniq Electric*	BEV	Midsize Cars
Hyundai Kona Electric*	BEV	Small Sport Utility Vehicle 2WD
Jaguar I-Pace EV400	BEV	Small Sport Utility Vehicle 4WD
Kandi K27	BEV	Compact Cars
Kia Niro Electric*	BEV	Small Station Wagons
MINI Cooper SE Hardtop 2 door*	BEV	Subcompact Cars
Nissan Leaf (40 kW-hr battery pack)*	BEV	Midsize Cars
Nissan Leaf (62 kW-hr battery pack)*	BEV	Midsize Cars
Nissan Leaf SV/SL (62 kW-hr battery pack)*	BEV	Midsize Cars
Polestar 2*	BEV	Midsize Cars
Porsche Taycan 4S Perf Battery	BEV	Large Cars
Porsche Taycan 4S Perf Battery Plus	BEV	Large Cars
Porsche Taycan Perf Battery	BEV	Compact Cars
Porsche Taycan Perf Battery Plus	BEV	Compact Cars
Porsche Taycan Turbo	BEV	Large Cars
Porsche Taycan Turbo S	BEV	Large Cars
Tesla Model 3 Long Range AWD	BEV	Midsize Cars
Tesla Model 3 Performance AWD	BEV	Midsize Cars
Tesla Model 3 Standard Range Plus RWD	BEV	Midsize Cars
Tesla Model S Long Range	BEV	Large Cars
Tesla Model S Performance (19in Wheels)	BEV	Large Cars
Tesla Model S Performance (21in Wheels)	BEV	Large Cars
Tesla Model S Plaid (21in Wheels)	BEV	Large Cars
Tesla Model X Long Range Plus	BEV	Standard Sport Utility Vehicle 4WD
Tesla Model X Performance (20in Wheels)	BEV	Standard Sport Utility Vehicle 4WD
Tesla Model X Performance (22in Wheels)	BEV	Standard Sport Utility Vehicle 4WD
Tesla Model Y Long Range AWD	BEV	Small Sport Utility Vehicle 4WD

Model	Drive Type	EPA Size Class
Tesla Model Y Performance AWD	BEV	Small Sport Utility Vehicle 4WD
Tesla Model Y Standard Range RWD	BEV	Small Sport Utility Vehicle 2WD
Volkswagen ID.4 1st*	BEV	Small Sport Utility Vehicle 2WD
Volkswagen ID.4 Pro*	BEV	Small Sport Utility Vehicle 2WD
Volkswagen ID.4 Pro S*	BEV	Small Sport Utility Vehicle 2WD
Volvo XC40 AWD BEV*	BEV	Small Sport Utility Vehicle 4WD
BMW i3 with Range Extender*	BEVx	Subcompact Cars
BMW i3s with Range Extender*	BEVx	Subcompact Cars
Honda Clarity*	FCEV	Midsize Cars
Toyota Mirai Limited*	FCEV	Compact Cars
Toyota Mirai XLE*	FCEV	Compact Cars
Audi A7 quattro	PHEV	Midsize Cars
Audi A8 L	PHEV	Large Cars
Audi Q5	PHEV	Small Sport Utility Vehicle 4WD
BMW 330e	PHEV	Compact Cars
BMW 330e xDrive	PHEV	Compact Cars
BMW 530e	PHEV	Compact Cars
BMW 530e xDrive	PHEV	Compact Cars
BMW 745e xDrive	PHEV	Large Cars
BMW X3 xDrive30e	PHEV	Small Sport Utility Vehicle 4WD
BMW X5 xDrive45e	PHEV	Standard Sport Utility Vehicle 4WD
Bentley Bentayga	PHEV	Standard Sport Utility Vehicle 4WD
Chrysler Pacifica Hybrid*	PHEV	Minivan - 2WD
Ferrari SF90 Stradale Coupe	PHEV	Two Seaters
Ford Escape FWD PHEV*	PHEV	Small Sport Utility Vehicle 2WD
Honda Clarity Plug-in Hybrid*	PHEV	Midsize Cars
Hyundai Ioniq Plug-in Hybrid	PHEV	Midsize Cars
Jeep Wrangler 4dr 4xe	PHEV	Small Sport Utility Vehicle 4WD
Karma GS-6 (21-inch wheels)	PHEV	Subcompact Cars
Karma GS-6 (22-inch wheels)	PHEV	Subcompact Cars
Karma Revero GT (21-inch wheels)	PHEV	Subcompact Cars

Model	Drive Type	EPA Size Class
Karma Revero GT (22-inch wheels)	PHEV	Subcompact Cars
Kia Niro Plug-in Hybrid	PHEV	Small Station Wagons
Land Rover Range Rover PHEV	PHEV	Standard Sport Utility Vehicle 4WD
Land Rover Range Rover Sport PHEV	PHEV	Standard Sport Utility Vehicle 4WD
Lincoln Aviator PHEV AWD	PHEV	Standard Sport Utility Vehicle 4WD
Lincoln Corsair AWD PHEV	PHEV	Small Sport Utility Vehicle 4WD
MINI Cooper SE Countryman All4	PHEV	Midsize Cars
Mitsubishi Outlander PHEV	PHEV	Small Sport Utility Vehicle 4WD
Polestar 1	PHEV	Minicompact Cars
Porsche Cayenne Turbo S e-Hybrid	PHEV	Standard Sport Utility Vehicle 4WD
Porsche Cayenne Turbo S e-Hybrid Coupe	PHEV	Standard Sport Utility Vehicle 4WD
Porsche Cayenne e-Hybrid	PHEV	Standard Sport Utility Vehicle 4WD
Porsche Cayenne e-Hybrid Coupe	PHEV	Standard Sport Utility Vehicle 4WD
Porsche Panamera 4 e-Hybrid	PHEV	Large Cars
Porsche Panamera 4 e-Hybrid Executive	PHEV	Large Cars
Porsche Panamera 4 e-Hybrid ST	PHEV	Large Cars
Porsche Panamera 4S e-Hybrid	PHEV	Large Cars
Porsche Panamera 4S e-Hybrid Executive	PHEV	Large Cars
Porsche Panamera 4S e-Hybrid ST	PHEV	Large Cars
Porsche Panamera Turbo S e-Hybrid	PHEV	Large Cars
Porsche Panamera Turbo S e-Hybrid Executive	PHEV	Large Cars
Porsche Panamera Turbo S e-Hybrid ST	PHEV	Large Cars
Subaru Crosstrek Hybrid AWD	PHEV	Small Sport Utility Vehicle 4WD
Toyota Prius Prime	PHEV	Midsize Cars
Toyota RAV4 Prime 4WD*	PHEV	Small Sport Utility Vehicle 4WD
Volvo S60 AWD PHEV	PHEV	Compact Cars
Volvo S90 AWD PHEV	PHEV	Midsize Cars
Volvo V60 AWD PHEV	PHEV	Small Station Wagons
Volvo XC60 AWD PHEV	PHEV	Small Sport Utility Vehicle 4WD
Volvo XC90 AWD PHEV	PHEV	Standard Sport Utility Vehicle 4WD
In summary, there are currently 30 EV models eligible for CVRP and more than 90 models available in the U.S. market, and there has been a significant increase in the number of EV models over recent years. In 2011, there were about 5 EVs available for sale which has expanded to more than 80 in 2020, and more than 90 in 2021. Looking forward, manufacturers have announced many additional vehicle introductions anticipated over the next several years, specifically in larger vehicle classes.⁸² However, vehicle diversity remains far more limited than the fully diversified ICE market. Because of this, the EV market still does not meet the needs of a wide range of consumers for various vehicle choices in different categories, but it should in the next few years as more trucks and larger vehicles are added to the mix.

Consumer Awareness and Assessment of Light-Duty EV Marketing Efforts by Automobile Manufacturers

The Supplemental Report to the 2018-19 Budget Act directs CARB to assess the marketing efforts of EV 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 EV website, Electric For All, Veloz also produces statewide public education campaigns to encourage EV adoption.⁸³ These campaigns raise awareness about EVs, bust myths and provide access to tools that help consumers make their next EV 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 EVs. The 2021 campaign, titled

⁸² Bartlett, Jeff and Preston, Ben. Consumer Reports. "Automakers Are Adding Electric Vehicles to Their Lineups. Here's What's Coming." Published June 7, 2022. <u>https://www.consumerreports.org/hybrids-</u> evs/why-electric-cars-may-soon-flood-the-us-market-a9006292675/

⁸³ Veloz, Electric For All Overview. <u>https://www.veloz.org/electric-for-all/</u>. Accessed on July 23, 2022.

"40 Million Reasons to Go Electric," highlighted the reasons every Californian should go electric with a focus on social, economic, and environmental justice. The next Veloz public awareness campaign is expected to launch in late-2022 and will focus on busting myths surrounding EV technology and EV ownership.⁸⁴ CARB and CSE are founding members of Veloz.

Auto Innovators 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 EVs by educating dealer staff through trainings. CVRP continues to educate and foster relationships with eligible automakers and dealers about the CVRP rebate and the clean vehicle market.

Plug In America has introduced PlugStar which provides nationwide dealer training on EVs as well as online support and tools for consumers, dealers, and electric utilities.⁸⁵ The PlugStar website offers an EV buying guide that allows shoppers to compare models, find information on charging, research available incentives, and get connected with PlugStar-trained EV dealers. PlugStar also offers in-person and online EV 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 EVs and improves EV sales.⁸⁶

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

and information regarding EVs 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 EV and incentive-related conversations with consumers.

Furthermore, CSE's Dealer Outreach team focuses on providing training, tools, and tips to dealers for EVs 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

⁸⁴ Electric For All Powered by Veloz, "Get Ready: The Next Electric For All Public EV Education Campaign is Launching Later this Year". <u>https://www.electricforall.org/campaign/</u>. Accessed on July 23, 2022.

 ⁸⁵ Plug In America, PlugStar EV Dealer Training, <u>https://pluginamerica.org/about-us/evtraining/</u>
⁸⁶ Ibid.

possible due to the pandemic, the staff made 623 phone calls and sent 19,580 emails to dealership staff from May 2021 to May 2022. Table C-4 shows the dealership outreach in recent years under the CVRP grant.

Dealership Outreach by Year	2015	2016	2017	2018	2019	2020	2021	2022*	Total
In Person Visits	-	-	222	990	1,777	339	0	0	3,328
Information Sessions	-	-	2	48	67	50	23	25	215
Materials Distributed	48	1,081	1,640	6,694	12,080	4,738	686	1,326	28,293

Table C-4: CVRP Dealer Outreach Team Activities

*As of 5/1/2022

Under the CVRP grant, CSE administers surveys to individual CVRP 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 EVs.⁸⁷ The inaugural U.S. Electric Vehicle Consideration (EVC) Study was fielded in December 2020 and January 2021 with respondents being car shoppers with an intent to purchase or lease a new vehicle in the next 12 months. The second edition of the survey was launched in 2022 and results indicate that car shoppers are more likely than ever before to consider purchasing a new EV.⁸⁸ This is in large part due to the number of new entries into the EV market, particularly those in the sport utility vehicle and light-truck categories. One of the key barriers continually cited by respondents 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 EVs were more likely to

⁸⁷ J.D. Power, February 25, 2021 Press Release: Battleground for Electric Vehicle Purchase Consideration is Wide Open, J.D. Power Finds. <u>https://www.jdpower.com/business/press-releases/2021-us-electric-vehicle-consideration-evc-study</u>

⁸⁸ J.D. Power. May 26, 2022 Press Release: Electric Vehicle Consideration Up but Skepticism Still Exists, J.D. Power Finds. <u>https://www.jdpower.com/business/press-releases/2022-us-electric-vehicle-consideration-evc-study</u>

buy an EV.⁸⁹ The second edition highlights that exposure to EVs will be key for auto manufacturers to encourage EV adoption from the larger percentage of EV shoppers that indicate they are "somewhat likely" to consider an EV.⁹⁰ Additional key findings from the second edition of the survey include that EV consideration is higher among premium buyers but that EV consideration among owners of mass-market vehicles is increasing.⁹¹ The survey also found that EV consideration varies by geographic location and that lack of EV education is still a key reason car shoppers do not consider these vehicles.⁹² This implies that in order to build stronger consumer demand for EVs, 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 EVs among consumers. This will be critical over the next 10-15 years as California, and the U.S. as a whole, looks to transition to fully electric vehicle sales.

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

Staff recognizes the value and importance of partnering with local community-based organizations (CBOs) and grassroots organizations to increase access to and awareness of EVs 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 efforts more closely with CBOs to ensure ZEV adoption 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 (ACCess) and provides insight into any future plans to expand partnerships with CBOs and grassroots organizations.

<u>CVRP</u>: Each year, CVRP has continued to increase outreach on EVs and available incentives in disadvantaged and low-income communities. This includes building a Community Partner Network which is a statewide coalition of CBOs 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

⁸⁹ Stropp, Stewart. "JD Power Suggests Outreach & Education To Build EV Demand". Published on the Inside EVs website on April 28, 2021. <u>https://insideevs.com/news/504167/jd-power-ev-demand-education/</u>

⁹⁰ J.D. Power. May 26, 2022 Press Release: Electric Vehicle Consideration Up but Skepticism Still Exists, J.D. Power Finds.<u>https://www.jdpower.com/business/press-releases/2022-us-electric-vehicleconsideration-evc-study</u>

⁹¹ Ibid.

⁹² Ibid.

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)
 - o Central California Environmental Justice Network
 - El Pablo Para el Aire y Agua Limpio
 - o El Quinto Sol de América
 - o 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 County and Yolo County)
- Comite Civico del Valle (Imperial County)
- Pryor Consulting (Sacramento County)

The CVRP Community Partner Network educates community members about CVRP and the benefits of electric vehicles 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.

Looking forward, CVRP CBOs will continue to increase their focus on priority communities. In particular, CVRP will be focused on expanding outreach to tribal and African-America communities. To assist with creating a strategy on how to best provide outreach to African-American communities, CVRP is partnering with Pryor Consulting, a black-woman-owned business. CVRP will also be including tribal nations in upcoming focus group forums to better understand the concerns and barriers to adopting EVs that are specific to tribal communities in order to use this input to help direct future outreach activities.

CVRP will also be expanding 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. The CVRP administrator is actively looking to expand the Community Partner Network by bringing in more diverse community representatives. <u>CC4A:</u> 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 EVs. 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 electric vehicle ride-and-drives, provide program participants an opportunity to familiarize themselves with EV 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)

Financing Assistance: Financing Assistance for Lower-Income Consumers project (Financing Assistance) is designed to help lower-income Californians purchase advanced clean vehicles by providing 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, 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 (CCAC)
- Center for Sustainable Energy (CSE)
- Foundations for California (FFC)
- GRID Alternatives
- Rising Sun
- Metropolitan Area Advisory Committee (MAAC)
- 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 Dev.
- Roots Community Health Center
- Rubicon Services
- Sandidge Urban Group Inc
- Shelter Inc
- Solano Workforce Development
- 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
- Working Solutions

The upcoming solicitation for Financing Assistance and Statewide Clean Cars 4 All will require potential program administrators to include detailed plans for collaboration and partnership with CBOs and grassroot 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 to partner with. Through CARB's complementary capacity-building grant projects Access Clean California is also able to form relationships with and formally partner 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 (LMR) -- San Joaquin County
- Catholic Charities Diocese of Stockton (CCDS) -- San Joaquin, Stanislaus, Merced Counties
- Valley Improvement Projects (VIP) -- Stanislaus County
- Madera Coalition for Community Justice (MCCJ) -- Madera County
- Central California Environmental Justice Network (CCEJN) -- Fresno, Tulare, 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 percent have heard at least a little about EVs, and 30 percent had heard a lot about EVs.⁹³

An early 2022 survey of U.S. adults by Consumer Reports found that 14 percent would definitely choose a BEV if choosing a new car today, and an additional 22 percent said they would seriously consider one. Of those who did not indicate they would definitely

⁹³ Tyson, A., Kennedy, B., & Funk, C. (2021). Gen Z, Millennials stand out for climate change activism, social media engagement with issue. Pew Research Center. <u>https://www.pewresearch.org/science/wp-content/uploads/sites/16/2021/05/PS_2021.05.26_climate-and-generations_REPORT.pdf</u>

choose an EV, the most commonly noted reasons that would prevent one from choosing an EV were "charging logistics, such as where and when I'd be able to charge it" (61 percent), vehicle range (55 percent), and vehicle costs (52 percent). Forty percent said they were at least somewhat familiar "with the fundamentals of owning an electric-only vehicle."⁹⁴ An Ipsos Mobility Navigator study finds interest in EVs increased over time to 36 percent in 2021.⁹⁵

A 2020 Consumer Reports survey found that most nationwide consumers, 68 percent, have learned about BEVs but do not know much about them.⁹⁶ Only 2 percent had never heard of BEVs and the remaining 29 percent range from knowledgeable to very knowledgeable about BEVs.⁹⁷ Exposure to BEVs appears widespread; many have seen public charging stations (63 percent) or ads for BEVs (44 percent).⁹⁸ Fewer have seen a BEV in their neighborhood (36 percent) or know someone who owns one (31 percent).⁹⁹ Despite this awareness, only 4 percent of Americans plan on getting a BEV for their next vehicle, and 27 percent would consider a BEV as their next vehicle.¹⁰⁰ Interest in California is higher, with 40 percent considering an electric vehicle for their next purchase.¹⁰¹ Reasons for avoiding BEVs include lack of knowledge about BEVs, lack of charging stations, the purchase price of BEVs, and range, among others.¹⁰² 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.

icles Fuel Economy National August 2020

⁹⁴ 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

⁹⁵ Kiser, J. (2021, September 9). Interest in electric vehicles has tripled. How can automakers take advantage? Ipsos. <u>https://www.ipsos.com/en-us/news-polls/Interest-in-electric-vehicles-has-tripled-How-can-automakers-take-advantage</u>

⁹⁷ Ibid.

⁹⁸ Ibid.

⁹⁹ Ibid.

¹⁰⁰ Ibid.

¹⁰¹ Consumer Reports. Consumer Attitudes Towards Electric Vehicles and Fuel Efficiency in California: 2020 Results. Published March 2021. <u>https://advocacy.consumerreports.org/wp-content/uploads/2021/03/California-EV-FE-Survey-Report-3.8.21.pdf</u>

¹⁰² 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: <u>https://article.images.consumerreports.org/prod/content/dam/surveys/Consumer Reports Electric Vehicles Fuel Economy National August 2020</u>

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.¹⁰³ About half are aware of BEV/PHEV advertising, and about a quarter are aware of education programs.¹⁰⁴ Several respondents reported that they are aware of state government incentives (54 percent), federal government incentives (46 percent), and parking incentives (46 percent).¹⁰⁵ 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 CVRP 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. CVRP outreach can be evaluated with this lens to increase consumer participation and knowledge.

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 EVs. 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 EV 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 EV tax credit, now known as the Clean Vehicle Credit.

The Internal Revenue Code Section 30D allows a tax credit of up to \$7,500 for the purchase of a qualifying plug-in electric vehicle. The tax credit amount begins to phase

 ¹⁰³ 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: <u>https://iopscience.iop.org/article/10.1088/2515-7620/aba943</u>
¹⁰⁴ Ibid.

¹⁰⁵ Ibid.

out once a vehicle manufacturer has sold 200,000 qualified vehicles. Six months after this milestone is reached, the credit amount is cut in half (from a maximum of \$7,500 to \$3,750). After 6 months, the maximum credit is cut in half again. Finally, the amount is reduced to \$0 for EV 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) (Figure C-7a). Toyota also reached the threshold in the second quarter of 2022 and will began the phase-out in October 2022 (Figure C-7b).



Figure C-7a: Tax incentive levels for Tesla Motors and General Motors during the phase-out period



Figure C-7b: Tax incentive levels for 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 March 2017 and November 30, 2020, 50 percent of CVRP survey respondents said the federal tax credit was extremely important, as shown in Figure C-8. This level of importance remained relatively constant between 2013 and 2019 but decreased in 2020 (see Figure C-9).







Figure C-9: Percent of CVRP Participants Indicating the Federal Tax Credit is Extremely Important over Time – 75,552 survey respondents weighted to represent 376,800 rebate recipients

The decline in the calendar year 2020 may be linked to the phase-out of federal tax credits for Tesla and General Motors. 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-10 and C-11 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-10: Percentage of CVRP Respondents Rebated for Tesla Vehicles Rating Incentives as "Extremely Important" during Tesla Phase Out – CVRP Consumer Survey Edition: 2017–2020



Figure C-11: Percentage of CVRP Respondents Rebated for GM Vehicles Rating Incentives as "Extremely Important" during GM Phase Out – CVRP 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 EV 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. As the tax credits have phased out for Tesla and GM, the survey data does not indicate that the CVRP rebate has increased in importance. It is not clear from this analysis how the phase-out of tax credits impacts EV adoption. Still, it is possible that it will reduce the rate of adoption or shift consumers to companies that have available tax credits. Research aimed at specifying the impact of the tax credit on the market is ongoing.

The current federal administration is implementing measures to extend and improve federal EV tax credits. On August 16, 2022, the Inflation Reduction Act¹⁰⁶ was signed into law and includes a number of measures to improve the economy with a focus on working families in America.¹⁰⁷ One of these measures includes a series of amendments to the Qualified Plug-in Electric Drive Motor Vehicle Credit (IRC 30D¹⁰⁸), 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.¹⁰⁹ Starting January 2023, the 200,000 unit cap for manufacturers will be removed and new MSRP and income caps will be effective.¹¹⁰ The MSRP cap is set at \$80,000 for SUVs, vans, and trucks and \$55,000 for all other vehicle classes; the income caps are set at \$150,000 for single filers, \$225,000 for those filing Head of Household, and \$300,000 for those filing jointly.¹¹¹ 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

¹⁰⁶ Text - H.R.5376 - 117th Congress (2021-2022): Inflation Reduction Act of 2022. (2022, August 16). <u>https://www.congress.gov/bill/117th-congress/house-bill/5376</u>

¹⁰⁷ The White House Briefing Room. FACT SHEET: The Inflation Reduction Act Supports Workers and Families. August 19, 2022. <u>https://www.whitehouse.gov/briefing-room/statements-</u>releases/2022/08/19/fact-sheet-the-inflation-reduction-act-supports-workers-and-families/

¹⁰⁸ 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

¹⁰⁹ Internal Revenue Service. "Plug-In Electric Drive Vehicle Credit (IRC 30D)". Updated August 16, 2022. Accessed on August 21, 2022. <u>https://www.irs.gov/businesses/plug-in-electric-vehicle-credit-irc-30-and-irc-30d</u>

¹¹⁰ Text - H.R.5376 - 117th Congress (2021-2022): Inflation Reduction Act of 2022. (2022, August 16). <u>https://www.congress.gov/bill/117th-congress/house-bill/5376107</u>

¹¹¹ Ibid.

effect.¹¹² 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 EV effective January 1, 2023.¹¹³

Additionally, the current administration has previously outlined a target of 50 percent of new vehicle sales in the U.S. must be electric in 2030.¹¹⁴ These supportive policies will be necessary as we look to encourage EV 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 EV policies and report on their impact on EV adoption in future iterations of this appendix.

Summary of Sustainable EV Market Section

Staff has defined the EV market reaching and maintaining a16-20 percent 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 ICEV market, lower incremental cost for EVs, increased availability of charging infrastructure, and a growing secondary market. As noted previously, EV car sales soared to more than 12 percent share of new car sales in California by the end of 2021 and grew to more than 16 percent by early-2022 despite the market disruptions. Increases in EV 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 ICEV market, the number of available models is growing signaling a shift in manufacturer funding priorities for cleaner vehicle technologies. Lastly, consumer awareness remains an issue where additional work is needed and the elimination of the federal tax credit for the top EV manufacturers may negatively impact future growth.

Evaluation of Program Funding Needs (Three Year Need)

California's EV market has rebounded since late-2020 with an increase in purchases and leases for new EVs. With the advancement of the technology, the current market trend indicates that EV 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 EVs and their benefits have improved and as a

¹¹² Ibid.

¹¹³ U.S. Department of the Treasury. Press Releases. "Treasury Releases Initial Information on Electric Vehicle Tax Credit Under Newly Enacted Inflation Reduction Act". Released August 16, 2022. Accessed on August 21, 2022. <u>https://home.treasury.gov/news/press-releases/jy0923</u>

¹¹⁴The White House Briefing Room Fact Sheet: President Biden Announces Steps to Drive American Leadership Forward on Clean Cars and Trucks. August 5, 2021. <u>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/</u>

result, the California EV market soared to more than 12 percent share of new car sales in California by the end of 2021 and grew to more than 16 percent by early-2022.

The next three to five years are critical for the EV market as industry, in response to CARB regulations and growing EV mandates around the world, is heavily investing in development and expansion of EV production and new government policies around the world are paving the way for the big shift from old polluting technologies to cleaner ones.¹¹⁵ During this time, and likely enhanced by proposed CARB regulations to further increase EV penetration in new vehicle sales, the California EV 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. We anticipate that at that point, we 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 Clean California (ACCess) over the next three years as required by SB 1275. Staff also projects forward EV sales and CVRP funding need out to 2030 if the EV market growth continues on its current trajectory to make a preliminary assessment of how the market is doing compared to the State's EV 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 EV 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 EV market include the target set by Executive Order S-03-05 to be carbon neutral by 2045 and Executive Order N-79-20¹¹⁶ which calls for 100 percent 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 more aggressive deployment of light-duty passenger vehicles, and CARB will be proposing regulations to support these goals.¹¹⁷

¹¹⁵ <u>https://www.iea.org/publications/reports/globalevoutlook2019/</u>

¹¹⁶ Executive Order N-79-20 <u>https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-</u> 20-Climate.pdf

¹¹⁷ California Air Resources Board. Proposed 2020 Mobile Source Strategy. September 2021. <u>https://ww2.arb.ca.gov/sites/default/files/2021-09/Proposed_2020_Mobile_Source_Strategy.pdf</u>

To begin this portion of the long-term plan, staff is including a detailed analysis of incentive levels which was used to determine increases in incentive amounts for CVRP, CC4A, and Financing Assistance. Then, in each subsection that follows, staff first describes an update to its methodology for projecting program funding needs. Staff then presents the projected funding need for each program for the next three fiscal years. Finally, staff presents an evaluation of effects of changes proposed in this Funding Plan.

Analysis of Incentive Funding Amounts for CVRP, CC4A, and Financing Assistance

Vehicle Purchase Incentive Amounts

CARB staff worked with the Center for Sustainable Energy to estimate the impact of different incentive levels on vehicle purchase affordability for both new and used EV purchases for one- and four-person households using the Affordability Calculator tool from CSE's Caret platform. The model analyzes the number of affordable vehicle options given an incentive mix for households with income at 225 percent FPL, 300 percent FPL, 400 percent FPL, and at the CVRP income cap for single filers and joint filers. For this analysis, affordability is defined as spending no more than 15 percent 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 percent down, get a four-year loan, and spend no more than 10 percent of income on vehicle costs (the 20/4/10 rule, explained further here: <u>https://www.capitalone.com/cars/learn/managing-your-money-wisely/what-is-the-20410-rule-for-car-buying/1532</u>).

The following inputs and assumptions were included in this analysis:

- New Vehicles: 2022 model year vehicles listed on fueleconomy.gov, where each vehicle option is a combination of make and model. Vehicle options were limited to those meeting CVRP eligibility requirements for all-electric range and MSRP. Where the trim affects the vehicle range each trim level is counted as an additional option. For example, the Nissan Leaf includes several "options" due to differences in range at various trim levels.
- Used Vehicles: 2010 model year or later vehicles listed on fueleconomy.gov, where each vehicle option is a combination of model year, make, and model. Vehicle options were again limited to those meeting CVRP eligibility requirements for all-electric range and Kelley Blue Book Fair Purchase Price. 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 Kelley Blue Book.
- Used Vehicle Purchase Prices: Fair Purchase Prices from Kelley Blue Book, priced without options in August 2022 for postal code 92110.

- Annual Interest Rate: In response to stakeholder feedback about the model inputs received at September 1, 2022 Public Work Group Meeting¹¹⁸ (to Discuss the Light-Duty Vehicle Purchase Incentive Programs for the Fiscal Year 2022-23), interest rates are capped at eight percent to align with finance assistance program requirements.
- Maintenance Costs: BEV: \$33/month, PHEV: \$32.50/month based on a 2020 Consumer Reports published report by Chris Harto (<u>https://advocacy.consumerreports.org/wp-content/uploads/2020/10/EV-</u> <u>Ownership-Cost-Final-Report-1.pdf</u>).
- Fuel Costs: Varies by vehicle-based on fueleconomy.gov default estimate.
- Insurance Costs: \$190/month based on national averages reported by Jason Metz for Forbes (<u>https://www.forbes.com/advisor/car-insurance/electric-vehicle/#:~:text=Electric%20Car%20Insurance%20Costs,top%2Dselling%20electric%20car%20models</u>).
- Finance Term: 48 months based on the 20/4/10 rule.
- **Down Payment Ratio:** 10 percent, modified from the 20/4/10 rule to approximate the grant provided by the financing assistance program.
- **Cost-to-Income Ratio:** 15 percent, modified from the 20/4/10 rule to account for the reality that Californians tend to spend more than 10 percent of their income on transportation.
- Sales Tax: 8.82 percent average based on 2021 Taxfoundation.org-reported California averages (<u>https://taxfoundation.org/publications/state-and-local-sales-tax-rates/</u>).
- Dealer Fees: \$789 average of DMV and dealership document fees, per Edmunds (<u>https://www.edmunds.com/car-buying/what-fees-should-you-pay.html</u>).
- **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: <u>https://www.oecd.org/els/soc/OECD-Note-EquivalenceScales.pdf</u>).

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 four-person household with an annual income of \$111,000 (equivalent to 400 percent FPL) receiving a \$14,000 point-of-sale incentive would have one affordable vehicle option available for purchase: the 2022 Nissan Leaf 40 kWh. Adding an additional \$7,500 to the incentive increases the number of affordable options to nine, including three small SUVs: Mazda MX-30, Chevrolet Bolt

¹¹⁸ California Air Resources Board. Public Work Group Meeting to Discuss the Light-Duty Vehicle Purchase Incentive Programs for Fiscal Year 2022-23. September 1, 2022. <u>https://ww2.arb.ca.gov/ourwork/programs/low-carbon-transportation-investments-and-air-quality-improvement-program/low-0</u>

EV, Chevrolet Bolt EUV, Hyundai Kona Electric, Nissan Leaf 40 kWh, Nissan Leaf S 62 kWh, Nissan Leaf SL/SV 62 kWh, Kia Sorrento Plug-in Hybrid, and Ford Escape PHEV.

At the September 1, 2022 Public Work Group Meeting¹¹⁹, stakeholders rightly noted that vehicles should not be considered affordable if they are not also available for purchase. An analysis of new vehicle sales data (including data from IHS Markit © 2022) revealed that each of these choices (with the possible exception of the Chevrolet Bolt EUV, which is not differentiated from the Chevrolet Bolt EV in the new vehicle sales data) has sold at least 1,000 vehicles in the first half of 2022, suggesting that they are both affordable and at least somewhat available for purchase despite industry-wide supply constraints.

Tables C-5 through C-8 display new vehicle affordability results summaries. In these tables, the left column shows varied incentive amounts ranging from \$2,000 to \$21,500, and the top row shows four different income levels. The numbers in each cell represent the number of affordable vehicle options that a household at the stated income level would reasonably have with the associated incentive amount.

Incentive Amount	Income: \$30,577	Income: \$40,770	Income: \$54,360	Income: \$135,000	Total Vehicles
\$2,000	0	0	0	27	27
\$4,500	0	0	0	27	27
\$10,000	0	0	0	27	27
\$14,000	0	0	1	27	27
\$21,500	0	1	7	27	27

Table C-5: 1-Person Household, New BEV Only

¹¹⁹ Ibid.

Incentive Amount	Income: \$62,438	Income: \$83,250	Income: \$111,000	Income: \$200,000	Total Vehicles
\$2,000	0	0	0	11	27
\$4,500	0	0	0	14	27
\$10,000	0	0	0	19	27
\$14,000	0	0	1	23	27
\$21,500	0	2	7	27	27

Table C-6: 4-Person Household, New BEV Only

Table C-7: 1-Person Household, New PHEV

Incentive Amount	Income: \$30,577	Income: \$40,770	Income: \$54,360	Income: \$135,000	Total Vehicles
\$2,000	0	0	0	5	27
\$4,500	0	0	0	6	27
\$10,000	0	0	0	6	27
\$14,000	0	0	0	6	27
\$21,500	0	1	7	27	27

Table C-8: 4-Person Household, New PHEV

Incentive Amount	Income: \$62,438	Income: \$83,250	Income: \$111,000	Income: \$200,000	Total Vehicles
\$2,000	0	0	0	3	27
\$4,500	0	0	0	4	27
\$10,000	0	0	0	5	27
\$14,000	0	0	0	5	27
\$21,500	0	2	7	27	27

This analysis suggests that a higher total incentive package of \$20,000 to \$30,000 provides lower-income households with the largest number of affordable new EV models to choose from. The analysis also suggests that current standard CVRP rebate levels provide applicants that meet income cap requirements with a comparable number of affordable new EV models to choose from.

A similar analysis was performed for used vehicles. Under normal market conditions, lower used vehicle prices mean more affordable options for lower-income households with smaller incentives. For example, a \$2,000 incentive for a four-person household making \$111,000 per year (400 percent FPL) enables 65 BEV options and nine PHEV options. Affordable vehicle options span a wide range of vehicle body styles, including smaller wagons and hatchbacks such as the 2018 Volkswagen e-Golf, to sedans such as the 2018 Hyundai Ioniq, 2018 Ford Focus Electric, or 2016 Chevrolet Volt, to small

SUVs such as the 2014 Toyota RAV4 EV. The incentive must be increased to \$9,000 before additional SUV choices become available, such as the 2019 Hyundai Kona Electric. Tables C-9 through C-12 summarize the used vehicle affordability results.

Incentive Amount	Income: \$30,577	Income: \$40,770	Income: \$54,360	Income: \$135,000	Total Vehicles
\$1,000	4	29	62	109	109
\$2,000	8	33	63	109	109
\$3,000	15	41	65	109	109
\$4,000	18	46	67	109	109
\$5,000	23	53	69	109	109
\$9,000	46	63	80	109	109

Table C-9: 1-Person Household, Used BEV Only

Table C-10: 4-Person Household, Used BEV Only

Incentive Amount	Income: \$62,438	Income: \$83,250	Income: \$111,000	Income: \$200,000	Total Vehicles
\$1,000	4	32	62	102	109
\$2,000	9	34	65	104	109
\$3,000	16	43	66	109	109
\$4,000	20	49	69	109	109
\$5,000	24	55	70	109	109
\$9,000	47	65	80	109	109

Table C-11: 1-Person Household, Used PHEV Only

Incentive Amount	Income: \$30,577	Income: \$40,770	Income: \$54,360	Income: \$135,000	Total Vehicles
\$1,000	0	0	8	31	31
\$2,000	0	2	8	31	31
\$3,000	0	3	9	31	31
\$4,000	0	3	9	31	31
\$5,000	0	3	9	31	31
\$9,000	3	8	16	31	31

Incentive Amount	Income: \$62,438	Income: \$83,250	Income: \$111,000	Income: \$200,000	Total Vehicles
\$1,000	0	1	8	29	31
\$2,000	0	2	9	31	31
\$3,000	0	3	9	31	31
\$4,000	0	3	9	31	31
\$5,000	0	4	10	31	31
\$9,000	3	9	18	31	31

Table C-12: 4-Person Household, Used PHEV Only

Staff is working with CSE to refine and improve these calculations and address additional stakeholder feedback, including assessing affordability in extremely highcost scenarios, assessing used vehicle inventory and availability, and grounding affordability assumptions in the lived experiences of low-to-moderate income new and used vehicle buyers.

Charging Incentive Amounts

Staff used the Vehicle Cost Calculator from the U.S. Department of Energy Alternative Fuels Data Center¹²⁰ to analyze the average annual cost to charge a BEV and PHEV. The assumptions in the calculator were adjusted to reflect the annual mileage assumptions used in Appendix A of this funding plan – 14,885 miles for PHEVs (40.7 miles per day) and 14,400 miles for BEVs (39.5 miles per day). A default assumption of 45 percent miles traveled on the highway and 55 percent traveled in the city was used in the analysis. An average gasoline cost of \$5.50 per gallon¹²¹ was assumed. Staff ran two separate calculations to account for the average cost of Level 2 public charging and public direct current (DC) fast charging in California, which is estimated at \$0.30 per kWh and \$0.40 per kWh respectively.¹²² For all PHEV models, it was assumed that the vehicle was plugged in once a day and costs for fueling are calculated separately from costs for electricity. For the purposes of this analysis, staff only analyzed all new model year 2022 BEVs and PHEVs currently eligible for CVRP, with the exception of the BMW i3 which is a 2021 model year.

Based on the results of this analysis, the average annual electricity cost to charge CVRP-eligible BEVs at public Level 2 stations is \$1,409 and \$1,879 at public DC fast charging stations. The analysis also indicated that the average annual electricity cost to

¹²⁰ United States Department of Energy. Alternative Fuels Data Center Vehicle Cost Calculator. <u>https://afdc.energy.gov/calc/</u>

¹²¹ Automobile Association of America. *Gas Prices*. \$5.50 was listed as the California average per gallon of gasoline at the time staff completed this analysis on August 5, 2022. <u>https://gasprices.aaa.com/?state=CA</u>

¹²² California Air Resources Board. DriveClean. *Electric Car Charging Overview*. <u>https://driveclean.ca.gov/electric-car-charging</u>

charge CVRP-eligible PHEVs at public Level 2 stations is \$1,533 and \$2,044 at public DC fast charging stations. Given these results, staff recommends a minimum pre-paid charging card incentive of \$2,000 in all three vehicle purchase incentive programs (CVRP, CC4A, and Financing Assistance) to cover the first year of public charging. Table C-13 summarizes the results of the analysis.

Model Year	Make/Model	Technology Type	Annual Fuel Use (gallons)	Annual Electricity Use (kWh)	Annual Gasoline Cost	Annual Electricity Cost (Level 2)	Annual Electricity Cost (DC)
2021	BMW i3 EV	BEV	0	4284	\$0	\$1,285	\$1,714
2022	Chevrolet Bolt EUV	BEV	0	4228	\$0	\$1,268	\$1,691
2022	Chevrolet Bolt EV	BEV	0	4041	\$0	\$1,212	\$1,616
2022	Ford F-150 Lightning	BEV	0	7098	\$0	\$2,129	\$2,839
2022	Ford Mustang Mach-E	BEV	0	5221	\$0	\$1,566	\$2,088
2022	Hyundai Ioniq 5	BEV	0	4353	\$0	\$1,306	\$1,741
2022	Hyundai Kona EV	BEV	0	4059	\$0	\$1,218	\$1,624
2022	Hyundai Ioniq EV	BEV	0	3650	\$0	\$1,095	\$1,460
2022	Kia EV6	BEV	0	4117	\$0	\$1,235	\$1,647
2022	Kia Niro Electric	BEV	0	4314	\$0	\$1,294	\$1,726
2022	Mazda MX-30	BEV	0	5284	\$0	\$1,585	\$2,114
2022	MINI Cooper SE EV	BEV	0	4416	\$0	\$1,325	\$1,766
2022	Nissan Leaf	BEV	0	4375	\$0	\$1,313	\$1,750
2022	Nissan Leaf Plus	BEV	0	4642	\$0	\$1,393	\$1,857

Table C-13: Annual Fuel and Electric Costs for CVRP-Eligible BEVs and PHEVs

2022	Volkswagen ID.4 EV	BEV	0	4558	\$0	\$1,367	\$1,823
2022	Volvo C40 Recharge	BEV	0	5539	\$0	\$1,662	\$2,216
2022	Volvo XC40 Recharge	BEV	0	5671	\$0	\$1,701	\$2,268
2022	Chrysler Pacifica	PHEV	108	4857	\$594	\$1,457	\$1,943
2022	Ford Escape	PHEV	33	4330	\$182	\$1,299	\$1,732
2022	Honda Clarity	PHEV	0	4563	\$0	\$1,369	\$1,825
2022	Hyundai Santa Fe	PHEV	108	4993	\$594	\$1,498	\$1,997
2022	Hyundai Tuscon	PHEV	80	5063	\$440	\$1,519	\$2,025
2022	Kia Sorento	PHEV	93	4921	\$512	\$1,476	\$1,968
2022	Lexus NX 450h	PHEV	38	5394	\$209	\$1,618	\$2,158
2022	Toyota RAV4 Prime	PHEV	0	5274	\$0	\$1,582	\$2,110
2022	Volvo XC60 Recharge PHEV	PHEV	61	6598	\$336	\$1,979	\$2,639

CVRP

CVRP Projection Methodology

To estimate the future budgetary need of the CVRP and progress toward state goals, the CVRP administrator, the Center for Sustainable Energy (CSE), uses Prophet, an open-source forecasting framework, to develop EV sales and rebate forecasts. The Prophet framework allows CSE to account for factors external to the program and to estimate the impact of various market conditions, such as the recovery from the pandemic-related decline in EV sales and rebates. Prophet also allows for the exclusion of anomalous events, which can then be excluded from the model to mitigate the outsized impact on the forecasts. The projections methodology is summarized in Figure C-12, and the inputs and assumptions used in the model are summarized in the following section.



Figure C-12: Simplified Projections Methodology Diagram

CVRP Projections Inputs and Assumptions

The forecasts use CVRP rebate data from the life of the program through May 2022 and EV sales data through March 2022 from IHS Markit. Two external factors are included in the model. A COVID-19 pandemic regressor is included, which dampens sales forecasts starting in April 2020, and allows for a steady recovery to pre-pandemic levels from July 2020 through November 2021. A waitlist regressor is also included to estimate the impact of waitlists on rebate demand.

The BEV sales forecasts exclude a relatively anomalous time period from June 2018 through May 2019. This period was characterized by a temporary sharp increase in overall BEV rebate and sales volumes due to the pent-up demand unleashed by the release of the Tesla Model 3.

In February 2022, the income cap was reduced for all three tax filing groups. The cap for single, head-of-household, and joint filers was reduced from \$150,000 to \$135,000, \$204,000 to \$175,000 and \$300,000 to \$200,000, respectively. The impact of this program was implemented in the projections by reducing standard rebates by 12 percent–26 percent, which was estimated from historical CVRP data.

Additionally, in February 2022, the base MSRP cap was reduced to \$45,000 for all cars (e.g., hatchbacks, sedans, wagons, and two-seaters), while the original \$60,000 cap for larger-sized vehicles remained. This adjustment led to a small exclusion of eligible vehicles, which only affected a few BEVs. To model this change, BEV rebates were reduced by 1 percent–5 percent, estimated from historical CVRP data.

In March 2022, Tesla raised their base MSRP for multiple vehicles. This MSRP increase was after the initial February 2022 MSRP cap change and led to the exclusion of the once eligible Model 3 and Model Y. To better predict rebate demand, the BEV rebate forecasts were separated into non-Tesla and Tesla-specific BEVs. This separation improved forecasting flexibility among the two groups and allowed Tesla rebates to be gradually phased out over time. The impact of Tesla being program ineligible was modeled by linearly reducing projected rebates from April 2022 until October 2022, when Tesla rebates were estimated to halt.

Historically, Tesla-specific rebates were roughly 59 percent of all program rebates, and after their removal from the program, stakeholders decided that it was best to reconsider the scheduled February 2023 changes. The original slated February 2023 changes include:

- Further reducing the income cap
- Removing PHEVs from the program
- A \$250 decrease in all rebates

CVRP Three-Year Funding Need

Table C-14 depicts the projected CVRP funding demand throughout the next three fiscal years and factors in the legislatively-required removal of PHEVs by January 1, 2025. Table C-15 summarizes the total estimated funding demand from June 2022 through June 2025 which ranges from \$45 million to 359 million dollars, with \$20 million-\$98 million utilized towards lower-income increased rebates and \$25 million-\$262 million utilized towards standard and DAC-fleet increased rebates.

Table C-14: Projected CVRP Funding Demand from April 2022 – June 2024 byFiscal Year

Year	Rebate Type	Projected Funding Demand Range (In Millions)	Projected Rebates Range (In Thousands)
June 2022	Standard and DAC- Fleet Increased	\$3–\$8	1–4
June 2022	Lower-Income Increased Rebates	\$1–\$3	0–1
June 2022	Total Need	\$4–\$11	1–4
July 2022 – June 2023	Standard and DAC- Fleet Increased	\$12–\$62	5–30
July 2022 – June 2023	Lower-Income Increased Rebates	\$8–\$22	1–5
July 2022 – June 2023	Total Need	\$20–\$84	6–35
July 2023 – June 2024	Standard and DAC- Fleet Increased	\$7–\$78	2–42
July 2023 – June 2024	Lower-Income Increased Rebates	\$5–\$30	1–6
July 2023 – June 2024	Total Need	\$12–\$108	3–48
July 2024 – June 2025	Standard and DAC- Fleet Increased	\$4–\$87	1–44
July 2024 – June 2025	Lower-Income Increased Rebates	\$6–\$42	1–9
July 2024 – June 2025	Total Need	\$9-\$129	2–53

Year	Rebate Type	Projected Funding Demand Range (In Millions)	Projected Rebates Range (In Thousands)
June 2022 – June 2025	Standard and DAC- Fleet Increased	\$25–\$235	9–120
June 2022 – June 2025	Lower-Income Increased Rebates	\$20–\$97	3–20
June 2022 – June 2025	Total Need	\$45–\$332	12–140

Table C-15: Total Projected CVRP Funding Demand from April 2022 – June 2024

Impact of Proposed CVRP Program Changes

As stated in the Funding Plan, Tesla vehicles became ineligible for CVRP in March 2022 due to a price increase that exceeded CVRP's MSRP cap. As Tesla vehicles make up a large percentage of EV sales, this greatly reduced CVRP volume, impacting program funding demand projections. In response to this change, the previously slated February 2023 changes of further reducing the income cap and a \$250 decrease in the rebate amount for all rebates have now been withdrawn from consideration. Program stakeholders have proposed other 2023 program changes that would impact the program by improving equity and offering alternatives to distribute funds directly to the consumers at the initial vehicle purchase. The following proposals include:

• Removal of PHEVs from CVRP eligibility by January 1, 2025: As directed by the Legislature in AB 211 Public Resources Trailer Bill (Chapter 574, Statutes of 2022)¹²³, which provides amendments to the Budget Act of 2021, staff plans to remove PHEVs as an eligible vehicle type in CVRP by January 1, 2025. While this was initially part of staff's proposal for phase out in 2023, it was included as a cost saving measure that is no longer needed. Staff recognizes that PHEVs continue to play an important role in the transition to zero-emission vehicles by serving as a plug-in option for residents of rural areas and those residing in other communities that lack sufficient charging infrastructure. As this change is now planned for a later date, staff will provide updates on the anticipated impact this change will have on CVRP in future Funding Plan documents.

¹²³ Assembly Bill 211 Public Resources Trailer Bill, Chapter 574, Statutes of 2022. Approved September 27, 2022. https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB211

- Reconsidering implementation of a second decrease to the income cap for standard rebate eligibility and a modest decrease in rebate amounts planned for implementation in February 2023: In last year's approved plan, a second set of phased-in changes for CVRP was tentatively slated to go into effect in February 2023. This second set of changes included a second decrease to the income cap for standard rebate eligibility and a modest decrease in rebate amounts across the board. Over the past eight months, staff has continued analyzing program and EV market data and met with stakeholders to determine if these changes were still needed to keep the program open through FY 2023-24. As updated projections indicate, there is an expected surplus of funding at the end of FY 2023-24 given current program design and the ineligibility of Tesla Model 3 and Model Y vehicles. As such, staff does not believe these changes, which were proposed in FY 2021-22, are warranted in the program at this time and is proposing to defer implementation.
- Including a \$2,000 pre-paid charge card with every low- and moderateincome increased rebate issued: Currently, charging incentives are offered through Clean Cars 4 All and Financing Assistance but have yet to be introduced into CVRP. These charging incentives are in place to help address the barrier of electric vehicle charging access experienced by many low- and moderate-income program participants. Recent survey data indicates that the availability of charging infrastructure is still a top barrier to EV adoption for many individuals. In an effort to continue addressing this barrier and aligning with both Financing Assistance and Clean Cars 4 All, staff is proposing to include charging incentives for low- and moderate-income participants in CVRP. Staff analyzed what the average cost to charge an EV is annually and the results of the analysis indicated an average cost of about \$2,000. Additional details of this analysis can be found on page C-61 of this appendix. By July 2023, CVRP would include a \$2,000 pre-paid charge card with every Increased Rebate issued that will be valid at public EVGO charging stations or alternative charge card options. Increased Rebate applicants would be able to stack this charging incentive with any other charging incentives they are eligible for. This change is expected to have a low impact on funding demand, however, as this is a new addition to CVRP, it is unknown how providing charging incentives to increased rebate participants will impact program participation. Currently, Financing Assistance provides up to \$2,000 for the installation of a Level 2 charging station or a \$1,000 prepaid charge card plus a portable charger, however, staff is proposing to increase the prepaid charge card amount to \$2,000 in this funding plan to align with all programs. CC4A offers up to \$2,000 for the installation of a Level 2 charger or up to \$2,000 in prepaid charging credit. With this proposal, consumers can stack CVRP charging incentives and Financing Assistance charging incentives for a total of up to \$4,000 in charging incentives if they are purchasing a new EV without scrapping an older vehicle. Additionally, consumers can also stack CVRP charging incentives with CC4A

charging incentives for a total of up to \$4,000 in charging incentives if purchasing a new EV and scrapping an older vehicle. This would help support charging at public stations for the first 2 years of EV ownership given CARB vehicle mileage assumptions of 14,885 miles for PHEVs and 14,400 miles for BEVs. This support could last beyond 2 years if the consumer drives less miles annually or has access to free charging through other means.

Increasing the rebate amount for low- and moderate-income consumers by \$3,000: As noted earlier in this document, inflation and rising interest rates combined with continued vehicle supply issues has led to soaring costs for both new and used vehicles. A recent analysis indicates the average price for an EV skyrocketed to \$63,821 by December 2021 while the average price of an ICEV was about \$47,000 – a difference of nearly \$17,000.¹²⁴ Additionally, the purchase price of vehicles receiving a CVRP increased rebate have increased from about \$29,000 in 2016 to about \$43,000 at the end of 2021 – an increase of about \$14,000. Staff also recognizes that some lower-income consumers may not have a high enough taxable income to take advantage of the full Federal EV Tax Credit which helps offset costs of a new EV. To help bridge the gap between a new EV and new ICEV and to continue encouraging EV adoption by all Californians, staff is proposing an increase of \$3,000 to CVRP increased rebate amounts for PHEVs and BEVs and an increase of \$500 for FCEVs. The proposed change would go into effect in February 2023 and would raise the PHEV rebate from \$3,500 to \$6,500 and the BEV rebate amount from \$4,500 to \$7,500. The FCEV rebate amount would increase slightly from \$7,000 to \$7,500 and would bring incentive amounts for BEVs and FCEVs in alignment similar to the structure seen in Financing Assistance and Clean Cars 4 All. Table C-16 illustrates current and proposed increased rebate amounts by vehicle technology type. The effect of this program change would have a moderate impact on program funding and participation since estimates are based on current LMI rebate levels, which are atypically low due to Tesla's program ineligibility. Further, the proposed increase for CVRP increased rebates may be underestimated as the new amounts may pass a tipping point leading to a higher demand than originally anticipated. CVRP increased rebates would continue to stack with other CARB vehicle purchase incentives in addition to other available EV incentives.

¹²⁴ Osaka, Shannon. Grist. Batteries are getting cheap. So why aren't electric vehicles? April 27, 2022. <u>https://grist.org/article/batteries-are-getting-cheap-so-why-arent-electric-vehicles/</u>

Vehicle Technology Type	Current CVRP Increased Rebate Amount	Proposed CVRP Increased Rebate Amount
Battery Electric	\$4,500	\$7,500
Fuel Cell Electric	\$7,000	\$7,500
Plug-In Hybrid Electric	\$3,500	\$6,500

Table C-16: Current and Proposed Amounts for CVRP Increased Rebates

Expanding CVRP Rebate Now, the pre-qualification pilot, statewide for lowand moderate-income consumers: Currently, Rebate Now is available in participating San Diego and San Joaquin Valley dealerships, but the proposal would open Rebate Now to all of California starting in July 2023. A later implementation date is proposed for CVRP Rebate Now statewide expansion in order to ensure a sufficient number of participating dealers are enrolled, to refine and improve the CVRP Rebate Now process, and to provide additional outreach prior to launch. Staff will provide updates on this expansion through the public process and will work with stakeholders to improve implementation before launching statewide. While not directly adjusting the rebate amount, the impact of this change would allow applicants to receive their rebate amount directly and apply it towards the purchase price of their vehicles. For those who are financing their vehicle, the direct rebate may lower the principal on their loan which would allow them to pay a lower price for an EV. Staff believes that this policy would allow for more increased rebate applicants without increasing the direct rebate amount.

In addition to these proposed changes, staff also analyzed the impact of other proposals put forth by stakeholders through the public process.^{125,126,127} These proposals included reverting the income caps to pre-February 2022 limits and increasing the LMI rebate by \$5,500 while removing the need for stacking. Staff consulted with stakeholders and developed a list of potential program change scenarios. All scenarios factor in the removal of PHEVs by January 1, 2025, as that is a legislatively-required change that will occur regardless of the scenario. A summary of these program change scenarios is included in Table C-17.

¹²⁶ California Air Resources Board. Second Public Work Group Meeting to Discuss the Clean Vehicle Rebate Project (CVRP) for Fiscal Year 2022-23. July 6, 2022. <u>https://ww2.arb.ca.gov/our-</u> work/programs/low-carbon-transportation-investments-and-air-guality-improvement-program/low-0

¹²⁵ California Air Resources Board. First Public Work Group to Discuss the Clean Vehicle Rebate Project for Fiscal Year 2022-23. May 11, 2022. <u>https://ww2.arb.ca.gov/our-work/programs/low-carbon-transportation-investments-and-air-quality-improvement-program/low-0</u>

¹²⁷ California Air Resources Board. Public Workshop on the Fiscal Year 2022-23 Funding Plan for Clean Transportation Incentives. July 21, 2022. <u>https://ww2.arb.ca.gov/our-work/programs/low-carbon-transportation-investments-and-air-quality-improvement-program/low-0</u>

Scenario Summary	Increase LMI Rebate Amount by \$2,000	Increase LMI Rebate Amount by \$3,000	Increase LMI Rebate Amount by \$5,500*	Statewide Rebate Now for LMI	\$2,000 Charging Incentive for LMI Rebates	Revert Income Caps⁺
Scenario 0 "Baseline, No 2023 Changes"	-	-	-	-	-	-
Scenario 1 "Staff Proposal: \$3k LMI Rebate Increase, Charging incentive, & Rebate Now"	-	Х	-	Х	Х	-
Scenario 2 "\$2k LMI Rebate Increase, Charging incentive, & Rebate Now"	х	-	-	Х	х	-
Scenario 3 "Revert Income Caps and Rebate Now"	-	-	-	Х	-	х
Scenario 4 "Revert Income Caps, \$5.5k LMI Rebate Increase, Rebate Now"	-	-	х	х	-	х
Scenario 5 "\$5.5k LMI Rebate Increase & Rebate Now"	-	-	Х	Х	-	-
Scenario 6 "\$2k LMI Rebate Increase & Rebate Now"	Х	-	-	Х	-	-

Table C-17: Considered 2023 Program Changes

* BEV: \$10,000, PHEV: \$9,000, and FCEV: \$12,000. At these amounts, no stacking with other CARB vehicle purchase incentive programs was suggested.

⁺The income cap limits prior to February 2022 were \$150,000 for single filers, \$204,000 for those filing head-of-household, and \$300,000 for joint filers.

Program and market impact estimates are summarized in Table C-18. Impact estimates are relative to the middle baseline scenario from the program projections summarized above. These estimates apply each program design change element in series. As a result, the estimates do not take interactions between the designs into effect. For example, increasing the LMI rebate and providing statewide Rebate Now may contain overlap in projected additional rebates. Therefore, these estimates may overestimate the impact.

Table C-18: Estimated Program Scenario Funding and Rebate Demand forFY 2022-25

Scenario Summary	Funding Demand (In Millions)	Difference in Funding to Baseline (In Millions)	Remaining Funding (In Millions)	Rebates	Difference in Rebates to Baseline
Scenario 0 "Baseline, No 2023 Changes"	\$156	N/A	\$206	55,248	N/A
Scenario 1 "Staff Proposal: \$3k LMI Rebate Increase, \$2k Charging incentive, & Rebate Now"	\$202	+\$46	\$157	56,782	+1,534
Scenario 2 "\$2k LMI Rebate Increase, Charging incentive, & Rebate Now"	\$191	+\$35	\$169	56,554	+1,306
Scenario 3 "Revert Income Caps and Rebate Now"	\$167	+\$11	\$194	60,888	+5,640
Scenario 4 "Revert Income Caps, \$5.5k LMI Rebate Increase, Rebate Now"	\$248	+\$92	\$107	63,870	+8,622
Scenario 5 "\$5.5k LMI Rebate Increase & Rebate Now"	\$239	+\$83	\$118	58,451	+3,203
Scenario 6 "\$2k LMI Rebate Increase & Rebate Now"	\$183	+\$27	\$177	56,554	+1,306
From the results in Table C-17, each scenario predicts funding demand to remain between \$156 million and \$248 million. The baseline scenario expects the funding demand to reach \$156 million with roughly 55,200 rebates. Scenario 1 projects funding demand will increase by \$46 million for the remainder of the fiscal year 2022-2025, and rebates will increase by roughly 1,500 compared to the baseline scenario. Scenario 2 projects baseline funding demand will increase by \$35 million for the remainder of the fiscal year 2022-2025 period, and rebates will increase by about 1,300. Scenario 3 projects baseline funding demand will increase by \$11 million for the remainder of the fiscal year 2022-2025 period, and rebates will increase by about 5,600. Scenario 4 projects baseline funding demand will increase by \$92 million for the remainder of the fiscal year 2022-2025 period, and rebates will increase by about 8,600. Scenario 5 projects baseline funding demand will increase by \$83 million for the remainder of the fiscal year 2022-2025 period, and rebates will increase by about 3,200. Scenario 6 projects funding demand will increase by \$27 million for the remainder of the fiscal year 2022-2025, and rebates will increase by roughly 1,300 compared to the baseline scenario. Again, these projections do not factor in upcoming EV model releases, which we expect there to be many over the next few years. Staff will work with CSE to update these projections as new rebate and EV market data becomes available and present updated projections through the public process and in next year's funding plan.

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
- The average total cost of each incentive is \$11,945

• Administrative funds are assumed to be 20 percent for air district programs and 25 percent for the statewide program

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-19 summarizes historic consumer participation for each air district.

Air District	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22
South Coast AQMD	586	947	1,008	1,725	1,733	1,452	274
San Joaquin Valley APCD	548	364	274	704	984	712	160
Bay Area AQMD	0	0	0	15	695	684	232
Sac Metro AQMD	0	0	0	0	0	328	140
Total Participants	1,134	1,311	1,282	2,444	3,412	3,176	806

 Table C-19: Historic Consumer Participation by Air District

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 APCD, 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 EV 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 EV market. Staff is actively pursuing the findings to better understand the dynamics of the used EV 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-19 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 APCD and statewide. The total funding amount includes the average cost per incentive plus the associated administrative funds.

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Air Districts	FY 2022-23	FY 2023-24	FY 2024-25		
South Coast AQMD	2,000 - 2,200	2,100 – 2,300	2,200 - 2,400		
San Joaquin Valley APCD	700 - 900	800 – 1,000	900 - 1,100		
Bay Area AQMD	400 - 600	500 - 700	600 - 800		
Sac Metro AQMD	200 - 250	400 - 600	500 - 700		
San Diego APCD	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)	\$49-\$60	\$87-\$104	\$97-\$119		

Table C-20: Projected Participation and Funding Ranges

Impact of Proposed Clean Cars 4 All Program Changes

Staff is recommending the following program changes to Clean Cars 4 All for FY 2022-23.

- Lowering the income eligibility cap to 300% FPL for district and statewide programs.
- Collapsing income tiers into one category for ease of implementation and consumer understanding.
- Increased incentive amounts and the addition of a \$2,000 bonus for applicants that live in a disadvantaged community.
- Allow air district programs to expand geographic eligibility to all areas of their respective jurisdictions.

Income Tier	HEV	PHEV	BEV	FCEV
300-400% FPL	\$5,000	\$5,500	\$5,500	\$5,500
225-300% FPL	\$7,000	\$7,500	\$7,500	\$7,500
225% FPL and below	N/A	\$9,500	\$9,500	\$9,500

Table C-21: Current CC4A Incentive Amounts & Income Tiers

Table C-22: Proposed CC4A Incentive Amounts & Income Tiers

Applicant Type	HEV	PHEV	BEV	FCEV
300% FPL and below	\$7,000	\$9,500	\$10,000	\$10,000
≤300% & in DAC	\$7,000	\$11,500	\$12,000	\$12,000

• Removal of conventional hybrid vehicles by November 2024 as directed by the Legislature in Assembly Bill 179¹²⁸, a trailer bill to the Budget Act of 2022.

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 EV deployment goals. Staff will be closely monitoring participation in the new program in San Diego and the proposed statewide program.

Financing Assistance

Financing Assistance Projection Methodology

To date, \$67 million has been allocated for both Financing Assistance programs, of which \$7 million has gone to the local pilot project in the Bay Area and \$45 million to the statewide project. \$15.5 million from FY 2021-22 in addition to the FY 2022-23 allocation will be solicited later in 2022.

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 EV 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

¹²⁸ Assembly Bill 179, Ting. Budget Act of 2022. <u>https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB179</u>

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 EV market. Staff is actively pursuing the findings to better understand the dynamics of the used EV 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-23 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 the program grows statewide and new and used EVs 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-23:	Financing	Assistance	Three-Year	Funding	Estimates
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Financing Assistance for Lower- Income Consumers	FY 2022-23	FY 2023-24	FY 2024-25
Total Funding (in millions)	\$110-\$120	\$120-\$150	\$150-\$200

Impact of Proposed Financing Assistance Program Changes

Staff is considering increasing incentive amounts in response to recent vehicle price increases and to ensure low-income consumers can bridge the price gap between EVs and ICEVs by using these incentives. In conducting the analysis to determine appropriate incentive amounts, staff considered vehicle prices in the used market, affordability for lower-income consumers, and the potential for program alignment. Stakeholders have requested staff to adjust incentive amounts to increase access to high quality clean vehicles for the lowest-income consumers. Additionally, staff is proposing to collapse income tiers into one category to simplify implementation and limit consumer confusion. Tables C-24 and C-25, below, display current and proposed incentive amounts will go into effect when Financing Assistance re-launches in 2023. Ongoing analysis of the program will be conducted to determine if further adjustments to vehicle incentive amounts are needed so that incentive amounts continually reflect community-identified needs, lessons learned from the local and statewide projects, and stakeholder feedback from public work groups.

Income Tier	HEV	PHEV	BEV	FCEV
300-400% FPL	\$1,500	\$4,500	\$5,000	\$5,000
225-300% FPL	\$1,500	\$4,500	\$5,000	\$5,000
225% FPL and below	\$2,500	\$5,000	\$5,000	\$5,000

Table C-25: Proposed Financing Assistance Incentive Amounts & Income Tiers

Income Tier	HEV	PHEV	BEV	FCEV
300% FPL and below	\$2,500	\$7,000	\$7,500	\$7,500

Staff analyzed what the average cost to charge an EV is annually and the results of the analysis indicated an average cost of about \$2,000. Additional details of this analysis can be found on page C-56 of this appendix. Currently, Financing Assistance provides up to \$2,000 for the installation of a Level 2 charging station or a \$1,000 prepaid charge card plus a portable charger. Based on the results of this year's analysis, staff is proposing an increase in the amount offered for prepaid charge cards from \$1,000 to \$2,000. This amount would align with what is currently offered in CC4A and staff's proposal for prepaid charge cards for low-income applicants in CVR. Eligible Financing Assistance applicants would continue to receive a portable low speed charger if they choose the prepaid charge card option. With this proposal, consumers can stack CVRP charging incentives and Financing Assistance charging incentives for a total of up to \$4,000 in charging incentives if they are purchasing a new EV without scrapping an older vehicle. This would help support charging at public stations for the first 2 years of EV ownership given CARB vehicle mileage assumptions of 14,885 miles for PHEVs and 14,400 miles for BEVs. This support could last beyond 2 years if the consumer drives less miles annually or has access to free charging through other means.

In collaboration with stakeholders through a comprehensive public process, staff have successfully finalized the details of the needs-based model in which applications will be evaluated and prioritized based their needs. Criteria such as income, DAC residency, need for financial counselling and support, and categorical eligibility are key measures that qualifies applications for an expeditious and thorough processes. The new model might take some time to be fully refined and implemented. Therefore, staff anticipates application processing in the first year of program implementation to be slower than desired. The ability to quickly adapt and make program changes through a public work group process will be critical to the success of this program. As new program data, implementation challenges, market information, and new technologies become available, nimble policy adjustments will enable the program to be most effective.

A new joint solicitation will be released later this year to select one program administrator to implement both Financing Assistance and Statewide Clean Cars 4 All with the goal to simplify application processing for programs participants and improve programs efficiency.

Access Clean California

Access Clean California Projection Methodology

The overarching goals for Access Clean California for the upcoming three years are to: expand 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 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 percent 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 estimated 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 consumerfocused, climate equity incentive projects, including but not limited to the clean vehicle incentive projects currently being developed by investor-owned utilities (IOUs) using Low-Carbon Fuel Standard holdback credit funds. Finally, staff estimates that approximately 5 percent 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-26 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.

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Access Clean California	FY 22-23	FY 23-24	FY 24-25
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.

Updated Stacked Incentive Totals

As described in detail in the body of the FY 2022-23 Funding Plan and in this appendix, staff is proposing increases to incentive amounts offered in CVRP, CC4A, and Financing Assistance. These increases also impact the total stacked incentive package available through CARB's light-duty vehicle purchase incentive programs for eligible income-qualified car buyers.

Currently, eligible car buyers can get \$8,000 to \$12,000 towards a new EV without scrapping an old vehicle and \$9,000 to \$16,500 towards a new EV with scrapping an old vehicle. With staff's proposed increases to incentives, eligible car buyers with incomes at or below 300 percent of the federal poverty level can now get \$12,500 towards a new PHEV or \$15,000 towards a new BEV or FCEV without scrapping an old vehicle and between \$16,000 to \$19,500 towards a new PHEV, BEV, or FCEV when scrapping an old vehicle. In addition to these stacked incentive totals, eligible applicants can receive charging incentives and also choose to go through the Financing Assistance program to obtain low-interest rate loans for the purchase of their vehicle. With the proposal to expand CVRP Rebate Now statewide, this provides the opportunity to apply all stacked incentives at the point of purchase. To put this into perspective, the average price of a new EV ranges from \$40,000 to \$60,000 and this stacked incentive amount could help cover about a third to half of the vehicle's cost before taking other federal and local EV incentives into account. Tables C-27 and C-28 illustrate updated stacked incentive totals given staff's proposed increases to incentive amounts.

Table C-27: Updated Stacked Incentive Amounts for New Purchases W/O Scrap (CVRP + Financing Assistance, at 300% FPL or lower)

Vehicle Type	Stacked Incentive Total
Battery Electric	\$15,000
Fuel Cell Electric	\$15,000
Plug-In Hybrid Electric	\$13,500

Table C-28: Updated Stacked Incentive Amounts for New Purchases with Scrap(CVRP + CC4A, at 300% FPL or lower)

Vehicle Type	≤300% FPL	≤300% FPL & in DAC
Battery Electric	\$17,500	\$19,500
Fuel Cell Electric	\$17,500	\$19,500
Plug-In Hybrid Electric	\$16,000	\$18,000

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

As previously stated, this document provides a major update to the Long-Term Plan for Light-Duty Vehicles and Clean Mobility Investments. 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 EV market and vehicle purchase incentive programs. Public workshops were held on February 10, March 30, and June 22 of 2022.¹²⁹ Over the course of these workshops, staff provided updated information about the EV market, available technology, incremental costs for EVs, market sustainability metrics, the equitable transition to electric, 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 to be made over the next few years. 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 EV market

¹²⁹ California Air Resources Board. Low Carbon Transportation and Air Quality Improvement Program Meetings and Workshops. <u>https://ww2.arb.ca.gov/our-work/programs/low-carbon-transportation-investments-and-air-quality-improvement-program/low-0</u>

• 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.¹³⁰ 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 electric. 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 EVs in an effort to keep these clean vehicles in California and to provide an affordable EV option for car buyers.

With stakeholder input and agency priorities in mind, CARB staff propose that several program changes 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.

Beyond FY 2024-25, CARB staff recognize that there will need to be continued investment in the secondary EV market, particularly for consumers who do not have a vehicle to scrap, to help enable affordable EV options for consumers and continued growth in this segment of the market. Dependent on updated EV market metrics, this could also be a time when the standard rebate option for CVRP is phased-out and the program shifts to an equity-only program. This would be closely coordinated with CC4A and Financing Assistance to ensure that CVRP is addressing any gaps in vehicle

¹³⁰ 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. <u>https://ww2.arb.ca.gov/our-work/programs/low-carbon-transportation-investments-and-air-quality-improvement-program/low-0</u>

purchase incentives for low-income car buyers and isn't duplicating efforts that are already underway in these programs.

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 EV 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 EV technology, the EV market, the economy, and fuel prices, the market is moving towards the path to achieve the State's EV deployment goals. If EV sales growth increases and continues on the current trajectory and there are no additional major disruptions in the economy, California would meet the 2025 and 2030 EV deployment goals early according to our simulations. However, CARB's pending proposal to greatly increase the stringency of its EV program and requiring 100 percent EV sales by 2035, will further efforts toward meeting these goals and help stabilize the market.

EVs 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 ICEVs. Availability of less expensive EVs and a more diverse selection in different vehicle classes with higher range is needed to make EVs more favorable than ICEVs. Lastly, a greatly expanded EV charging infrastructure network is very critical to achieving the widespread adoption of EVs 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 EV 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 making the transition to electric. 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. A number of improvements can be made to CARB's light-duty vehicle purchase incentive programs over the next few years 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 EV market. This additional targeted support is critical to achieving the equitable widespread EV 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. As the EV market is expected to reach the early majority in this timeframe, staff believes it will be the right time to shift CVRP's main focus to harder to reach market segments through increased rebates. Staff will work with stakeholders through the public process to determine how to best shape CVRP into an EV purchase incentive program focused solely on equity in future years and provide updates on this process in future iterations of this plan.

Part 2: Clean Mobility Investments and Outreach

Clean Mobility Investments Three-Year Funding Need Estimates

In this section of the Long-Term Plan, staff provides an update to the three-year projection estimates for clean mobility investments pursuant to SB 1275, including:

- Planning and Capacity Building (new)
- Clean Mobility Options (CMO) Voucher Pilot Program
- Clean Mobility in Schools (CMiS)
- Sustainable Transportation Equity Project (STEP)

These investments increase access to clean mobility options such as transit, car share, ride share, van pool, bike share, and other micro-mobility options and reduce greenhouse gas emissions and vehicle miles traveled. They also complement vehicle purchase incentives by promoting increased awareness of clean mobility options and focusing investments on alternatives to personal vehicle ownership which directly address community-identified needs. Three-year projection estimates consider how CARB's investments in clean mobility projects can support the broader transportation system by promoting more connected, sustainable communities.

Given the complexity of clean mobility programs and diversity of community-identified needs, projecting funding demand across CARB's investments is challenging. In past years CARB focused on stakeholder input and results from earlier grant solicitations for regional clean mobility projects to determine potential funding demand. Stakeholder input has been a critical point-in-time reflection of mobility investments but does not necessarily speak to the specific funding needs at a programmatic level. Uncertainty about the budget and whether there will be multiple years of funding has generally focused stakeholders input on the continued importance of all programs and the need for long-term funding.

Clean Mobility Investments Three-Year Funding Need and Methodology

CARB's methodology to estimate clean mobility investments funding demand builds on past analysis where feasible. Recommendations for projecting mobility project funding considers, but does not rely solely on, stakeholder feedback CARB has received and solicitation and funding window results. Demand for clean mobility investments continues to grow in communities and will grow further as outreach takes place in communities where additional investments are needed. CARB approaches are intended to refine methods of reaching unique community needs with incremental increases in demand over time with the goal of getting closer to reaching as many low-income and disadvantaged communities as possible. Incremental increases in demand vary by program based on their current status (new or existing investment), scope, reach of current investments, and desired approaches to further increase clean mobility access. The funding methodology also considers the SB 350 Guidance Document where the goal was to increase access to clean mobility for 100 percent of low-income and disadvantaged communities statewide. Staff realizes this is an ambitious goal but is an important consideration for long-term plan development and focusing investments on equity outcomes and needs over the next 20 to 30 years.

CARB engaged stakeholders through the long-term plan development process specific to what methodology should be used to measure clean mobility investment funding demand. This year, CARB did not receive feedback to inform changes to how staff approached estimating funding demand for the purposes of this long-term plan. Previous input was that CARB should strive for a certain number of projects statewide within a certain timeframe. CARB leveraged this feedback to estimate the demand for the number of projects on a program-by-program basis.

Stakeholders have pointed CARB to results of grant solicitations and funding windows as a key indicator of mobility program funding demand. More recent solicitation and funding window results for the CMO Voucher Pilot Program, CMiS, and STEP provide a data point into potential demand, but this data alone likely underestimates total statewide demand for funding to build more sustainable communities and support a more connected, clean, and safe transportation system. For example, the first CMO Voucher Pilot Program application window closed within minutes of opening, so this is not a robust method to assess the total demand for project funding as there were likely many more that would have applied if funding remained available. Funding requested does not reflect the full scope of communities who may have been interested in applying for funding, nor represent the complexity of projects and barriers they are working to address. CARB has learned over the last few years that more communities need to be aware of clean mobility programs and require technical assistance to apply for and successfully implement a project. For example, limited access to the internet or computers, and language barriers may need to be better addressed.

Table C-29 provides the historical funding amounts requested for each project solicitation or funding window to provide part of the picture of overall clean mobility investment demand. The goal is to provide transparency as well as historical context for decision making as investments have been adapted over time. More funding was requested than available in each funding category. For example, this provides a general overview of the number of projects requested versus the historical allocation and funding awarded. Historical funding requested for projects is not the only basis for projecting three-year mobility investment funding demand since CARB can only partially measure the historical demand. CARB staff builds our understanding of overall program interest and where dedicated outreach and education could take place to increase mobility program participation from other sources, including direct interaction with grantees, stakeholders, and community surveys.

Table C-29: Funding Demand from Previous Clean Mobility Investment Solicitationsor Funding Windows

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Program	Funding Requested in Solicitation/Funding Window	Funding Previously Allocated			
Legacy Mobility Projects (2 solicitations)	~\$38M for 28 projects	\$17.9M for 6 projects			
CMO Voucher Pilot Program*	~\$30M for 30 mobility projects ~\$1.9M for needs assessments	\$20M for 20 mobility projects** \$1.15M for 24 needs assessments			
CMiS	~\$55M for 7 projects	\$34.6M for 4 projects			
STEP	~\$101.7M for 14 implementation projects ~\$7.2M for 20 planning projects	\$42.8M for 5 implementation projects \$1.7M for 8 planning projects			
Totals	~\$234M	\$138M			

* \$47M total in CARB funds has been allocated to this project. In addition to the \$21.15 million in current funded projects, \$21 million will be available for CMO in late 2022 or early 2023, with \$8 million in funding coming from the California Energy Commission.

** Funding window for Clean Mobility Options was only opened for 24 hours due to high demand and limited funding. Many more communities had participated in the technical assistance efforts but were not able to apply. CARB expected funding to be available for a longer period before launching.

Clean mobility investments have demonstrated equal importance across each of the projects listed in the table above, consistent interest, and increased demand which has been reinforced through public comments in the Funding Plan process. Differences in project design such as CMO Voucher Pilot Program being a first-come, first-served project and CMiS and STEP having competitive solicitations reiterates the importance of adopting a more comprehensive methodology for measuring funding demand beyond solicitation and funding window demand. CARB has learned that some potential applicants are deterred from spending precious resources on a very competitive solicitation process that does not guarantee funding. This increases the importance of streamlining the application process and simplifying requirements to the extent feasible.

Awareness of these projects has increased over time as implementation has picked up and investments address multiple community needs, such as clean mobility services in the CMO Voucher Pilot Program and STEP community greening projects. Even so, there continues to be a need for more dedicated outreach and awareness building for communities, especially those in African American, Asian American, and other communities of color, as well as tribal government and rural areas to be able to apply for incentive funding. CARB realizes there has been an underinvestment in these areas or that not all members of the communities these projects are intended to serve have been able to participate and reap the benefits of increased clean mobility access. CARB anticipates demand projections in this Appendix will take into account the desire for building community capacity and providing dedicated outreach resources over the next three fiscal years and beyond.

Adapted Methods of Measuring Demand

CARB's continued goal is to refine data collection and build a more robust understanding of clean mobility investment needs. Thus, to determine funding demand for this year's Funding Plan process, CARB has reviewed lessons learned from multiple years of project implementation and where there are critical challenges that need to be addressed through further funding support. CARB's primary focus in this year's three-year funding demand projection process is program-level funding demand analysis.

This analysis focuses on the specific needs of clean mobility projects based on program design and lessons learned in implementation, new solicitation periods and funding windows etc., as well as funding demand based on the number of projects CARB projects are needed to fill critical gaps in access for priority populations. All programs assume incremental increase in funding demand over the next three years as communities become more familiar with programs and Planning and Capacity Building ramps up to help with applications and implementation of mobility projects through dedicated technical assistance resources. Staff will update funding demand estimates annually through a public process, allowing the opportunity to incorporate new information and further refine program-level estimates over time.

Projection Considerations

Specific considerations CARB made when analyzing clean mobility investments and projected funding needed include:

- Staff lessons from implementing clean mobility projects, including feedback received during the solicitation and funding window process and during program and from technical assistance providers or other partners.
- Ongoing feedback from a wide network of grantees, subgrantees, and users of these projects.
- Overall increasing demand and program uptake over time.
- Community-identified needs, including those not currently covered within the scope of existing programs or requiring additional technical assistance and capacity building support.
- Variability in design (e.g., first-come, first-served versus competitive solicitation) that impacts measuring historical program uptake and future measurement of funding demand.
- Community sustainability goals to allow for funding to better support long-term community benefits and access to multiple clean mobility options to meet the most critical needs.

One of the most common requests CARB has received through the public process is for multi-year funding and additional certainty of access to resources upfront before

projects are implemented in communities. There is a desire to help support projects for longer periods of time to maximize benefits and put them into position to become financially sustainable without CARB funding. This has been a critical barrier identified including through the SB 350 Guidance Document process and project implementation. More consistent funding over a longer-term basis would enable project teams to hire additional resources, including to support more technical assistance, to guide communities through program applications and project implementation. Funding estimates are provided over a multi-year basis consistent with past long-term planning efforts. SB 350 Guidance Document findings of barriers to clean mobility access and community needs provided a good foundation for better understanding the role CARB can play in increasing clean mobility investments in communities. CARB is continuing to refine the definition of community and what that means for filling critical gaps in making a more sustainable transportation system.

Statewide Clean Mobility Investments Gap Analysis

Based on preliminary review of total low-income, disadvantaged, and tribal community census tracts statewide and population based on Senate Bill 535 disadvantaged community and Assembly Bill 1550 low-income communities' designations, CARB is beginning to explore and identify clean mobility investment gaps. Thus far in data review, CARB found that while there are many census tracts that have clean mobility projects, communities want more to be done to address funding needs such as building awareness and benefiting broader populations through dedicated outreach. Data review and evaluation is something CARB will continue to explore in order to support future three-year funding demand projection efforts. CARB is working to identify areas where additional funding is needed and what funding we think it will take in order to meet community mobility needs. Current CARB analysis is provided below to show current project coverage by census tract and community designations as discussed through this year's long-term plan public process.



Figure C-13: Identifying Investment Gaps Based on Census Tracts and Community Designations

Geographic coverage of clean mobility investments may look broad based on this visual, but the number of projects and community residents that are benefitting from these projects is less. There are investment gaps which CARB is working to address. More investment is needed, even in census tracts that have received some investment.

CARB is working to increase the impact of investments by transitioning from pilots to community-based programs and providing more funding for clean mobility projects. This includes building community-level awareness and providing resources and funding from the time a community learns about clean mobility opportunities to where mobility funding is being used to launch mobility options. This is reflected in the incremental increase in estimated projects in communities over the next three fiscal years in the program-level funding demand projection analysis. In addition to more investment and expanded mobility services, there is a need for more dedicated outreach to build awareness of clean mobility investments and technical assistance to allow for more communities to apply for funding. In order to refine the methodology for clean mobility investment, in future years, CARB and our project partners will continue to review and identify the demographic composition of the populations that community investments are serving.

Over the next 3 fiscal years, CARB aims to get one step closer to bridging the statewide clean mobility investment funding gap with the goal of 100 percent of low-income, disadvantaged, and tribal communities served in the next 20 to 30 years.

Program-Level Funding Demand Analysis

Program-level analysis of funding demand is consistent with previous long-term planning efforts but considers additional program lessons on deeper community-identified needs raised through program outreach and engagement over time. Analysis includes projected funding needed for current projects, including Planning and Capacity Building, CMO Voucher Pilot Program, CMiS, and STEP.

These estimates take into consideration the variability of projects as well as where there is overlap or support provided such as planning and technical assistance. They also account for flexibility in order to overcome many unique barriers in clean mobility access, consistent with lessons learned while implementing programs and feedback received in the long-term plan public process. Estimates also consider where there is qualitative and quantitative data collected and other factors including scalability to other areas of the state and community sustainability to provide lasting benefits, and other factors. Demand overall is anticipated to increase over time as CARB works to align clean mobility investments. This could include utilizing the same terminology, definitions, and requirements of applicants and grantees (where it makes sense and still meets the goals of the program) and streamlining processes to increase the ability for communities to apply.

Rationale for estimates is described for each program in further detail below.

Planning and Capacity Building Three-Year Funding Demand Methodology

CARB has allocated funding to outreach, technical assistance, capacity building and workforce training and development in past funding plans. This includes a total of \$2 million for technical assistance and capacity building pilots implemented through Access Clean California. Planning and Capacity Building has been adapted based on the desire to streamline these investments. CARB is working to unify this funding stream and develop a more comprehensive framework for providing priority populations with technical assistance and capacity building resources.

The goal is to fund community-led planning and capacity building projects that build from lessons learned while implementing clean mobility programs and channel communities to the right incentive opportunities, as well as provide comprehensive technical assistance support tailored to community needs. The goal is to also focus on supporting communities through the design and development of community-driven projects that address a wide range of transportation barriers.

There are multiple planning and capacity building grant funding opportunities CARB has identified. Some examples include community transportation needs and equity assessments, clean transportation plan development and project planning, school-based electrification planning, and workforce development programs. These fall within the following specific categories of investment:

- Community and stakeholder engagement for new or existing clean transportation planning, operations, or infrastructure projects.
- Land use or transportation-focused plan development and sustainable community planning.
- Capacity building to implement new or enhance existing clean transportation planning, operations, or infrastructure projects.
- Workforce training and development.

In addition to mobility project support, the intent is for this funding to include dedicated technical assistance for application and implementation support of planning and capacity building projects as well as CMiS and STEP projects, given the needs already identified.

Funding projections assume providing adequate funding to support the estimated number of projects for the CMO Voucher Pilot Program, CMiS, and STEP. This considers broader community transportation needs assessment goals to reach more sustainable community and transportation system outcomes and increased program awareness and interest over time. Technical assistance funding staff anticipate will be needed is also included in the funding methodology, as described later in this Appendix. CARB anticipates the funding demand will increase as the number of STEP and CMiS projects increases.

This funding would allow CARB to build a flexible program, possibly with a statewide administrator, that reaches more localized community-identified needs. Funding estimates reflect staff's understanding of the potential uptake for these types of projects; interest expressed by stakeholders, including disadvantaged and low-income communities; and the projected scale of these projects.

Staff assumes that Planning and Capacity Building funding demand is a minimum of \$500,000 per project and a maximum of \$2 million per project consistent with other

state programs such as the Regional Climate Collaboratives Program administered by the California Strategic Growth Council. This considers feedback from stakeholders within existing programs that fund planning and capacity building that there are gaps in community awareness and getting projects ready to implement, as well as the time and resources needed being much higher as a result of lessons learned from program implementation. This could change depending on the funding mechanism, size and scale of mobility investments, and additional planning for community specific needs through the public process.

Staff assumes a funding demand for dedicated technical assistance for application support and project implementation of \$2 million in FY 2022-23 with a ramp up to \$4 million in FY 2023-24 once awareness grows for the program, and \$6 million in FY 2024-25 to address additional community-identified needs. This could support 1-4 communities in FY 2022-23, 2-8 communities in FY 2023-24, and 3-12 communities in FY 2024-25 based on a funding demand estimate of between \$500,000 to \$2 million per project.

As described earlier, the total estimated project demand is 57-66 projects in FY 2022-23, 67-80 projects in FY 2023-24, and 88-99 projects in FY 2024-24 for a range of 212-245 total project demand. Staff assume half of projects each fiscal year will have a funding demand of \$500,000 and half will have a funding demand of \$2 million to support a good mix of large and small projects. This results in \$290 million to \$340 million in total project funding demand.

If there are years where CMiS or STEP is not releasing a solicitation, Planning and Capacity Building funding would focus on preparing communities to access, apply for, and receive funding that advances clean mobility and equity goals in the next fiscal year.

Table C-30 provides Planning and Capacity Building three-year funding demand and the estimated number of projects this could support.

Table C-30: Planning and Capacity Building Three-Year Funding and PotentialProjects Supported, including Technical Assistance

Program	Potential Projects	Potential Projects	Potential Projects
	Supported	Supported	Supported
	FY 2022-23	FY 2023-24	FY 2024-25
CMO Voucher Pilot	40-45	45-50	50-55
Program			
CMiS	5-6	7-10	18-19
STEP	12-15	15-20	20-25
Total Potential Projects	57-66	67-80	88-99
Supported			
Estimated Funding	\$80-\$90	\$90-\$110	\$120-\$140
Demand (in millions)	Includes	Includes	Includes
Including Technical	\$2 million in	\$4 million in	\$6 million in
Assistance Support	technical	technical	technical
	assistance	assistance	assistance
Total Funding Demand			\$290-\$340
(in millions)			

*Estimated funding demand has been rounded to the nearest whole number for the purposes of this analysis.

Staff will observe the demand during additional stakeholder discussions and planned public process in late 2022. Staff assume based on existing project implementation that there will be a high volume of technical assistance needed and that more funding could be needed for future years to promote further planning and community capacity building.

CMO Voucher Pilot Program Three-Year Funding Demand Methodology

CARB has allocated \$55.2 million¹³¹ to the statewide CMO Voucher Pilot Program to date to improve underserved communities' access to clean mobility options that are safe, reliable, convenient, and affordable. This program had its first application window for community transportation needs assessments in June 2020 and mobility project vouchers opened in October 2020. Application window 2 is anticipated to

¹³¹ This includes \$8 million in funding contributed through CARB's partnership with the California Energy Commission and \$10 million in funding from Fiscal Year 2021-22 to amend the current grant agreement with CALSTART, Inc. which is underway.

open for needs assessments in late 2022 and for mobility project vouchers in early 2023.

Funding demand projections are based on improvements made to the CMO Voucher Pilot Program over time and increased interest in program technical assistance support and participation. For example, CARB has increased mobility project voucher amounts to allow for more comprehensive projects. Application window 2 mobility project voucher award amounts are being increased from \$1 million up to \$2.5 million with the goal of addressing significant rise in insurance costs, a rise in capital and operation costs, and supply chain constraints.

CARB assumes based on discussion in the long-term plan public process that there is continued funding demand for regional clean mobility projects, particularly to expand and support community sustainability. Since the new CMO Voucher Pilot Program implementation manual includes eligibility for existing regional project grantees to apply, this is an important consideration in three-year funding demand.

CARB assumes incremental growth in the demand for clean mobility project voucher funding each year based on increased program awareness and community capacity to apply for a total demand of 40-45 projects in FY 2022-23, 45-50 projects in FY 2023-24, and 50-55 projects in FY 2024-25. CARB also assumes dedicated resources for application and implementation technical assistance as part of overall project support. CARB assumes \$2.5 million voucher caps for FY 2022-23 and FY-2023-24 with an increase in award cap to \$5 million in FY 2024-25 to account for inflation, longer grant terms to support sustainability, and other increased costs that have been seen across almost all projects to date. CARB assumes up to 25 percent in implementation costs for the program administrator each fiscal year consistent with past demand analysis, which includes ongoing development of the Clean Mobility Equity Alliance. This results in \$460 million to \$510 million in total project funding demand. CARB assumes funding for community transportation needs assessments could be accommodated through Planning and Capacity Building.

Table C-31 provides CMO Voucher Pilot Program three-year funding demand estimates and the estimated number of projects this could support. This includes supporting existing projects through their grant term to promote sustainability.

Table C-31: CMO Voucher Pilot Program Three-Year Funding and PotentialProjects Supported

Fiscal Year (FY)	Funding Demand (In Millions)*	Potential Projects Supported
FY 2022-23	\$130-\$140	40-45 mobility projects
FY 2023-24	\$140-\$160	45-50 mobility projects
FY 2024-25	\$190-\$210*	50-55 mobility projects
Total	\$460-\$510**	135-150 mobility projects

*Funding demand has been rounded to the nearest whole number for the purposes of this analysis. **As mentioned, staff is estimating the costs of projects to increase over the next few years which results in increased funding demand in later years.

Staff will observe the demand during application window 2 and the technical assistance application window. If the project received high demand for funding and there is a high volume of technical assistance needed, staff may propose more funding for future years.

CMiS Three-Year Funding Demand Methodology

CARB has allocated \$34.6 million to CMiS to date to increase knowledge and adoption of zero-emission options within school communities. CARB is continuing to see investments and adoption of zero-emission options beyond the grant funding provided and anticipates more of this will continue in order to promote further financial and community sustainability of projects.

Funding projections are based on the number of school sites and what it would take to reach the school districts that are eligible to apply for CMiS funding. Staff continues to receive substantial interest from stakeholders who want the opportunity to transition to cleaner and active modes of transportation for students and staff. There are 10,615 public school sites in California. There are 2,493 school sites are in low-income and disadvantaged communities based on the latest available and verified CalEnviroScreen 3.0 data. This results in 326 possible school districts that would be eligible to apply for Clean Mobility in Schools projects¹³² where at least one school site in each school district is in a disadvantaged community. School site is defined for the purposes of this analysis as a as a school campus including elementary, secondary, middle, or high school campus. Staff assumes we can reach 10 percent of the possible 326 school districts eligible for CMiS projects over the next 3 fiscal years for a total of 33 projects based on the desire for incremental increase in projects over time. Staff assumes project implementation will ramp up over the 3 fiscal years as awareness

¹³² CARB staff utilized CalEnviroScreen 3.0 for this analysis. This data set was readily available and confirmed for quality. Staff will update analysis through the Funding Plan process and based on any changes due to CalEnviroScreen 4.0, if applicable.

increases and technical assistance is provided resulting in an estimated demand of 5-6 projects in FY 2022-23, 7-10 projects in FY 2023-24, and 18-19 projects in FY 2024-25.

Staff assumes a range for funding demand of \$7 million to \$10 million per project amount for greening a school district and promoting ongoing adoption of zero-emission transportation options based on lessons learned the last two years of project implementation. This results in \$231 million to \$330 million in total project funding demand. Staff assumes that technical assistance for CMiS will be supported through Planning and Capacity Building funding in FY 2023-24 and FY 2024-25. Staff is proposing to expand project eligibility to encompass more project types, such as active transportation infrastructure, that meet the transportation needs of public school districts and the surrounding community, which is supported by an increase in the number of projects each year. Estimates take into consideration the flexibility required in order to overcome barriers to clean transportation access in the most impacted school districts across the State, including additional outreach for school districts.

Staff will observe the demand during the next CMiS solicitation. If the project becomes oversubscribed and there is a high volume of funding requested, staff may propose more funding for future years to support more school districts statewide.

Table C-32 provides CMiS three-year funding demand estimates and the estimated number of projects this could support through their grant terms to promote sustainability.

Fiscal Year (FY)	Funding Demands (In Millions)*	Potential Projects Supported
FY 2022-23	\$40-\$50	5-6
FY 2023-24	\$70-\$100	7-10
FY 2024-25	\$130-\$180	18-19
Total	\$240-\$330	30-35 (approximately 10 percent of 326 possible school districts)

Table C-32: CMiS Three-Year Funding and Potential Projects Supported

*Funding demand has been rounded to the nearest whole number for the purposes of this analysis.

STEP Three-Year Funding Demand Methodology

CARB has allocated \$44.5 million for STEP to date to address community transportation needs and expanding access to key destinations while reducing vehicle miles traveled (VMT) and greenhouse gas emissions. Many STEP-funded mobility services are set to begin implementation in late 2022 and early 2023 which will result in additional lessons and evaluation of program benefits which will be critical to assess funding demand for future three-year planning efforts.

Funding projections consider the level of previous program demand and scale up the project over the next three years to bolster implementation of community-driven clean mobility projects. Staff continues to receive substantial interest from stakeholders in this pilot project and has received continued support for efforts to take a community-based approach to CARB's transportation and mobility investments.

CARB anticipates funding demand to be approximately 12-15 STEP Implementation Grant projects in FY 2022-23 based on demand during the first solicitation, which, with minimal outreach conducted, resulted in 14 Implementation Grant applicants. Like the CMO Voucher Pilot Project, CARB assumes incremental growth in the number of projects demanded each year based on both an increased readiness and awareness of communities to apply for funding (due in part to CARB's planning and capacity building investments) and an expected increase in outreach about STEP. This is expected to result in demand for a total of 15-20 projects in FY 2023-24 and 20-25 projects in FY 2024-25 and a total of \$400 million to \$510 million in total project funding demand. Staff assumes that technical assistance for STEP will be supported through Planning and Capacity Building funding in FY 2023-24 and FY 2024-25.

Funding estimates reflect staff's understanding of the potential uptake for these types of projects; interest expressed by stakeholders, including low-income and disadvantaged communities and tribal governments; a projected increase in demand based on expected changes in project criteria and outreach; and the projected scale of these projects. Staff expects interest in STEP to grow over time as community readiness to implement clean transportation projects and the need to reduce local VMT increases. Staff is also interested in increasing the availability of implementation grants over time to pilot implementation projects in different community contexts, accounting for diversity in community size, demographics, density, and geography, among other community characteristics.

Staff will observe the demand during the next STEP solicitation in early 2023. If the project becomes oversubscribed and there is a high volume of funding requested, staff may propose more funding for future years.

Table C-33 provides STEP three-year funding demand estimates and the estimated number of projects this could support through their grant terms to promote sustainability.

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Fiscal Year (FY)	Funding Demand (In Millions)*	Project Estimates (Implementation Grants)		
FY 22-23	\$100-\$130	12-15		
FY 23-24	\$130-\$170	15-20		
FY 24-25	\$170-\$210	20-25		
Total	\$400-\$510	47-60		

Table C-33: STEP	P Three-Year Fu	nding Demand	and Potential	Projects Supported

*Funding demand has been rounded to the nearest whole number for the purposes of this analysis.

Summary of Program-Level Funding Demand Analysis Outcomes

Table C-34 provides a summary of estimated three-year funding demand for all clean mobility investments based on program-level analysis. Total estimated funding demand of \$1.4 billion to \$1.7 billion is significant. This analysis is consistent with CARB expectations that funding demand far exceeds supply of resources available which will require that programs serve communities that are most burdened and increasing targeted outreach efforts to promote awareness where current uptake is low. As demand increases it will become even more important for longer-term funding to be made available to allow especially smaller, more overburdened communities to participate and receive the technical assistance and capacity building support needed to implement clean mobility projects. CARB continues to explore viable options that would allow for maintaining mobility programs beyond CARB seed funding provided.

Program	FY 22-23	FY 23-24	FY 24-25
Planning and Capacity Building (including technical assistance)	\$80-\$90	\$90-\$110	\$120-\$140
CMO Voucher Pilot Program	\$130-\$140	\$140-\$160	\$190-\$210
CMiS	\$40-\$50	\$70-\$100	\$130-\$180
STEP	\$100-\$130	\$130-\$170	\$170-\$210
Total per Fiscal Year	\$350-\$410	\$430-\$540	\$610-\$740
Total for Three Fiscal Years			\$1.4 Billion-
			\$1.7 Billion

Clean Mobility Investments Long-Term Funding Demand Conclusions

The demand for clean mobility investments in priority populations is high. Clean mobility investments will need to continue to support more sustainable communities and provide adequate access to mobility and associated health, economic, and social opportunities. These community driven investments are a part of the transportation planning ecosystem and are essential in meeting the State's air quality and climate goals.

CARB staff will continue to work with project administrators and stakeholders to collect critical data as it becomes available across programs, including from participants of mobility services, to refine three-year funding estimates for clean mobility investments. Lessons learned will be applied to our analysis to better understand the needs of communities and how to address them in a strategic way.

CARB anticipates that future funding needs will depend on the level of support and community capacity building that takes place, including direct technical assistance, to be able to participate in clean mobility programs. Additionally, outreach and education can be more focused and tailored to the communities who have not received funding and would benefit most from access to clean mobility investment. An essential part of this process will be to connect communities to the funding opportunities that meet the greatest community-identified needs, which goes beyond services such as car share to include other innovative approaches of micro-mobility. In addition, CARB will consider technological advancement, new challenges based on pandemic recovery and the economic downturn, the costs of inflation and what that means for increasing project caps, and complementary efforts in California and across the world.